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**Datasheet for the decision
of 2 March 2009**

Case Number: T 0189/05 - 3.2.04

Application Number: 99917970.8

Publication Number: 1071870

IPC: F02B 37/013

Language of the proceedings: EN

Title of invention:

Turbocharged internal combustion engine

Patentee:

3K-Warner Turbosystems GmbH

Opponent:

Honeywell International Inc.

Headword:

-

Relevant legal provisions:

EPC Art. 123(3)

Relevant legal provisions (EPC 1973):

EPC Art. 100(b),(c), 111

Keyword:

"Added subject-matter (no)"
"Sufficiency of disclosure (yes)"
"Remittal"

Decisions cited:

T 0731/03, T 0511/92, T 0312/94, T 0969/92

Catchword:

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Case Number: T 0189/05 - 3.2.04

D E C I S I O N
of the Technical Board of Appeal 3.2.04
of 2 March 2009

Appellant:
(Patent Proprietor)

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Representative:

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Respondent:
(Opponent)

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Decision under appeal:

**Decision of the Opposition Division of the
European Patent Office posted 3 February 2005
revoking European patent No. 1071870 pursuant
to Article 102(1) EPC.**

Composition of the Board:

Chairman: M. Ceyte
Members: M. Poock
C. Heath

Summary of Facts and Submissions

- I. This appeal is against the decision of the Opposition Division of 3 February 2005 in which European patent No. 1071870 was revoked.
- II. The Opposition Division held that the ground for opposition of Article 100(b) EPC prejudiced the maintenance of the patent because there was no support in the original disclosure of the feature in claim 1 that the flow shifts to the low pressure turbine at low load and to the high pressure turbine at high load independently of engine speed. In the original disclosure it was far from sure what the skilled person should do since the given instructions are uncertain at best and at worst conflicting.

Moreover, the requirements of Article 123(3) EPC were not met, because the feature that the exhaust gas mass flow may be distributed "optionally to the fresh air side of the engine" had been removed.

- III. The Patent Proprietor lodged the appeal on 9 February 2005 and paid the prescribed fee simultaneously. The statement of grounds of appeal was received on 13 June 2005.
- IV. Oral Proceedings took place on 2 March 2009.

The Appellant (Patent Proprietor) requested that the decision under appeal be set aside and that the patent be maintained according to the main request, as filed during the oral proceedings, or according to the

auxiliary request, as filed with letter of 13 June 2005.

The Respondent (Opponent) requested that the appeal be dismissed.

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

- "1. A turbocharged internal combustion engine (10) comprising
 - 1.1 a high-pressure turbine (21);
 - 1.2 a low-pressure turbine (31) arranged downstream of the high-pressure turbine (21);
 - 1.3 pipes (60, 61) connecting the inlet side of the high-pressure turbine (21) to the exhaust side (12) of the engine (10) and connecting the inlet side of the low-pressure turbine (31) to the outlet side of the high-pressure turbine (21);
 - 1.4 a bypass pipe (24, 24a, 24b) having a pipe switch (70, 71) and connecting the exhaust side (12) of the engine (10) to the inlet side of the low-pressure turbine (31);
 - 1.5 sensors for detecting operating parameters of the engine (10); and
 - 1.6 a central processing unit (CPU) fed with signals of the sensors for actuating the pipe switch (70, 71) in such a way that variable partial flows of the entire exhaust mass flow are distributed to the high-pressure turbine (21), to the low-pressure turbine (31), and optionally to the fresh air side of the engine (10),
 - 1.7 wherein a minimum exhaust mass flow always passes through the high-pressure turbine (21) so that it continuously rotates;

characterized in that

1.8 the CPU is adapted to actuate the pipe switch in such a way, that with high load of the engine (10) the expansion work is shifted to the high-pressure turbine (21) by closing the bypass pipe (24, 24a, 24b), and with low load of the engine (10) the expansion work is shifted to the low-pressure turbine (31), independently of the rotational speed of the engine (10) by opening the bypass pipe (24, 24a, 24b), for optimising both the stationary and the non-steady mode of operation of the engine (10) with a view to minimising fuel consumption and/or pollutant emission".

VI. The Appellant argued essentially as follows:

(a) Article 100(c) EPC

The subject-matter of claim 1 does not extend beyond the content of the application as filed. The features mentioned in the characterising portion of this claim and in particular the control modes and the precondition of a high load of the engine is at least implicitly disclosed for the person skilled in the art in the application as originally filed.

