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**Datasheet for the decision  
of 2 March 2012**

**Case Number:** T 0153/11 - 3.2.04  
**Application Number:** 01118251.6  
**Publication Number:** 1178192  
**IPC:** F02B 37/24, F02D 35/00,  
F02D 21/08  
**Language of the proceedings:** EN

**Title of invention:**

Apparatus for controlling supercharging pressure in internal combustion engine

**Applicant:**

Kabushiki Kaisha Toyota Jidoshokki  
Toyota Jidosha Kabushiki Kaisha

**Headword:**

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**Relevant legal provisions:**

EPC Art. 54

**Keyword:**

"Novelty (yes - main request)"

**Decisions cited:**

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**Catchword:**

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Case Number: T 0153/11 - 3.2.04

**D E C I S I O N**  
of the Technical Board of Appeal 3.2.04  
of 2 March 2012

**Appellant I:**  
(Applicant 1)

Kabushiki Kaisha Toyota Jidoshokki  
2-1, Toyoda-cho  
Kariya-shi  
Aichi-ken (JP)

**Representative:**

Vollnhals, Aurel  
TBK  
Bavariaring 4-6  
D-80336 München (DE)

**Appellant II:**  
(Applicant 2)

Toyota Jidosha Kabushiki Kaisha  
1, Toyota-cho  
Toyota-shi, Aichi-ken, 471-8571 (JP)

**Representative:**

Vollnhals, Aurel  
TBK  
Bavariaring 4-6  
D-80336 München (DE)

**Decision under appeal:**

Decision of the Examining Division of the  
European Patent Office posted 1 September 2010  
refusing European patent application  
No. 01118251.6 pursuant to Article 97(2) EPC.

**Composition of the Board:**

**Chairman:** M. Poock  
**Members:** A. de Vries  
C. Heath

## Summary of Facts and Submissions

I. The Appellant lodged an appeal, received 11 November 2010, against the decision of the Examining Division posted 1 September 2010, refusing the European patent application No. 01 118 251.6 and simultaneously paid the required fee. The statement of the grounds of appeal was received 21 December 2010.

In the appealed decision the Examining Division held that the application did not meet the requirements of Article 52(1) in combination with Article 54 for lack of novelty of the claimed subject-matter having regard to the following document:

D1: EP-A-0 965 740

II. With letter of 19 January 2012 the Appellant filed an amended claim 1 in reply to comments made by the Rapporteur on behalf of the Board in a telephone conversation on 16 November 2011 and agreed with a remittal for further prosecution. With letter of 7 February 2012 he clarified that this amended claim is to replace claim 1 of the main request as on file.

III. The Appellant requests that the decision under appeal be set aside and that a patent be granted on the basis of claims according to the new main request submitted with letter of 19 January 2012, or, in the alternative, claims of second and third auxiliary requests submitted with the statement of the grounds of appeal. He requested oral proceedings in the event the main request was not allowed.

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

"An apparatus for controlling supercharging pressure in an internal combustion engine, wherein the engine includes:

an exhaust passage (20);

a turbine (32) located in the exhaust passage (20), the turbine (32) having variable position vanes (36) which open and close to change the flow rate of an exhaust gas through the turbine, wherein the exhaust gas applies a driving torque to the turbine (32);

an intake passage (22);

a compressor (34) located in the intake passage (22), the compressor (34) supplying air to the internal combustion engine depending on the driving torque of the turbine (32);

a recirculating passage (24) connecting the exhaust passage (20) and the intake passage (22) to each other to recirculate exhaust gas from the exhaust passage (20) to the intake passage (22); and

an EGR control valve (50) located in the recirculating passage (24), wherein the position of the EGR control valve (50) is varied to adjust the quantity of exhaust gas passing through the recirculating passage (24);

wherein the position of the variable vanes (36) is controlled according to the position of the EGR control valve (50) by setting a limit value (Va) for the position of the variable vanes (36) when the vanes are being closed to limit the operational range of the variable vanes (36) depending on the degree of opening of the EGR control valve (50), thereby preventing an excessive amount of exhaust gas from flowing into the recirculating passage (24)".

## Reasons for the Decision

1. The appeal is admissible.
2. *Background*

The invention is concerned with a variable displacement turbo-charger which has an exhaust gas driven turbine with adjustable vanes driving a compressor in the intake. Exhaust gas is re-circulated into the intake via a so-called exhaust gas recirculation or EGR control valve. According to the claimed invention, adjustment of the turbine vanes is controlled according to EGR control valve position. In particular, a limit value is set for the position of the vanes when they are being closed to limit their operational range depending on the degree of opening of the EGR valve. This ensures that the vanes are kept sufficiently open by a degree that depends on the EGR control valve. A build up of pressure differential across the valve which would result in excessive recirculation and smoke in the exhaust, see the paragraph bridging description pages 2 and 3, is thus avoided.

