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D E C I S I O N
of 17 December 1998

Case Number: W 0006/98 - 3.4.2

Application Number: PCT/JP 97/02463

Publication Number: -

IPC: G01M 15/00

Language of the proceedings: EN

Title of invention:

Method of testing assembled internal combustion engine

Applicant:

Toyota Jidosha Kabushiki Kaisha et al

Opponent:

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Headword:

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Relevant legal provisions:

PCT Art. 33(2), 34(3)(a)
PCT R. 13.1, 13.2, 68.2, 68.3

Keyword:

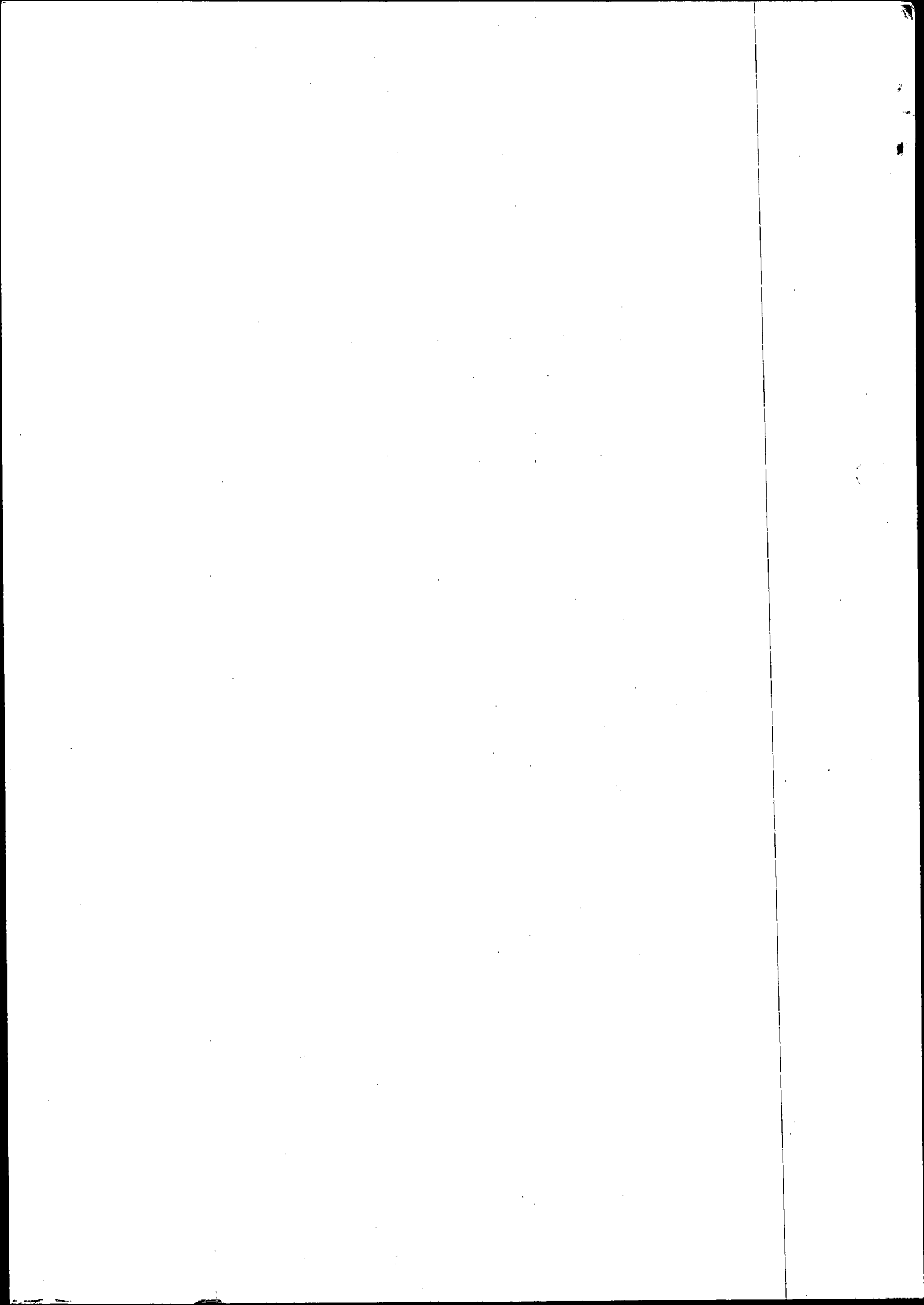
"Lack of unity of invention a posteriori - not established"
"Insufficient reasoning"