It is appreciated that the first sentence on page 3 does not refer to "high load" as claim 1, but to "corresponding load". However, the entire paragraph describes two opposite conditions of load change. Under increasing load (e.g. for acceleration), there is a shift in expansion work towards the high pressure turbine, and, consequently, for a drop in load, there is a shift in expansion work away from the high

pressure turbine and towards the low pressure turbine. Since it is clear that the condition for a shift to the low pressure turbine is a decrease in load, and since any stable and convergent control requires an opposite response to an opposite command, it is but logical that the condition for a shift to the high pressure turbine is increase in load, and that this must be meant by the expression "corresponding load". There is thus no other sensible way of understanding the teaching of the patent than the detection of an increasing or decreasing load change is meant with the terms "high load" and "low load" in claim 1. These terms describe relative but not absolute values.

The "corresponding load" is mentioned in the patent in connection with "increasing rotational speed". This is the most important and typical example of increasing load, both in a vehicle and in a stationary machine. While for a vehicle, speed may increase with no or a negative increase in load (when driving down hill), the skilled reader realises that this operating condition is of no importance in the control of a turbocharger system.

The first paragraph on page 3 does not prevent the reader from understanding that load which increases for reasons other than increasing speed (e.g. increasing wind load on a vehicle, increasing resistance on a stationery machine, uphill driving of a car) will cause a shift of the expansion work to the high-pressure turbine. Quite in contrast, this understanding is again supported by the second sentence in paragraph [0011] which says what happens under decreasing load.

As a result, claim 1 is supported by the application as filed originally.

(b) Article 100(b) EPC

The decision under appeal is based on the assumption that there was an irresolvable contradiction between the two sentences in paragraph [0011] of the patent.

This assumption, however, is not justified. It should be noted that the second sentence in this paragraph clearly teaches the shift of the expansion work to the low pressure turbine as a consequence of the load being low independently of speed, thus implying that load is the command or control variable of the control but speed is not. The author of the patent specification had in mind the depression of the accelerator pedal when he wrote "corresponding load and increasing rotational speed of the engine". He did not consider acceleration due to downhill driving or increasing tailwind because such conditions are of no concern in the control of a turbo system.

On the other hand, the first sentence in this paragraph does not say that a shift of the expansion work to the high pressure turbine is done independently of load. It rather relates to both load and speed. Since load and speed behave in different ways in certain situations (uphill/downhill driving), they cannot be both command variables of the control. The answer to the question which of them it is, is given in the second sentence.

As a result, the patent does disclose its subject-matter to the extent it is claimed, well enough to be carried out by a person skilled in the art.

VII. The Respondent argued essentially as follows:

(a) Article 100(c) EPC

The application as filed originally provides no basis for feature 1.8 in claim 1 and in particular for the control modes and "high load" defined as a precondition of the first mode where the expansion work should be shifted to the high-pressure turbine.

Two operational modes are disclosed in the application as originally filed. However, there is no indication that these are alternative modes. The first operational mode is described on page 3, lines 1 to 5 and the second operational mode is described in lines 5 to 11. Nothing in this or any other passage suggests that the modes are to be considered without any doubt as alternatives such that the first mode is necessarily understood as having exactly the opposite characteristics of the second mode. Thus, the assumption that in the first mode "corresponding load" is to be understood as "high load" is not supported by the application.

Moreover, there is neither a mention nor an explicit suggestion in the original description that the additional parameter of the "small exhaust mass flow" on page 3, lines 5 to 11 can be ignored for setting the control mode at low load.

It results from page 2, paragraph 3 and page 3, paragraph 1 that the control variables are engine load and engine rotational speed rather than only engine load.

(b) Article 100(b) EPC

The technical content and meaning of the terms "with high load" and "with low load" in claim 1 of the main request is unclear because the description of the patent gives conflicting meanings. Column 2, lines 22 to 30 appear to define the loads in terms of relative high and low loads (without clear reference to load changes). However in column 1, lines 47 to 51 it is stated that "the invention is based on the problem of providing an internal combustion engine [...] which responds to fast load and speed changes". Therefore, the skilled person does not know how to interpret claim 1.