3. *Amendments*

Claim 1 of the main request adds to claim 1 as filed the features of dependent claim 2 as filed and incorporates detail from the description. This detail qualifies or clarifies the effect of the limit on the operational range of the vanes and how it results in prevention of an excessive recirculation of exhaust

gases. It derives from page 15, lines 18-19 and 23-25, of the description as filed, read in conjunction with page 12, lines 31 to 32 (referring to "degree of opening" of the EGR valve) and page 13, lines 21 to 22 (with the limit defined in the direction of closing of the valve).

The amendments have a clear basis in the application as filed, and are in compliance with Article 123(2) EPC.

#### 4. *Novelty*

- 4.1 The decision under appeal argues lack of novelty over D1. This document, see figure 1, relates to the same type of variable displacement turbocharger with valve controlled exhaust gas recirculation as the application. Here the variable displacement turbo-charger is controlled in response to corrections in the EGR rate of the EGR control system, see abstract and figure 8, between blocks 103 and 106. In more detail, see figures 6 and 7, vane control signal LADUTY is determined according to different schemes (either following step S45 in figure 6, or one of steps S50, S51 in figure 7) for different engine operating states. It is always derived from a duty signal DUTB2, which depends on EGR valve position via control and corrections signals MEGRM, KEGR1, VNEGR2, see figure 5, but has different offsets or none depending on operation state. Figure 6, step S45, shows a downward correction by DUTDT for heavy acceleration, where the turbocharger tends to run too fast, to effectively open up the vanes and so slow the turbine down, column 19, lines 12 to 16, reducing boost pressure in the intake, column 7, lines 47 to 49, and thus back-pressure in the exhaust passage. This

effect is similar to that in the present application, see above, and is achieved by the valve position dependency of the vane control signal LADUTY. In that they produce the same or similar effect and both involve valve position dependency the two approaches can be said to be "comparable", as argued in the decision under appeal.

- 4.2 However, it is not enough that functions or effects are "comparable", the same or similar to demonstrate lack of novelty. Rather, the prior art must also achieve these functions and effects *in the same way* as the claimed invention, and, applying the generally accepted standard for assessing novelty, this must be derivable *clearly and unambiguously* from D1. That is not the case in the present appeal. In D1 the vane control signal LADUTY depends on the EGR valve position as well as on other variables. Vane position thus varies with EGR valve position among others across some range. The limits of that range and how they might correlate with the EGR valve position are entirely unknown, let alone that it can assumed conclusively and with certainty that the limit value in the direction of opening depends on the EGR valve position. This indeed need not be so. Nor can the correction of LADUTY by an offset be regarded in any way as a limitation in this particular sense, namely that of the limit value required by claim 1. This particular feature of the valve control, which represents the "core" or "essence" of the claimed invention is thus not clearly and unambiguously disclosed in D1. The subject-matter of claim 1 of the main request is thus novel over D1.

4.3 The above feature is also not directly and unambiguously derivable from any of the other prior art cited in the search report. Briefly, in prior right document EP-A-1 031 719 the turbo vane signal *Aturbr* is based on the EGR valve opening value *Aevr*, see figures 15, 20 and 21 and paragraphs [0149] and [0111]. A similar approach is taken in JP-A-2000002120. In US-A-6 076 353 vane and valve position control signals are each calculated from intake pressure and mass airflow, while in JP-A-2000170580 the two are controlled so that the supercharge pressure and fresh air intake increase or decrease together. There is no mention in these documents, explicitly or otherwise, of limiting the operation range of the vane depending on the opening degree of valve.

4.4 The Board can but conclude that the apparatus of claim 1 is novel over the prior art as required by Article 52(1) in combination with Article 54 EPC.

5. *Remittal*

The decision under appeal concerned only the issue of novelty, and did not consider any of the further requirements of the EPC, in particular that of inventive step. So as not to deprive the Appellant of a first instance consideration of these remaining, substantive requirements, the Board considers it appropriate to exercise its discretion under Article 111(1) EPC to remit the case for further prosecution on the basis of the set of claims of the main request. The Appellant has stated his agreement with this course of action.



**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

G. Magouliotis

M. Poock