Decisions cited:

G 0001/89, W 0006/90, W 0003/92, W 0003/93, W 0004/93,
W 0004/98

Catchword:

-





Case Number: W 0006/98 - 3.4.2
International Application No. PCT/JP 97/02463

D E C I S I O N
of the Technical Board of Appeal 3.4.2
of 17 December 1998

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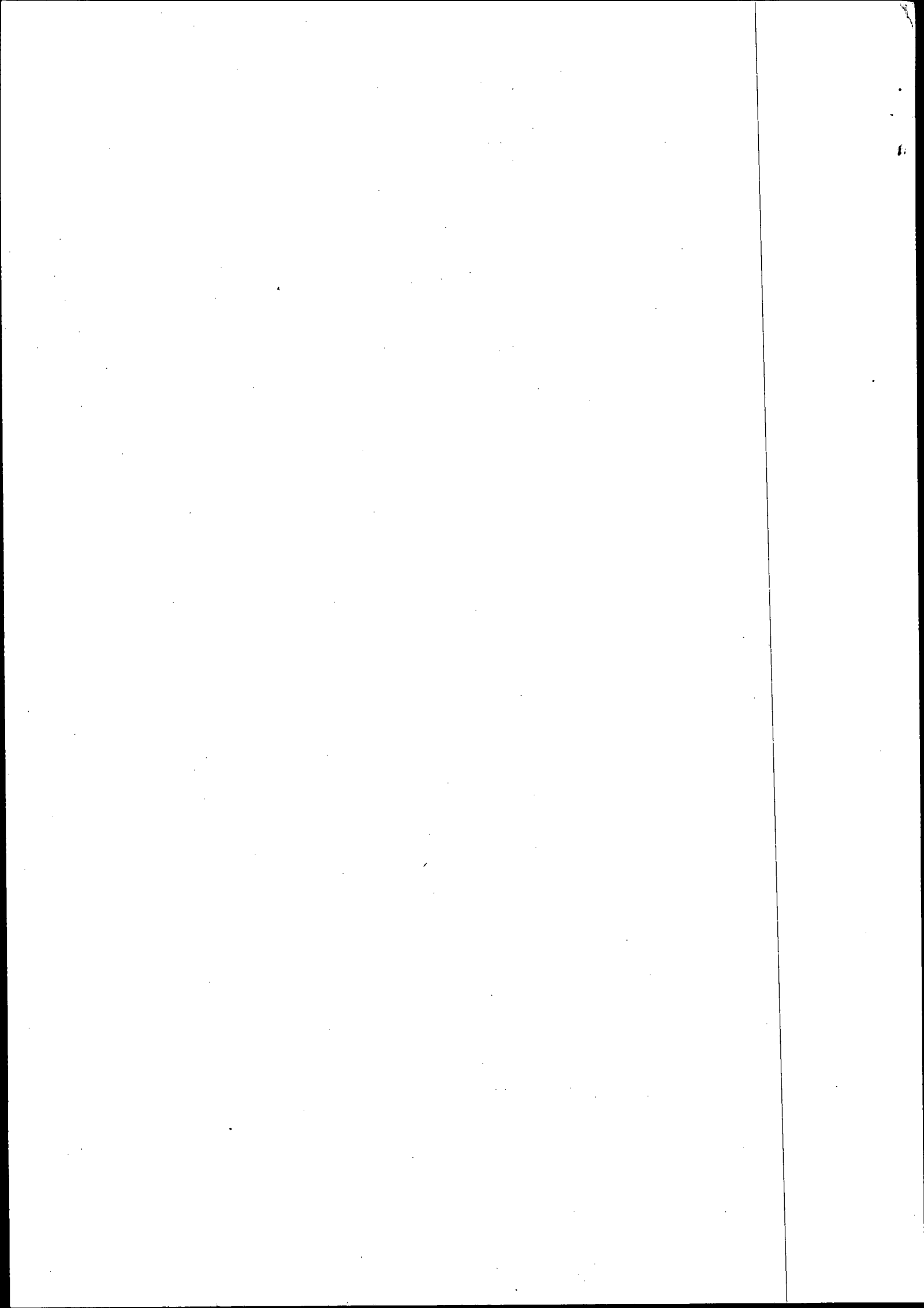
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Subject of the Decision:

Protest according to Rule 68.3(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.