Moreover the term "independently of the rotational speed of the engine" in this claim is unclear for similar reasons. From column 1, lines 47 to 51 and column 2, lines 16 to 19, it is clear that the shift responds to speed changes. Thus, there is no clear definition as to how the invention is supposed to work.

(c) Article 123(3) EPC

The replacement of the expression "load corresponding to increasing rotational speed of the engine" by the term "high load" leads to a larger scope of protection.

Reasons for the Decision

Since this European patent was already granted at the time of the entry into force of the EPC 2000 on 13 December 2007, the transitional provisions according to Article 7 of the Act revising the EPC of 29 November 2000 and the decisions of the Administrative Council of 28 June 2001 and of 7 December 2006 have been applied. When Articles or Rules of the version of the EPC 1973 are cited, the year is indicated.

1. The appeal is admissible.

2. *Amendments - Article 100(c) EPC 1973*

2.1 The characterising portion of claim 1 as filed originally has been amended to a high load and a low mode of operation, i.e. that "with high load of the engine (10) the expansion work is shifted to the high-pressure turbine (21) by closing the bypass channel (24, 24a, 24b), and with low load of the engine (10) the expansion work is shifted to the low-pressure turbine (1), independently of the rotational speed of the engine (10) by opening the bypass channel (24, 24a, 24b)".

Therefore, it has to be established whether the application as originally filed provides a basis for these amendments.

2.2 General remarks

2.2.1 From features 1.6 to 1.8 of claim 1 it follows that the pipe switch has not a single on/off characteristic but has variable opening degrees so that variable partial

flows of the entire exhaust mass flow can be distributed to the high-pressure turbine and to the low pressure turbine.

2.2.2 In accordance with the established case law of the Boards of Appeal, the relevant question to be decided in assessing whether the application as filed originally provides a basis for these amendments is whether they were directly and unambiguously derivable from it (see e.g. T 731/03, not published in OJ EPO), including information which for the skilled person is implicit in what is explicitly disclosed (see e.g. T 511/92 of 27 May 1993, point 2.2, not published in the Official Journal of the EPO), i.e. it is, for the skilled person, a clear and unambiguous consequence of what is explicitly mentioned.

2.3 On page 3, paragraph 1 it is stated that with "corresponding load and increasing rotational speed of the engine a fast response of the high-pressure turbine is thus ensured in that the expansion work is shifted in the direction of the high pressure turbine, i.e. through extensive closure of the bypass channel by means of the bypass switch the largest portion of the exhaust flow is set to the high pressure turbine. If, at low load and with small exhaust mass flows, [...] the expansion work of the exhaust can for the greater part take place in the low pressure turbine and possibly by appropriate positioning of the pipe switch via the exhaust return, independently of the rotational speed of the engine by opening the bypass channel".

2.3.1 Low load mode of operation

- (a) The first sentence in this paragraph teaches when read in view of the drawings, e.g. figure 1, that by closing the bypass channel, the expansion work is shifted in the direction of the high pressure turbine.

On the other hand, in the second sentence of this paragraph it is stated that by opening the bypass channel, the expansion work of the exhaust for the greater part can take place in the low pressure turbine.

Thus, the skilled person derives as a clear and unambiguous consequence of what is explicitly mentioned that at low load and with small exhaust mass flows, the expansion work is shifted to the low pressure turbine.

- (b) The characterising portion of claim 1 recites the low load mode of operation but does not mention the term "with small exhaust mass flows".

Nevertheless, it was not necessary to be recited because feature 1.7 requires a minimum exhaust mass flow which always passes through the high pressure turbine so that it continuously rotates. This is applicable for every mode of operation, i.e. also at low loads.

Therefore the cited passage from the application provides a clear basis for the amendment to the low load mode of operation of the engine.

2.3.2 High load mode of operation

- (a) The first sentence on page 3, mentions a "corresponding load" but does not specify where to the load corresponds. Hence, this term is unclear in this context.
 - (i) For understanding the meaning of terms in a patent document, the person skilled in the art does not consider the terms in isolation from the remainder of the document, i.e. only in their literal meaning. On the contrary, the terms are considered in the context of the document as a whole (see e.g. T 312/94, T 969/92, neither published in the OJ EPO).
 - (ii) The term "corresponding load" relates to the mode of operation in which the expansion work is shifted to the high pressure turbine, such as at acceleration (see page 2, lines 13 to 15), in contrast to the "low load" mode in which the expansion work is shifted to the low pressure turbine recited in the second sentence on page 3.
 - (iii) Thus, the Board concludes that the skilled person understands the term "corresponding load" in the meaning of a high load, i.e. a relative load higher than the low load.
- (b) The first sentence on page 3 also states that the expansion work is shifted in the direction of the

high pressure turbine with "corresponding load and increasing rotational speed of the engine".

