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D E C I S I O N
of 19 September 1995

Case Number: T 0629/93 - 3.2.4

Application Number: 86113450.0

Publication Number: 0262240

IPC: F02F 1/24

Language of the proceedings: EN

Title of invention:
Composite cylinder head of internal-combustion engine

Patentee:
KAWASAKI JUKOGYO KABUSHIKI KAISHA

Opponent:
MTU MOTOREN- UND TURBINEN-UNION FRIEDRICHSHAFEN GMBH

Headword:
-

Relevant legal provisions:
EPC Art. 123(2) and (3), 111(1)

Keyword:
"Amendments - substantive"
"Decision re-appeals - remittal (yes)"

Decisions cited:
-

Catchword:
-



Case Number: T 0629/93 - 3.2.4

D E C I S I O N
of the Technical Board of Appeal 3.2.4
of 19 September 1995

Appellant:
(Opponent)

MTU MOTOREN-UND TURBINEN-UNION
FRIEDRICHSHAFEN GMBH
- Patentabteilung ED-F -
D-88040 Friedrichshafen (DE)

Representative:

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Respondent:
(Proprietor of the patent)

KAWASAKI JUKOGYO KABUSHIKI KAISHA
1-1 Higashikawasaki-cho 3-chome
Chuo-ku
Kobe-shi
Hyogo-ken (JP)

Representative:

Klunker - Schmitt-Nilson - Hirsch
Winzererstrasse 106
D-80797 München (JP)

Decision under appeal:

Interlocutory decision of the Opposition Division
of the European Patent Office dispatched 7 June
1993 concerning maintenance of European patent
No. 0 262 240 in amended form.

Composition of the Board:

Chairman: C. A. J. Andries
Members: P. Alting van Geusau
J. P. B. Seitz

Summary of Facts and Submissions

I. European patent No. 0 262 240 was granted on the basis of European patent application No. 86 113 450.0 filed on 30 September 1986.

II. With notice of opposition the appellant (opponent) requested revocation of the patent for the reason of non-compliance with the provisions of Article 100(a) EPC.

In respect of alleged lack of novelty and inventive step the opposition was based on

D1: DE-C-399 362

D2: US-A-3 593 406

D3: DE-C-2 514 592

D4: DE-A-2 507 073.

III. By interlocutory decision, with written reasons dispatched on 7 June 1993, the Opposition Division maintained the patent in amended form on the basis of amended patent documents filed at the oral proceedings.

The Opposition Division was of the opinion that, given the fact that none of the cited documents was concerned with joining cylinder head parts by welding methods in which the contacting surface areas were direct joining surfaces, and in view of the resulting improved thermal and mechanical properties of the claimed cylinder head assembly, the subject-matter of the amended Claim 1 was not only novel but also involved an inventive step.

IV. Notice of appeal and the statement of grounds of appeal were filed on 9 July 1993. The appeal fee was paid at the same time.

The appellant requested setting aside of the decision under appeal and revocation of the patent.

In the statement of grounds of appeal the appellant referred to the further prior art document

D5: Dubbel, "Taschenbuch für den Maschinenbau", 14. Auflage, Springer Verlag, 1981, pages 345 to 363,

considered to represent the basic knowledge of the skilled person in respect of welding techniques.

V. In a communication in preparation for oral proceedings requested by the respondent, the Board expressed the provisional opinion that, in addition to a problem of clarity concerning the interpretation of the feature relating to flat contacting surfaces in the Claim 1 upheld by the Opposition Division, it would have to be discussed at the oral proceedings whether an inventive activity was necessary to select a surface joining method known in itself when assembling the cylinder head known from D1 if such an assembly is intended to withstand high thermal and very high mechanical stresses.

VI. Oral proceedings took place on 19 September 1995 in the presence of both parties.

At the oral proceedings the Respondent filed a new independent Claim 1 and requested that the patent be maintained on the basis of this new Claim together with the dependent Claims 2 to 7 as granted.

The present Claim 1 reads as follows:

"1. A cylinder head of an internal-combustion engine,
(a) comprising a bottom wall part (1) facing the combustion chamber of a cylinder, and a reinforcement part (2) on the side of the bottom wall part (1) opposite to the combustion chamber;
(b) the bottom wall part (1) and the reinforcement part (2) being separately formed structures, joined into a single integral structure;
(c) the reinforcement part (2) comprising ribs (9) which reach to the bottom wall part (1) and confine cooling water passages (13); and
(d) the bottom wall part (1) upper surface and the reinforcement part (2) lower surface each being formed of a flat surface in its entirety so as to provide flat contacting surfaces in only one plane, characterised in that
(e) additional ribs (14) are provided within the cooling water passages (13) thereby dividing said passages;
(f) and the bottom wall part (1) upper surface and the reinforcement part (2) lower surface, including the rib end surfaces of all ribs (9, 14) are joined to each other with the contacting surface areas being direct joining surfaces."