Composition of the Board:

Chairman: E. Turrini
Members: S. Steinbrener
B. Schachenmann



Summary of Facts and Submissions

I. The applicants filed an international patent application PCT/JP 97/02463 comprising a set of 20 claims, the independent claims of which read as follows:

"1. A method of testing an assembled internal combustion engine having an intake valve (50) and an exhaust valve (48), characterized by rotating the assembled engine, measuring a timing of occurrence of at least one predetermined condition of a pressure in at least one of an external intake-valve side space (92) which communicates with the intake valve and an external exhaust-valve side space (100) which communicates with the exhaust valve, and judging, based on the measured timing, whether there is at least one fault with the assembling of the engine."

"19. A method of testing an engine including a cylinder, a piston (10, 12), a crank shaft (18), an intake valve (50) and an exhaust valve (48), characterized by rotating, using an independent rotating device, the crank shaft and thereby reciprocating the piston in the cylinder, while at least one of an external intake-valve side space (92) which communicates with the intake valve and an external exhaust-valve side space (100) which communicates with the exhaust valve is isolated from an atmosphere, and evaluating a state of the engine based on at least one of (a) a pressure in said one of the intake-valve side and exhaust-valve side spaces which is measured while a corresponding one of the intake and exhaust valves is closed and (b) at least one of a

starting and an ending timing of a closed state of one of the intake and exhaust valves which corresponds to said one of the intake-valve side and exhaust-valve side spaces."

"20. A method of testing an assembled internal combustion engine including a plurality of cylinders each of which has an intake valve (50) and an exhaust valve (48), characterized by rotating the assembled engine, measuring, for each of at least two cylinders of said plurality of cylinders, at least one of (a) a value of a pressure in at least one of an external intake-valve side space (92) which communicates with the intake valve corresponding to said each cylinder and an external exhaust-valve side space (100) which communicates with the exhaust valve corresponding to said each cylinder, when said pressure satisfies a predetermined condition, and (b) a timing at which said pressure satisfies said predetermined condition, comparing the at least one of the value and the timing of a first one of said at least two cylinders with the at least one of the value and the timing of a second one of said at least two cylinders, and judging that there is at least one fault with the assembling of the engine, when the at least one of the value and the timing of said first cylinder is not equal to the at least one of the value and the timing of said second cylinder."

Claims 2 to 18 are either directly or indirectly appended to claim 1 and relate to preferred embodiments of the claimed testing method.

II. By the communication dated 15 April 1998, the European Patent Office, acting as an International Preliminary Examining Authority (IPEA), invited the applicants

pursuant to Article 34(3)(a) and Rule 68.2 PCT to restrict the claims or to pay four additional preliminary examination fees.

In its invitation, the IPEA stated that for the assessment of unity of invention only claims 1 to 18 had been considered since claims 19 and 20 should be deleted for reasons of conciseness.

Referring to documents

D1: GB-A-1 167 292, and
D2: US-A-5 355 713

the IPEA then found the subject matter of claim 1 to be known from either prior art, and inferred from this finding that there was lack of unity, the claims covering five different inventions or groups of inventions:

Group A: claims 2 to 7,
Group B: claims 8 to 10 and 17,
Group C: claim 11,
Group D: claims 12 to 16, and
Group E: claim 18.

III. By their reply dated 8 May 1998, the applicants restricted the claims to Group A, Group B and claims 19 and 20, and paid three additional preliminary examination fees under protest pursuant to Rule 68.3(c) PCT.

In support of the protest, the applicants argued in its "Statement under Rule 68.3(c)" that documents D1 and D2 were not novelty-destroying for the subject matter of claim 1 so that claims 1 to 18 complied with the requirement of unity of invention. Moreover, since claims 19 and 20, respectively, had a scope of

protection differing from that of claims 1 to 18, no necessity of deleting claims 19 and 20 was seen, these claims being also considered unitary with the preceding claims.

- IV. In a prior review pursuant to Rule 68.3(e) PCT dated 10 June 1998, the IPEA found the invitation to pay additional fees to be justified and invited the applicant to pay the protest fee. In substance, lack of novelty of the subject matter of claim 1 with respect to either of documents D1 and D2 was confirmed, and the arguments given in the above-mentioned communication for the grouping of different inventions were referred to.

Moreover, having regard to claims 19 and 20 it was argued that in the IPEA's view these claims also lacked unity with claim 1.

