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Datasheet for the decision of 24 June 2008

Case Number: T 0063/06 - 3.2.04

Application Number: 94106058.4

Publication Number: 0621402

IPC: F02B 41/00

Language of the proceedings: EN

Title of invention:
Apparatus and method of fuel injection and ignition of internal combustion engine

Patentee:
Hitachi, Ltd.

Opponent:
DaimlerChrysler AG

Headword:
-

Relevant legal provisions:
-

Relevant legal provisions (EPC 1973):
EPC Art. 100(b), 111(2)

Keyword:
"Sufficiency of disclosure - no"
"Shifting of the burden of proof"

Decisions cited:
T 0226/85, T 0016/87, T 0182/89, T 0019/90, T 0665/90, T 0890/02, T 1014/02

Headnote:
The burden of proof generally lies upon an opponent to establish insufficiency of disclosure.

When the patent does not give any information of how a feature of the invention can be put into practice, only a weak presumption exists that the invention is sufficiently disclosed (see Reasons 3.3). In such case, the opponent can discharge his burden by plausibly arguing that common general knowledge would not enable the skilled person to put this feature into practice.

The patent proprietor then has the burden of proof for contrary assertion that common general knowledge would indeed enable the skilled person to carry out the invention.

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Case Number: T 0063/06 - 3.2.04

D E C I S I O N
of the Technical Board of Appeal 3.2.04
of 24 June 2008

Appellant: (Patent Proprietor)	Hitachi, Ltd. 6, Kanda Surugadai 4-chome Chiyoda-ku Tokyo 101 (JP)
Representative:	Beetz & Partner Steinsdorfstrasse 10 D-80538 München (DE)
Respondent: (Opponent)	DaimlerChrysler AG D-70546 Stuttgart (DE)
Representative:	Dahmen, Toni DaimlerChrysler AG FTP, C 106 D-70546 Stuttgart (DE)
Decision under appeal:	**Decision of the Opposition Division of the European Patent Office posted 4 November 2005 revoking European patent No. 0621402 pursuant to Article 102(1) EPC.**

Composition of the Board:

Chairman: M. Ceyte
Members: M. Poock
T. Bokor

Summary of Facts and Submissions

I. With the decision of 4 November 2005, European patent No. 0621402 was revoked on the ground for opposition of Article 100(b) EPC 1973.

The Opposition Division held that the patent did not disclose the invention in a manner sufficiently clear and complete for it to be carried out by the person skilled in the art. The Division did not share the Patent Proprietor's view that the common general knowledge enabled the skilled person to produce flame kernels of the claimed size without a flame nozzle with simple trials, because it was neither supported by textbook evidence nor by the available information. Moreover, the burden of proof for this ability of the skilled person had been shifted to the Patent Proprietor.

II. The Patent Proprietor lodged a notice of appeal against this decision on 12 January 2006 and paid the prescribed fee simultaneously. The statement of grounds of appeal was received on 14 March 2006.

It is already the second appeal resulting from the opposition against this patent. In the first appeal T 1014/02, the decision of the Opposition Division to revoke the patent on the ground for opposition of Article 100(c) EPC 1973 was set aside by this Board in a different composition. The Board held that the claims meet the requirements of Article 100(c) - 123 EPC 1973 and remitted the case to the Opposition Division for further prosecution which had to be restricted to the subject-matter covered by the claims 1 to 8 filed

during the oral proceedings held on 5 March 2004, i.e. "to those embodiments of the invention without a flame nozzle, since these embodiments (as agreed by the appellant) are clearly excluded by the present claims".

III. Oral proceedings took place on 24 June 2008 in which the Appellant submitted a new set of claims as an auxiliary request.

IV. The Appellant (Patent Proprietor) requested that the decision under appeal be set aside, and the patent be maintained on the basis of claims 1 to 8 as filed during the oral proceedings in the appeal T 1014/02 - 3.2.04 held on March 5, 2004 (main request), or in the alternative, that the patent be maintained on the basis of claims 1 to 8 as filed during the oral proceedings before the Board on 24 June 2008 (auxiliary request).

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

V. Claim 1 of the main request is identical to claim 1 on which was decided in the first appeal T 1014/02 and reads as follows:

"Method of fuel injection and ignition in an internal combustion engine with the steps of

— introducing air into the combustion chamber (21) of the engine,

- injecting fuel with a fuel injection valve (2) into the combustion chamber (21) in order to form a fuel/air—mixture and

- igniting the fuel/air—mixture with a spark plug (3), characterized in that

the spark plug (3) is disposed in a central portion of the combustion chamber (21) near the fuel injection valve (2), a fuel jet flow B is injected into the combustion chamber (21) so as to pass by the spark plug (3) and generate flame kernels (40) having a size of 1 mm or more and in time of a small load when the accelerator pedal position a is small, the ignition is performed by the spark plug (3) being ignited within the fuel injection time period in which energy of the fuel jet flow B is available to disperse said flame kernels (40) in the combustion chamber (21), so that the flame kernels (40) are carried on the fuel jet flow B to increase the penetration force of the flame".

