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**Datasheet for the decision
of 3 August 2006**

Case Number: T 1221/04 - 3.2.02

Application Number: 00114027.6

Publication Number: 1067206

IPC: C22C 38/48

Language of the proceedings: EN

Title of invention:

Steam turbine blade, and steam turbine and steam turbine power plant using the same

Applicant:

HITACHI, LTD.

Opponent:

-

Headword:

-

Relevant legal provisions:

EPC Art. 54, 84, 123(2), 87(1), 87(4)
EPC R. 29(2)

Keyword:

"Novelty (yes, after amendment)"

Decisions cited:

-

Catchword:

-



Case Number: T 1221/04 - 3.2.02

D E C I S I O N
of the Technical Board of Appeal 3.2.02
of 3 August 2006

Appellant: Hitachi, Ltd.
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Decision under appeal: Decision of the Examining Division of the
European Patent Office posted 29 April 2004
refusing European application No. 00114027.6
pursuant to Article 97(1) EPC.

Composition of the Board:

Chairman: T. K. H. Kriner
Members: R. Ries
E. Dufrasne

Summary of Facts and Submissions

- I. This appeal is against the decision of the examining division posted 29 April 2004 to refuse European patent application No. 00 114 027.6.

The ground of refusal was that the application failed to satisfy the requirements of Articles 52(1), 54(1) and 84 EPC and of Rule 29(2) EPC. Due to the similarity of the technical teaching referred to in the application and in document

D1 Patent Abstracts of Japan, volume 2000, no. 09, 13 October 2000, & JP-A-2000161006

the present application was not considered as being the "first application" within the meaning of Article 4 of the Paris Convention and Article 87(4) EPC. In particular, the subject matter of claims 1, 2, and 6 to 13 was held to be known from the disclosure of document D1. As the priority claimed was invalid for these claims, D1 belongs to the prior art for them and their subject matter therefore lacked novelty. A translation into English language (D1e) of JP-A-2000161006 was submitted by the applicant.

- II. On 23 June 2004 the appellant (applicant) lodged an appeal against the decision and paid the prescribed fee on the same day. A statement setting out the grounds of appeal was filed on 9 September 2004. Enclosed with this statement the appellant submitted a revised set of claims and requested oral proceedings.

III. In order to meet the appellant's request, the appeal board issued a summons to oral proceedings expressing doubts in the annexed communication that the revised set of claims satisfied the requirements of Articles 123(2) and 84 EPC.

IV. Oral proceedings were held on 3 August 2006. In the appellant's view, the limitations to claim 1 submitted at the oral proceedings overcame the grounds underlying the decision of the examining division to refuse the application. The appellant therefore requested that the decision under appeal be set aside and a patent be granted on the basis of the claims 1 to 10 submitted at the oral proceedings.

Claim 1 reads as follows:

"1. Steam turbine blade having a blade length above 1143 mm (45 in) for a 3000 rpm turbine or a blade length above 952 mm (37.5 in) for a 3600 rpm turbine, - which blade is made of a martensite steel having a 20°C V-notch impact value larger than a value Y (kg·m/cm²) calculated by $Y = -0.44 \cdot x + 71$ where x is a 20°C tensile strength (kg/mm²), and a 20°C tensile strength above 145 kg/mm²,

which martensite steel consisting of - in wt.-% -
- C above 0.25 to 0.32%, Mo 2.0 to 4.0%, Si less than 0.5%, Mn less than 1.5%, Ni 2.0 to 3.5%, Cr 8.0 to 13.0%, V 0.05 to 0.35%, N 0.04 to 0.15%, at least one of Nb and Ta 0.02 to 0.3% in total,
- optionally at least one of Al, Ca, Mg, Y, rare-earth elements less than 0.2% in total,

- optionally at least one of Ti, Zr, Hf less than 0.5% in total, and
- Fe balance."

Claims 2 to 5 relate to preferred embodiments of the steam turbine blade set out in claim 1. Claims 6 and 7 to 10 are concerned with a steam turbine power generating plant or a low pressure steam turbine, respectively, comprising the steam turbine blade(s) according to any one of claims 1 to 5.

