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**Datasheet for the decision
of 5 April 2007**

Case Number: W 0023/06 - 3.2.04

Application Number: PCT/IB 2005/003885

Publication Number: WO 2006/070259

IPC: F02D 41/40, F02D 41/06,
F02D 41/04

Language of the proceedings: EN

Title of invention:
Fuel injection control apparatus and method for direct
injection internal combustion engine

Applicant:
Toyota Jidosha Kabushiki Kaisha

Opponent:
-

Headword:
-

Relevant legal provisions:
PCT Art. 16, 17(3)(a)
PCT R. 13.1, 13.2, 40.1, 40.2(c), 40.2(e)

Keyword:
"Invitation to pay additional fees sufficiently reasoned
(yes)"
"Clear case in the meaning of G 0001/89 (no) - protest
justified (yes)"

Decisions cited:
G 0001/89, W 0004/85, W0011/89, W 0003/93, W 0004/94

Catchword:
-



Case Number: W 0023/06 - 3.2.04

International Application No. PCT/IB 2005/003885

D E C I S I O N
of the Technical Board of Appeal 3.2.04
of 5 April 2007

Applicant: TOYOTA JIDOSHA KABUSHIKI KAISHA
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Decision under appeal: Protest according to Rule 40.2(c) of the Patent Cooperation Treaty made by the applicants against the invitation of the European Patent Office (International Preliminary Examining Authority) to restrict the claims or pay additional fees dated 13 April 2006.

Composition of the Board:

Chairman: M. Ceyte
Members: C. Scheibling
S. Hoffmann

Summary of Facts and Submissions

- I. International patent application No. PCT/IB2005/003885 was filed with 18 claims, including 6 independent claims, relating to fuel injection control apparatuses and to corresponding fuel injection control methods.
- II. The European Patent Office (EPO), acting in its capacity as an International Searching Authority (ISA) under Article 16 PCT and 154 EPC, informed the applicant that the application did not comply with the requirement of unity of invention (Rule 13.1 PCT) and invited the applicant to pay fees for two additional inventions, in accordance with Article 17(3)(a) and Rule 40.1 PCT.

In the invitation the ISA listed the following groups of claims, each held to relate to a different invention:

1. claims: 1-6, 16
A fuel injection control apparatus for a direct injection internal combustion engine, which, when the engine is cold, switches a fuel injection mode between a batch injection in which the fuel is injected once at the end of a compression stroke and a split injection in which the fuel is injected at a plurality of timings including at least at the end of the compression stroke.
2. claims: 7-9, 17
A fuel injection control apparatus for a direct injection internal combustion engine, which, when the engine is cold, switches a fuel injection mode

between a batch injection in which the fuel is injected once during intake stroke and a split injection in which the fuel is injected at a plurality of timings during intake stroke.

3. claims: 10-15, 18

A fuel injection control apparatus for a direct injection internal combustion engine, wherein when increase-correcting a fuel injection quantity set based on an engine operating stage, from after the engine start-up until a predetermined period of time has passed, the fuel injection mode is set to a first injection mode in which the fuel increase amount for the split injection is set larger than the fuel increase amount for the batch injection, and then the fuel injection mode is set to a second injection mode in which the fuel increase amount for the batch injection is set larger than the fuel increase amount for the split injection.

The invitation then essentially stated that the common technical aspect (a fuel injection control apparatus for a direct injection internal combustion engine, which, when the engine is cold, switches a fuel injection mode between a batch injection and a split injection, the fuel injection control apparatus comprising increase correction means for setting a fuel increase amount larger for the split injection than for the batch injection) was known and was not considered to be the special technical feature of the invention.

III. The applicant paid the additional fees under protest (Rule 40.2(c) PCT) and contested the findings of the ISA.

He argued that the subject-matter of the three independent claims were linked by the single concept that, if the fuel injection amount is increased when the engine is cold, the fuel increase amount is differently set for a batch injection and a split injection depending on the amount of fuel contributing to combustion in each specific mode.

The applicant duly paid the protest fee.