- V. By a letter of 29 June 1998 received as facsimile on the same day, the applicants paid the protest fee according to Rule 68.3(e) PCT and submitted a "Supplemental Statement under Rule 68.3(c)" containing further arguments as to why documents D1 and D2 did not anticipate the subject matter of claim 1. As a consequence, it was held that claims 1 to 18 must be considered unitary.

Reasons for the Decision

1. *General requirements of protest proceedings pursuant to Rule 68.3 PCT*
- 1.1 Pursuant to Rule 68.3 PCT, the Board shall examine the protest and, to the extent that it finds the protest

justified, shall order the total or partial reimbursement to the applicant of the additional fees.

- 1.2 In accordance with constant practice of the Boards of Appeal, the examination in protest proceedings has to be carried out in the light of the reasons given by the IPEA in its invitation to pay additional fees under Rule 68.2 PCT and the applicant's submissions in support of the protest. Neither can the Board take account of new reasons and evidence added by the IPEA review body in the invitation to pay the protest fee (see W 4/93, OJ EPO 1994, 939), nor can it investigate of its own motion whether an objection relating to non-unity of invention might be justified for other reasons not considered in the IPEA's invitation to pay additional fees (see W 3/93, OJ EPO 1994, 931).

This is basically due to the fact that pursuant to Rule 68.2 and 68.3(c) PCT the applicant has to decide on its options for the further preliminary examination proceedings, i.e.

- to restrict the claims, or
- to pay additional fees, or
- to pay additional fees under protest, or
- not to comply with the invitation at all,

solely on the basis of the reasons given in the invitation to pay additional fees. Therefore, any subsequent considerations which the applicant cannot take account of in its decision making process, would contravene the applicant's legitimate expectations.

1.3 A complete and comprehensive reasoning in the IPEA's invitation to pay additional fees is therefore mandatory. The necessity of setting out "a logically presented, technical reasoning containing the basic considerations behind the finding of lack of unity in accordance with Annex B to the Administrative Instructions" is underlined in the PCT Preliminary Examination Guidelines (PCT/GL/3, see Chapter VI, 5.5) which are binding on the EPO when acting as an IPEA and on the Boards of Appeal when deciding on protests against the charging of additional fees (see G 1/89, OJ EPO 1991, 155, point 6).

2. *Novelty*

2.1 In the present case, the IPEA's invitation to pay additional fees is based on the allegation that either of documents D1 and D2 anticipates the subject matter of claim 1 (see items 3.1 and 3.3 of said invitation). This allegation has been contested by the applicants in their above-mentioned "Statement" and "Supplemental Statement" under Rule 68.3(c) PCT. Therefore, the Board has to examine the relevance of the prior art identified.

2.2 Although document D1 discloses

- a method of testing an assembled internal combustion engine (see D1, page 1, lines 10 - 16 and 31) having an intake valve and an exhaust valve (see D1, page 2, lines 19 - 25), said method comprising the steps of
- rotating the assembled engine (see D1, implicit from page 1, lines 13 - 16 and 64 - 66 and claim 4);

- sensing the occurrence of at least one pressure variation in at least one of an external intake-valve side space which communicates with the intake valve and an external exhaust-valve side space which communicates with the exhaust valve (see D1, claims 4 and 5), and
- judging whether there is at least one fault with the assembling of the engine (see D1, claim 4 and page 3, lines 31 - 33),

the Board does not consider this document to be novelty-destroying.

In its first embodiment, the judgement step according to D1 is carried out by subtracting from the actually sensed pressure pulse an ideal pressure pulse derived from testing a properly operating engine (see D1, page 1, lines 33 - 59 and page 3, lines 77 - 90): if the sensed pulse is not substantially cancelled, this will indicate that the engine under test is not functioning properly.

As may be seen from Figure 24 of the present application, any of the possible engine faults listed there will cause variations of the pressure amplitude and a time shift of characteristic pressure conditions, the latter, however, with the exception of the faults relating to

- (i) exhaust-valve clearance too large, and
- (ii) compression-ring missing,

i.e. in almost all fault cases the sensed pulse will deviate from the ideal pulse by timing and amplitude, in cases (i) and (ii) only by amplitude.