In claim 1 of the auxiliary request, the following feature was added in its characterising portion:

"a nozzle (30) is provided at the periphery of the injection port of the fuel injection valve (2), the nozzle (30) being provided with hole portions (19, 20) through which jet flow of the fuel injected from the fuel injection valve (2) passes, the diameter of the hole portions (19, 20) of the nozzle (30) being at least 1 mm".

VI. With the summons to the oral proceedings, the Board expressed doubts whether the skilled person would succeed to vary the parameters mentioned by the Patent Proprietor so that the claimed kernel size is produced without a flame nozzle. Moreover it was indicated that the decision would have to be taken on the basis of who carries the relevant burden of proof if these doubts

were not dispelled. It appeared to the Board that the burden of proof lay upon the Patent Proprietor to show that the skilled person using his common general knowledge would be able to produce the claimed kernel size without a flame nozzle.

VII. The Appellant argued that the invention was disclosed in a manner sufficiently clear and complete for it to be carried out by a person skilled in the art.

(a) With his common general knowledge, the skilled person knew how to perform simple trials to achieve flame kernels of the claimed size without a flame nozzle.

The skilled person, i.e. a mechanical engineer experienced in the area of engine development in the automotive field, had to vary only few parameters and control the achieved kernel size by well known methods, e.g. by "Schlieren-Photography".

(i) He referred to the following parameters which influenced the size of the flame kernels:

In the oral proceedings: the fuel/injection pressure and the orifice diameter of the injector as the main parameters.
In the written proceedings: also the speed of jet flow (flame dispersions speed), the injection/ignition timing and the spark plug location.

In the opposition proceedings, the Appellant, then Opponent had listed the parameters according to their importance as follows:

"1. the flame dispersion speed (speed of jet flow)
2. the fuel pressure
3. the fuel injection time
4. the orifice diameter of the injector (and not the nozzle)".

(ii) A reasonable amount of trial and error was permissible according to the decisions T 226/85, T 14/83, T 48/05 and T 307/86 provided that the skilled person has at its disposal, either in the specification or on the basis of common general knowledge, adequate information leading necessarily and directly towards success through the evaluation of initial failures.

(b) According to the established case law of the Boards of Appeal, it was the opponent who bears the burden of proof to establish insufficiency of disclosure. Mere allegations did not suffice (T 182/89 and T 16/87). Serious doubts had to be substantiated by verifiable facts (T 19/90, T 890/02).

It was required that proof is submitted by the Opponent including, for example, experimental trials of unsuccessful attempts to repeat the teaching of the patent specification (T 665/90).

Since no such tests were submitted at all, the present case does not justify the deviation from the principles of this established case law.

Consequently, there was no basis for a shift of the burden of proof to the patent proprietor.

(c) The question of the technical interpretation of the disclosure in view of the flame kernel size and presence/absence of a nozzle could no longer be subject of dispute because it was finally decided with decision T 1014/02.

In this decision, the Board had clarified that there was sufficient disclosure for a flame kernel size of 1 mm to be produced also by embodiment 1 of the originally filed documents.

VIII. The Respondent contested that the invention was disclosed in a manner sufficiently clear and complete for it to be carried out by a person skilled in the art.

(d) No evidence was submitted that the skilled person knew how to perform the trials such that the claimed kernel size is achieved. To the contrary, it required an undue burden, because too many parameters influencing the kernel size had to be varied. Not only the fuel/injection pressure and the orifice diameter of the injector were important parameters, but also the location of the spark plug, the injection/ignition duration and timing and the strength of the spark.

(e) The patent specification did not describe any embodiment or example in which the claimed kernel size is generated without a flame nozzle. In such situation, it was not required to submit trials of unsuccessful attempts.

The circumstances of this case were different to those reported in the decisions cited by the Appellant in which examples were given which could be verified by tests. Only in such circumstances it can be required to provide comparative tests or evidence of unsuccessful attempts to reproduce the examples.

Reasons for the Decision

1. The appeal is admissible.

2. *Sufficiency of disclosure - claim 1*

2.1 Article 100(b) EPC 1973 stipulates that the European patent must disclose the invention in a manner sufficiently clear and complete for it to be carried out by the person skilled in the art.