VII. In support of its request for revocation of the patent the appellant relied essentially on the following submissions:

Since the subject-matter of the present Claim 1 was now limited to the embodiments disclosed in respect to Figures 2 to 4 of the patent and since such limitation could not have been foreseen on the basis of the granted patent claims, more time should therefore be given to the appellant to approach this new situation.

In any case, the present Claim 1 did not appear, prima facie, to involve an inventive step having regard to D1 and in particular to D3 in which also additional reinforcing ribs dividing the cooling water passages were provided.

Welding together essentially flat surfaces of a two-piece cylinder head was already known from D1 and given the fact that the skilled person was well aware of, for example, diffusion welding as a suitable welding technique available for bonding a complicated form of welding interfaces, such as additional reinforcement ribs known from D3, no inventive activity was necessary to use such a diffusion welding method and thereby to arrive at the claimed method.

VIII. The respondent contested the appellant's view and argued as follows:

The combination of features of Claim 1 provided a substantial advance in manufacturing cylinder heads suitable for severe working conditions present in modern combustion engines. In spite of the complicated shape of the cylinder head, due to the additional ribs for support of the bottom wall part counteracting the high combustion pressure, the head had excellent integrity because of the direct joining method used. Moreover, by providing the ribs in the claimed manner, improved cooling of the bottom wall part was achieved.

Considering the cited prior art it should be noted that none of the more recent documents disclosed welding of a two part cylinder head. D3 in fact concerned a multi-part cylinder head which was screwed together. In view of the development of combustion engines to ever increasing combustion pressures the skilled person would not envisage consulting the welded cylinder head

arrangement disclosed in D1 because this arrangement dated from an era when stresses and temperature gradients were not comparable to those found in recent combustion engine cylinder heads. The single document dealing with such problem was D3 but this document proposed a complicated screwed-together construction and not the slightest hint to the features of Claim 1 could be derived from this document. In the absence of any lead to the solution of the problem posed in the patent in the manner as claimed, the subject-matter defined in Claim 1 involved an inventive step in the meaning of Article 56 EPC.

Reasons for the Decision

1. The appeal is admissible.
2. *Amendments*
 - 2.1 The present Claim 1 is based on the granted Claim 1 and now further specifies that additional ribs are provided within the cooling water passages thereby dividing these passages and that the contacting surfaces of the bottom wall part and reinforcement part, including the rib end surfaces of all ribs, are direct joining surfaces of the bottom wall part and reinforcement part.

Claim 1 now also states that the joining surfaces are flat contacting surfaces which lie in one plane so as to make clear in feature (d) of Claim 1 that those parts of the bottom wall part upper surface and reinforcement part lower surface that are in contact with each other are flat to form only one plane.

2.2 These features are disclosed in relation to the embodiments shown in Figures 2 to 4 and described on page 9, line 17 to page 10, line 8 of the application as originally filed, and in column 6, line 39 to column 7, line 5 respectively of the patent as granted. Therefore no objections arise in respect of the requirements of Article 123(2) EPC.

2.3 In view of the fact that the scope of the present Claim 1 is more limited than the scope of the granted Claim 1, essentially by the restriction to the embodiments disclosed in respect to Figures 2 to 4 of the patent, also the requirements of Article 123(3) EPC are satisfied.

3. *Clarity*

The Board wishes to emphasise that the expression "direct joining surfaces" used in Claim 1 is clear to a person skilled in the art when taking into account the description (patent as maintained by the Opposition Division column 6, lines 1 to 3) and the drawings. Indeed the use of this expression excludes face-joining methods in which additional welding or soldering material or even a glue is used to join the surfaces.

4. *Procedural matters*

4.1 It follows from the above analysis of the amendments that present Claim 1 comprises subject-matter not earlier claimed either in the application as was originally filed or in the granted patent.

- 4.2 If a request is filed during the appeal proceedings with amended claims, then in accordance with the case law of the Boards of Appeal the case is normally remitted to the first instance if the amendments are substantial and require further substantive examination.
- 4.3 In the present case the amendments are indeed considered to be substantial because of the subject-matter claimed for the first time in the proceedings before the EPO.
- 4.4 Under these circumstances and due to the fact that the appellant also wished additional time to reconsider the case, the Board takes the view that it has to make use of its power under Article 111(1) EPC to remit the case to the first instance for further prosecution on the basis of the present Claim 1 and the dependent Claims 2 to 7 as granted.
- 4.5 It is to be noted that the subject-matter of Claim 1 is now limited to the embodiments of the invention disclosed with respect to Figures 2 to 4 of the patent in suit. Therefore, consequential amendments should be carried out in the description and drawing pages so as to bring the patent in agreement with the subject-matter claimed. These adaptations have to be effected during the further prosecution.

In the present case, it also should be verified whether or not the search has already taken into account the additional features of Claim 1 and thus whether there is a already sufficient basis for the assessment of novelty and inventive step of the newly claimed subject-matter (see Guidelines for Examination, D-VI, 5).

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.
2. The case is remitted to the first instance for further prosecution on the basis of Claim 1 as filed during the oral proceedings and on the basis of the embodiment according to Figures 2 to 4 as granted.

The Registrar:



N. Maslin

The Chairman:



C. Andries