When looking at pulse cancellation, the prior art seems to measure pulse deviations which would be due to variations of timing and/or amplitude (see D1, claims 4 and 5 referring to the timing and magnitude of the pressure variations), the respective contributions of which to a non-zero output could in general not be distinguished, as the applicants have rightly pointed out in its "Supplemental Statement under Rule 68.3(c)" (see page 5, first paragraph).

In consequence, even if time correlation is involved in the output signal according to D1, the Board considers the feature of "measuring a timing of occurrence of at least one predetermined condition of a pressure" not to be disclosed in document D1 since no time coordinate of a specific pressure condition, e.g. the occurrence of the pressure amplitude, is actually determined.

Finally, for the second embodiment described at page 3, lines 109 - 122 of D1 only the possibility of connecting the output directly to a wave shape recorder is mentioned. Although in this case the shape of the output pulses can be analysed to determine various problems or conditions in the engine, there is no direct and unambiguous indication that time coordinates of certain pressure conditions are actually measured.

Thus, the subject matter of claim 1 appears to be novel with respect to document D1.

2.3 In the Board's view, this is, however, not the case with respect to document D2.

In this document, there is also disclosed a method of testing an assembled internal combustion engine (see D2, column 1, lines 8 - 11 and column 2, lines 49 - 52) having an intake valve and an exhaust valve (see D2, column 6, line 30 and column 8, line 11).

Furthermore, as can be seen from column 9, lines 42 - 56, column 12, lines 5 - 11 and claims 1, 5 and 10, document D2 also provides the steps of

- rotating the assembled engine,
- measuring the timing of occurrence of at least one pressure amplitude (= maximum extent of oscillation from position of equilibrium) in at least an exhaust manifold, and
- judging, based on the measured timing, whether there is improper camshaft installation.

In this context, the Board cannot accept the applicants' argument (see the "Supplemental Statement under Rule 68.3(c)", page 6, first paragraph) that the cam timing in D2 is checked "by measuring an exhaust pressure at the proper (cam) timing and comparing the measured exhaust pressure with the prescribed pressure with respect to pressure pulse amplitude", and that therefore "document D2 does not teach measuring a timing of occurrence of a predetermined pressure condition". Although it may not be fully detailed in the above-cited passages of the description, the wording of claim 10 (and similar claims 21, 33 and 45) clearly stipulates that the prior art judging step based on a comparison of the measured pressure amplitude with the pressure amplitude of a normal engine includes the step of "determining an angle of the engine operating cycle" at which said measured pressure amplitude occurs and, in case it occurs at an angle different from that corresponding to the pressure amplitude of the normal engine, leads to the conclusion that the camshaft has been improperly installed. Of

course, the determination of an angle of the engine operating cycle means measuring a specific timing as can be seen from the explicit labelling of the abscissa in Figure 6 of the present application.

Therefore, the Board is convinced that in document D2 a timing of occurrence of a predetermined pressure condition is measured and the judgement on the existence of a fault is based on said measured timing.

Hence, the subject matter of claim 1 lacks the novelty required by Article 33(2) PCT with respect to document D2, and thus, the IPEA's finding is confirmed, albeit with respect to document D2 only.

3. *Unity of invention*

3.1 Although not explicitly specified in the invitation to pay additional fees, it is clear from the foregoing that in the present case the IPEA's objection of non-unity of invention has been raised on an *a posteriori* basis. From its allegation that the subject matter of claim 1 was anticipated by document D1, the IPEA then inferred (see the invitation, item 3.2) that the common concept of claims 1 - 18 was known from said document and that therefore there was "clearly a lack of unity (see PCT-Guidelines PCT/GL/3/Chapter II, 7.6)". In consequence, this was understood by the applicants to mean that by proving novelty of the subject matter of claim 1 unity of invention would be re-established.

3.2 However, apart from the fact that a "clear lack of unity" cannot be derived from the IPEA's allegation since in the Board's view this allegation does not apply insofar as D1 is concerned, lack of novelty of the subject matter of an independent claim does not **automatically** lead to a *a posteriori* lack of unity for

the claims directly or indirectly appended to said independent claim. This becomes immediately apparent when two specific cases are considered: if all the associated dependent claims only refer back to their respective preceding claim, then lack of novelty of the subject matter of the corresponding independent claim cannot cause a situation of non-unity on an *a posteriori* basis since in an assessment of unity the first novel dependent claim would replace the independent claim, the remaining claims being then dependent on said first novel dependent claim (see Annex B to the Administrative Instructions, Part 1(c)(i) published in PCT Gazette-Section IV No. 24/1996, 9474). On the other hand, if each of the dependent claims directly refers back to a fully anticipated independent claim then there **may** be lack of unity *a posteriori*, however only in case there is no inventive link between the remaining dependent claims, which issue has to be carefully considered (see Annex B to the Administrative Instructions, Part 1(c)(ii)).