2.2 This requires according to the well established case law of the Boards of Appeal that the disclosure must be reproducible without undue burden. A reasonable amount of trial and error is permissible provided that the skilled person has at his disposal, either in the specification or on the basis of common general knowledge, adequate information leading necessarily and

directly towards success through the evaluation of initial failures (T 226/85, OJ EPO 1988, 336).

2.3 In the present circumstances, it has to be established whether the skilled person had adequate information at his disposal of how to generate the claimed kernel size without a flame nozzle.

2.3.1 Patent specification

The patent specification does not describe how flame kernels of the claimed size are generated without a flame nozzle. This was in fact not disputed.

It is noted that the only mention of the claimed kernel size is made for embodiments in which a flame nozzle is provided in the combustion chamber. However, the claims under consideration relate to the first embodiment which is the only embodiment without a flame nozzle.

2.3.2 Common general knowledge

(a) The Board accepts that in the absence of adequate information in the patent specification, the skilled person would carry out trials to find out the right setting of the parameters influencing the kernel size such that the claimed size is generated. In these trials the parameters had to be varied and the resulting kernel size controlled, e.g. by "Schlieren-Photography".

(i) Parameters to be varied

The Board shares the view of the Appellant that important parameters are the fuel/injection pressure and the diameter of the injector orifice. However, also further parameters influence the size of the flame kernels, the injection/ignition timing, the spark plug location, the strength of the spark and the speed of jet flow (the flame dispersion speed). Moreover, also the geometry of the combustion chamber and the piston position are relevant parameters because they influence how much and which air/fuel mixture is present at the plug.

In the absence of any convincing submissions that only the fuel/injection pressure and the diameter of the injector orifice are the main parameters, the Board concluded that the skilled person had to vary a large number of parameters.

(ii) Undue burden

The trials have to be executed in a combustion chamber, i.e. in a highly complex environment. If only one or two parameters had to be varied, it might be feasible for the skilled person to find out the right parameter setting through the evaluation of initial failures. However, in the present circumstances, a large number of parameters

is involved and no guidance is available how these parameters should be varied.

(iii) Therefore, it does not appear to the Board that the skilled person had adequate information at his disposal leading necessarily and directly to the claimed kernel size with a reasonable amount of trial and error, i.e. without undue burden.

2.3.3 In view of the foregoing, the Board has doubts as to whether the invention and more particular the feature "a fuel jet flow B is injected into the combustion chamber (21) so as to pass by the spark plug (3) and generate flame kernels (40) having a size of 1 mm or more" in claim 1 can be put into practice by the skilled person without a flame nozzle.

3. *Burden of proof*

3.1 If a material fact is not or cannot be proven, a decision is taken on the basis of who carries the relevant burden of proof. The fact that the real position cannot be established operates to the detriment of the party which carries the burden of proof for this fact (see "Case law of the Boards of Appeal of the European Patent Office", 5th edition, VI.K.5.1.1).

3.2 In principle, each party bears the burden of proof for the facts it alleges.

3.2.1 If the opposition is based on the ground of Article 100(b) EPC 1973, it is the opponent who bears

the burden of proof (T 16/87, OJ EPO 1992, 212; T 182/89, OJ EPO 1991, 391) for the fact that the patent does not disclose the invention in a manner sufficiently clear and complete for it to be carried out by a skilled person.

3.3 Presumption of validity

3.3.1 The Board holds that after the grant of the patent, i.e. after the end of the examination proceedings, a legal presumption exists that the patent meets the requirements of the EPC. However, this presumption can be rebutted on the basis of the grounds for opposition mentioned in Article 100 EPC.

The weight of the submissions required to rebut this presumption depends on its strength. A strong presumption requires more substantial submissions than a weak one.

In the context of the opposition ground of sufficiency of disclosure, the strength depends on the way the invention is disclosed in the patent.

Two examples may be instructive:

(a) Strong presumption: the patent specification contains detailed information of how to put the invention into practice: this requires substantial submissions why the information is not sufficient for the skilled person to carry out the invention. If, for instance, the detailed information include test results to demonstrate a particular property or advantage, the submissions need to proof that

the results do not demonstrate what they should, e.g. by comparative tests. In other words, the submissions need to be supported by clear evidence.

(b) Weak presumption: the patent specification does not contain detailed information of how to put the invention into practice: this requires less substantial submissions. It is sufficient to raise serious doubts whether the skilled person can carry out the invention, e.g. by comprehensible and plausible arguments.