Reasons for the Decision

1. The Board is competent to decide on the present pursuant to Article 154(3) EPC in conjunction with Rule 40.2(c) PCT, second sentence. The protest complies with the requirements of Rule 40.2(c) and (e) PCT and is therefore admissible.

2. *General approach to the examination of unity*
 - 2.1 Rule 13.1 PCT states that that the requirement for unity of invention is that the international application shall relate to one invention only or to a group of inventions so linked as to form a "single general inventive concept."

 - 2.2 Rule 13.2 PCT stipulates that the requirement of unity of invention is fulfilled only when there is a "technical relationship" among the claimed inventions involving one or more of the same or corresponding "special technical features." The term "special technical features" is defined as "those technical features that define a contribution which each of the

claimed inventions, considered as a whole, makes over the prior art."

2.3 The PCT International Search Guidelines as in force from 25 March 2004 state at point 10.01 that the basic criterion for unity of invention is the presence of a single general inventive concept. With respect to a group of inventions, unity of invention exists only when there is a technical relationship among the claimed inventions involving one or more of the same or corresponding special technical features, i.e. those technical features that define the contribution which each of the inventions, considered as a whole, makes over the prior art.

2.4 Whether or not any particular feature makes a "contribution" over the prior art, and therefore constitutes a "special technical features" is considered with respect to novelty and inventive step (point 10.02 of the Guidelines).

3. *The ISA's Approach to the examination of unity*

3.1 As far as the present case is concerned, the Board first notes that the PCT International Search Guidelines state at point 10.03 that lack of unity of invention may be directly evident "a priori," that is, before considering the claims in relation to any prior art, or may only become apparent "a posteriori," that is, after taking the prior art into consideration.

At point 10.63, the Guidelines also state that the ISA should set out a logically presented, technical reasoning containing the basic considerations behind the finding of lack of unity.

3.2 In its invitation to pay additional fees, the ISA argued in essence that there were no common "special technical features", because all common features were known from the prior art. It is thus apparent that the ISA's objection to unity was "a posteriori". The invitation then essentially listed the group of claims, identified the features that the independent claims have in common.

4. *Substantiation of the invitation*

4.1 Rule 40.1 PCT requires that the invitation to pay additional fees must specify the reasons why the application is not considered to comply with the requirement of unity of invention.

4.2 Decision W 4/85 (OJ EPO 1987, 63, point 3) explained that the purpose of this provision was to enable the applicant and appeal body to examine whether the invitation was justified. This required that the basic considerations behind the finding must be set out in a logical sequence. A mere list of the subject-matter of the claims was only adequate in straightforward cases.

This was further defined in W 11/89 (OJ EPO 1993, 225, point 4.1) as requiring, except in straightforward cases, a reasoning why there was no technical connection or interaction between the separate inventions. This in turn required addressing the problems underlying the inventions.

Decision W 4/94 (OJ EPO 1996, 73, point 4.1) maintained a pragmatic approach when it stated that the obligation

to provide justification in the invitation was not infringed if the prime reason for the decision was identifiable, even though the reasons could be seen as insufficient or incorrect.

- 4.3 In the present case, although as mentioned in paragraph 3.2 above, the ISA's invitation contained in essence only the indication that the common features were already known, with no explicit discussion of why there was no single general inventive concept, i.e. not addressing the problems underlying the different inventions, nevertheless the Board judges that the ISA's invitation does comply with the requirements of Rule 40.1 PCT because the invitation specifies that no special technical features have been identified, which is a reason for lack of unity, which the applicant could understand and answer in the protest.

5. *Examination of the current protest*

- 5.1 The ISA held that the application comprises three groups of inventions, a first group comprising claims 1 to 6 and 16, a second group comprising claims 7 to 9 and 17, and a third group comprising claims 10 to 15 and 18.

In its invitation, the ISA considered that the technical features that the groups of invention have in common, are the following "a fuel injection control apparatus for a direct injection internal combustion engine, which, when the engine is cold, switches a fuel injection mode between a batch injection and a split injection, the fuel injection control apparatus comprising increase correction means for setting a fuel

increase amount larger for the split injection than for the batch injection" and that said features were already known from the prior art.