An analogous conclusion must be drawn from the passage of the above-mentioned PCT-Guidelines cited in the IPEA's invitation: "If the common matter of the independent claims is well known and the remaining subject matter of each claim differs from that of the others **without there being any unifying novel inventive concept common to all**, then clearly there is lack of unity of invention" (emphasis added by the Board).

Therefore, anticipation of the subject matter of an independent claim may well lead to a situation of non-unity *a posteriori*, which however can only be established by showing that there is indeed no unifying novel inventive concept common to all dependent claims.

As has been pointed out in item 1.2 above, reasons for such finding have to be given in the IPEA's invitation to pay additional fees.

- 3.3 In the present case, the IPEA defined five inventions or groups of inventions, in substance by specifying different additional features contained in groups of dependent claims or single dependent claims. Although in some cases allegedly "corresponding" features were taken into account for the grouping, the Board does not consider such a listing of different technical features to constitute sufficient reasoning for lack of unity on an *a posteriori* basis under Rule 13.1 and 13.2 PCT.

According to established case law of the Boards of Appeal (see W 6/90, OJ EPO 1991, 438, point 3.2 of the reasons; W 4/98, not published in the OJ), a single general inventive concept may be said to be absent only if no partial identity exists among the teachings in an application, taking account of the technical features of the subject matter claimed and the effects achieved. In particular, an investigation of unity of invention must be based on an analysis of the technical problem or problems underlying the respective groups of invention in the light of the relevant prior art. Such a full analysis of special technical features, associated effects and problems which would be necessary to exclude any technical relationship required by Rule 13.2 PCT may only be foregone in straight forward cases without offending against the obligations under Rule 68.2 PCT (see W 3/92, not published in the OJ).

- 3.4 However, the present case cannot be considered to be a straight forward case. From a procedural point of view, it would be necessary in a first step to complete the assessment of novelty having regard to the dependent

claims in order to establish the subject matter which is not anticipated by the prior art. In this approach, the claim dependencies, which are rather involved in the present case, must be taken into account. The IPEA only alleged lack of novelty of claim 2 in this respect, but it can, e.g., directly be derived from the above analysis of D2 that the subject matter of claim 6, at least when referring back to claim 1, also lacks novelty (see also the IPEA's own finding in the written opinion dated 30 June 1998, item V). Therefore, the IPEA's reasoning is incomplete in this respect.

Then, in a second step the special technical features and the respective technical contributions of the remaining novel subject matter (if any) must be defined. In this context, the technical problems solved with respect to the prior art have to be determined. On the basis of such an analysis, which is entirely lacking in the IPEA's present invitation, one might come to the conclusion that there is a technical relationship between, e.g., the subject matter of claims 5 (Group A) and 9 (Group B) (which has been considered novel by the IPEA pursuant to its above-mentioned written opinion), since these claims contribute to the solution of the same technical problem, i.e. to achieve an increase in accuracy and reliability of fault detection (see the present application page 6, lines 10 - 27 and page 8, lines 6 - 21).

- 3.5 Therefore, in the Board's view the IPEA's invitation to pay additional fees because of lack of unity of claims 1 to 18 does not comply with Rule 68.2 PCT in that it is not sufficiently reasoned.

The Board would like to add that in accordance with the above passage of the PCT Preliminary Examination Guidelines cited by the IPEA (PCT/GL/3, Chapter III,

7.6), the objection of lack of unity should only be raised in **clear** cases, not least because of reasons of procedural efficiency. The Board has serious doubts whether the present case falls under this guiding principle.

3.6 The IPEA's additional arguments concerning claims 19 and 20, which were given for the first time in its invitation to pay the protest fee, have been disregarded by the Board for the reasons set out in item 1.2 above.

3.7 The Board therefore finds the applicants' protest entirely justified so that the three additional fees and the protest fee must be refunded in accordance with Rule 68.3(c) and (e) PCT.

Order

For these reasons it is decided that:

The reimbursement of three additional preliminary examination fees and of the protest fee paid by the applicant is ordered.

The Registrar:

The Chairman:

P. Martorana

E. Turrini