3.3.2 The present case rests on the weak presumption as example b), because the patent specification does not give any information how the claimed kernels size can be produced (see above, item 2.3.1) without a flame nozzle.

In the Board's judgement, this weak presumption had been rebutted because the Opponent's comprehensible and plausible arguments why the trials required an undue burden for the skilled person raised serious doubts whether the skilled person can carry out the invention.

3.3.3 These findings are aggravated by the following considerations. It is normally the appellant's task to substantiate why the decision under appeal is wrong. Here, the patent proprietor must bring tangible arguments why the finding of the Opposition Division was wrong on a substantive basis, and it is not enough to argue that the Opponent's arguments did not meet the usual strict standard of proof.

The evaluation of the strength of the evidence is essentially a subjective decision, and, as such, it comes close to decisions made as a matter of discretion (as opposed to an evaluation of the technical content of the evidence, which is a matter of fact). To overturn a discretionary decision of the Opposition Division, it is not sufficient to state that the discretion could have been exercised differently, but that it was exercised manifestly wrong ("Case Law of the Boards of Appeal", 5th edition, Chapter VII.D.6.6.). It appears that a similar approach is proper by analogy: It is incumbent on the Patent Proprietor to challenge the finding of the Opposition Division also on a substantive basis, i.e. by bringing tangible evidence on its own which is actually capable of proving the opposite, instead of challenging the weight that was given to the evidence or arguments of the Opponent.

3.3.4 As a consequence, it is decisive that the Appellant has the burden of proof for the contrary assertion that common general knowledge would indeed enable the skilled person to carry out the invention.

Since no evidence had been provided in support thereof, the Board could not conclude that a skilled person using his common general knowledge would be able to carry out the invention.

4. *Ratio decidendi* of decision T 1014/02

4.1 Article 111(2) first sentence EPC 1973 stipulates that if the Board of Appeal remits the case for further prosecution to the department whose decision was

appealed, that department shall be bound by the *ratio decidendi* of the Board of Appeal, i.e. its legal assessment, insofar as the facts are the same.

4.2 In decision T 1014/02, the legal assessment concerned whether the amendments made comply with the requirements of Article 123(2) EPC 1973 in accordance with Article 100(c) EPC 1973. The decision does not contain any legal assessment whether the patent meets the requirements of Article 100(b) EPC 1973. Moreover, the facts have not changed.

Thus, the Opposition Division had the power to decide whether the patent specification discloses the invention in a manner sufficiently clear and complete for it to be carried out by the person skilled in the art.

Moreover, the decision T 1014/02 does not contain a statement that there was sufficient disclosure for a flame kernel size of 1 mm to be produced also by the first embodiment of the originally filed documents, which is the only embodiment without a flame nozzle.

4.3 When appeal case T 1014/02 was remitted to the first instance for further prosecution, the Board stated that the further prosecution had to be restricted to those embodiments of the invention without a flame nozzle (see reasons, point 3, second paragraph).

However, in this auxiliary request, the flame nozzle was reinserted.

5. In view of the foregoing it is concluded that the Appellant's main request is not allowable and the auxiliary request is not admissible.

6. These findings are consistent with the established case law of the Boards of Appeal

6.1 This decision does not alter the principle that the opponent bears the burden of proof for the fact that the patent does not disclose the invention in a manner sufficiently clear and complete for it to be carried out by a skilled person. However, it explains that the discharge of the burden of proof depends on the weight of the submissions which depends on the way the invention is disclosed in the patent specification.

6.2 Also the principle that mere allegations do not suffice in the notice of opposition but serious doubts have to be established by verifiable facts (T 19/90, OJ EPO 1990, 476; T 890/02, OJ EPO 2005, 497) is not altered by this decision.

The Respondent, then Opponent, had submitted that the patent specification does not contain any information as to how the claimed kernel size can be produced without a flame nozzle. Moreover, he submitted that the great number of parameters which have to be varied for generating the claimed kernel size required an undue burden for the skilled person, i.e. that the skilled person cannot carry out the invention even with a reasonable amount of trial and error without inventive considerations.

Thus, he had indicated clear facts that raised doubts whether the claimed invention can be put into practice by the skilled person without undue burden.

6.3 The Appellant stated that regularly the Opponent will have to submit the proof by presenting comparative tests (T 665/90 of 23 September 1992, not published in OJ EPO).

In principle the Board agrees. Comparative tests may be useful, for instance, if the patent specification itself gives detailed information in the form of tests as in decision T 665/90. However, as set out above (see section 3.3.2), the present case is different because it does not mention any test in the patent specification.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar: The Chairman:

G. Magouliotis M. Ceyte