As it becomes clear from the partial international search report annexed to the ISA's invitation, these technical features were held to be already known from D1: EP-A-1 077 321 as well as from D2: EP-A-1 035 315.

5.2 In G 1/89 (OJ EPO 1991, 155) the Enlarged Board held at point 8.2 that the charging of additional fees under Article 17(3)(a) PCT should be made only in "clear cases", in particular, where a posteriori objections were concerned. This means that the common concept has to be prima facie not novel or not inventive.

5.3 D1 states "Specifically, if the catalyst 22 is not warmed up yet when the engine 1 is started while it is cold, the exhaust gas temperature is increased by executing the primary injection splitting control to increase the temperature of the catalyst 22" (column 10, lines 37 to 41) and "if the catalyst 22 is in a low-temperature state and needs to be warmed up, ... , the primary injection control is first executed ..." (column 15, lines 52 to 57). It is further indicated that "if the engine 1 is in the usual operating condition, the basic fuel injection amount Q_{base} is sprayed all at once..."

Thus, when it is necessary to increase the exhaust gas temperature (when the engine is cold) D1 discloses to switch to a split injection mode in which the amount of injected fuel is increased. There is no clear reference in D1 to using the batch injection mode when the engine

is cold or to increasing the amount of injected fuel in this case. Thus, D1 does not clearly disclose correcting means for modifying the fuel increase amount Q_c , such that it is different for a split injection than for a batch injection.

Likewise D2 teaches to implement primary fuel injection through a split fuel injection mode when the catalyst is inactive due to a cold start of the engine (see paragraph [0013]), and to rise exhaust gas temperature by increasing the amount of fuel injected by an amount Q_c (column 7, lines 13 to 16). D2 does neither clearly disclose to implement a batch injection mode when the engine is cold, nor to modifying the computed additional amount of fuel Q_c according to the selected injection mode.

5.4 Thus, neither D1 nor D2 clearly disclose the following features with respect to:

- claim 1: "comprising increase correcting means for setting a fuel increase amount larger for the split injection than for the batch injection when increase-correcting a fuel injection quantity set based on an engine operating state."

- claim 7: "comprising increase correcting means for setting a fuel increase amount larger for the batch injection than for the split injection when increase-correcting a fuel injection quantity set based on an engine operating state."

- claim 10: "when increase-correcting a fuel injection quantity set based on an engine operating state, from

after engine start-up until a predetermined period of time has passed, the fuel injection mode is set to a first injection mode in which the fuel increase amount for the split injection is set larger than the fuel increase amount for the batch injection, and then the fuel injection mode is set to a second injection mode in which the a fuel increase amount for the batch injection is set larger than the fuel increase amount for the split injection."

Consequently, these features are special technical features which define the contribution that each of the claimed inventions makes over the prior art.

- 5.5 The applicant argued that the common concept of the invention is that, if the fuel injection amount is increased when the engine is cold, the fuel increase amount is differently set for a batch injection and for a split injection depending on the amount of fuel contributing to the combustion in each specific mode.
- 5.6 Indeed the afore mentioned special technical features have a technical relationship in that they all involve correction means for setting a fuel increase amount different for the split injection mode than for the batch injection mode based on an engine operating state.
- 5.7 In view of W 3/93 (OJ EPO 1994, 931), which states (point 4) that the Board cannot investigate ex officio whether an objection of lack of unity would have been justified for reasons other than those given in the invitation, the Board has to judge whether the retention of the search fees was justified, solely on the basis of the documents cited in the partial

international search. Therefore, D3: DE-A-102 05 494 which has been taken into consideration by the review body in its findings, but which has not been cited in the search report annexed to the ISA's invitation to pay additional fees, has not been taken into consideration in the present decision.

5.8 Consequently, the common inventive concept (see section 5.5, above) is not prima facie anticipated when taking the prior art cited in the partial international search into consideration and therefore, the protest is justified.

Order

For these reasons it is decided that:

1. The protest is justified
2. The refund of the two additional fees and the protest fee is ordered.

The Registrar:

The Chairman:

R. Schumacher

M. Ceyte