- (i) According to the problem mentioned on page 2, lines 10 to 15, the engine should respond to fast load and speed changes without unsteady acceleration and braking power response. However, as a matter of fact, the engine rotational speed is directly linked to its acceleration. Fast speed changes cause inevitably unsteady acceleration. Hence, this statement is unclear.

Since the skilled person reads the information contained in the application in view of his common general knowledge, the Board is convinced that he will recognise this inconsistency and learn from page 3, lines 5-11 that the control variable can only be the engine load rather than the engine load and the engine rotational speed. Moreover, he will understand that the correct problem implies that the engine should respond only to fast load changes without unsteady acceleration and braking power response, and that the exhaust mass flow is shifted in the direction of the high-pressure turbine only with a high load of the engine.

- (ii) These findings are also supported by the following considerations:

If the expansion work was shifted in the direction of the high pressure turbine only with corresponding load (i.e. a load higher than the low load) and increasing rotational speed of the engine, this would result in an unsatisfactory engine performance when it is particularly needed. For instance, frequently engines are operated at high load but with (constant or) decreasing rotational speed, e.g. driving a car uphill without acceleration. In such a situation, the high-pressure turbine would almost completely be bypassed, resulting in a lower performance than the one that can be achieved when both turbines are active.

(c) In view of the foregoing, the Board concludes that the cited passage from the application provides a clear basis for the amendment to the high load mode of the engine.

2.4 The characterising features of claim 1 therefore do not extend beyond the content of the application as filed originally.

3. *Sufficiency of disclosure - Article 100(b) EPC 1973*

3.1 According to the established case law of the Boards of Appeal, an invention is in principle sufficiently disclosed if at least one way is clearly indicated enabling the skilled person to carry out the invention (e.g. T 292/85, OJ EPO 1989, 275).

3.2 As stated above, the skilled person will understand the term "corresponding load" as a relative load, i.e. a load higher than the low load and that the control variable can only be the engine load rather than engine load and engine rotational speed.

3.3 Since the cited passages in the application as originally filed are identical to those in the patent specification, see in particular paragraphs [0007], [0011], the Board has no doubts that the skilled person can put the engine into practice with the information given in the patent, and in particular to adapt the CPU such that the pipe switch is activated in the manner described in feature 1.8 of the characterising portion of claim 1.

4. *Extent of protection - Article 123(3) EPC*

4.1 This Article stipulates that the patent may not be amended in such a way as to extend the protection it confers.

4.2 Since the term "high load" was already present in the granted claim 1, it does not relate to an amendment which extends the protection of the patent as argued by the Respondent.

4.3 Since the feature that the exhaust gas mass flow may be distributed "optionally to the fresh air side of the engine" has been reintroduced (see feature 1.6), the objection of the Opposition Division on this ground does not apply any more.

5. *Remittal*

Since proceedings before the Boards of Appeal are primarily concerned with the examination of the contested decision, remittal of the case to the Opposition Division in accordance with Article 111(1) EPC 1973 is normally considered by the Boards in cases where the Opposition Division issued a decision solely upon a particular issue and left other substantive issues undecided.

In the present case, the Opposition Division had decided on the extension of the protection conferred and on sufficiency of disclosure, but not on the patentability of the claimed subject-matter.

Since the grounds on which the decision of the Opposition Division rests do not apply any longer, the Board finds it appropriate to remit the case to the first instance for consideration of the undecided issues. In this respect, it should be observed that paragraph [0014] of the patent specification has to be amended, i.e. deleted, because it contradicts claim 1 in the present form. Moreover, in feature 1.3 of claim 1 "inlet side the low-pressure turbine" should be amended to "inlet side of the low-pressure turbine".

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.
2. The case is remitted to the department of first instance for further prosecution.

The Registrar:

The Chairman:

M. Schalow

M. Ceyte