Reasons for the Decision

1. The appeal is admissible.
2. *Amendments; Article 123(2) EPC*

The steam turbine blade according to claim 1 having a length above 1143 mm (45 in) for a 3000 rpm turbine or a blade length above 952 mm (37.5 in) for a 3600 rpm turbine is disclosed on page 3, lines 13 to 22 of the application as originally filed. As set out on page 32, lines 13 to 16 of the description as filed, a tensile strength (TS) above 145 kg/mm² is obtained with a steel composition having a carbon content ranging from 0.25 to 0.32% in combination with a molybdenum content in the range of 2 to 4%. The elemental ranges for Si, Mn, Ni, Cr, Nb and Ta, V and N have a basis on page 4, lines 2 to 7, and the ranges for Ti, Zr, Hf and Al, Ca, Mg and Y, respectively, are supported by the passage given on page 18, lines 12 to 19 of the application as filed.

It is further specified on page 35, lines 13 to 16 that for a C content above 0.25 % the impact value Y (kg·m/cm²) should be larger than calculated from the equation $Y = -0.44 \cdot x + 71$ also featuring in claim 1. By keeping the TS above 145 kg/mm² and the impact value Y larger than a value calculated from the equation above $Y = -0.44 \cdot x + 71$, the blade length can be even further increased, i.e. to above 48 inches for a rotation speed of 3000 rpm and to above 40 inches for a rotation speed of 3600 rpm, as is mentioned on page 35, last line to page 36, line 6 of the application as filed. The board is therefore satisfied that the technical features set out in amended claim 1 have a basis in the documents as originally filed.

The subject matter of the dependent claims is supported by the following passages of the application as filed:

claim 2 to 4: page 7, line 3 to page 8, line 1;
claim 5: page 19, lines 7 to 9;
claim 6 to 10: page 5, line 22 to page 7, line 2.

Hence, the requirements of Article 123(2) EPC are met.

2. *Clarity, Article 84 and Rule 29(2) EPC*

Amended claim 1 stipulates a steam turbine blade having exact dimensions and a specific combination of mechanical properties which are obtained by adhering to a narrowly defined and closed martensitic steel composition. The same is true for the dependent claims 2 to 5 which are concerned with preferred embodiments of the martensitic steel turbine blade of claim 1. Independent claims 6 to 8 and 10 relate either

to a steam turbine power generating plant or to a low pressure steam turbine, respectively, comprising the claimed turbine blade(s). Hence, there are no objections to the present claims with respect to Article 84 EPC and Rule 29(2) EPC.

3. *State of the art*

3.1 The decision of the examining division is essentially based on the ground of lack of novelty arising from the disclosure of document D1 (D1e) which was filed on 25 November 1998 (before the priority date of the present application) and published on 13 June 2000, i.e. after the priority date and before the filing date of the present invention. Given the similarity of the technical contents of D1e and those of the present application as then described and claimed, the examining division concluded that the present application was not the "first application" within the meaning of Article 4 of the Paris Convention and Article 87(4) EPC so that the priority claimed for the present application was invalid.

The evaluation of the contents of document D1e, however, reveals that this document is concerned with a steam turbine blade made of a martensitic steel in which the carbon content is restricted to 0.15 to 0.25% (cf. D1e, claims 6, 7, 19; paragraph [0065]). Moreover, the examples 1 to 14 given in Tables 1 and 2 (paragraphs [0112], [0016], [0017]) on page 27 of document D1 (D1e) show that a TS above 145 kg/mm² is not obtained with the martensitic steel blades having a carbon content within the above mentioned range.

3.2 In contradistinction thereto, the carbon content of the martensitic steel turbine blade now claimed in the present application has been increased to more than 0.25 to 0.32% and guarantees, in interaction with the other constituents making up the martensitic steel composition that the desired combination of a TS > 145 kg/mm² and a high V-notch impact value is successfully achieved. This is confirmed by the examples 19 and 22, 23 given in Table 1 and the mechanical properties disclosed in Table 2 and displayed in Figure 7 of the present application. The subject matter claimed in the present application is, therefore, clearly distinguished from the subject matter disclosed in document D1 (D1e).

3.3 Having regard to the different technical teaching disclosed in D1e and that now claimed in the present application, document D1e cannot be rated as concerning "the same subject-matter" according to Article 87(4) EPC. With respect to the above findings, the priority claimed in the present application is valid for the invention as now claimed, and document D1e thus merely constitutes an intermediate national prior right. On the proper interpretation of Article 54(3) EPC, such national prior rights are not comprised in the state of the art, and only European prior patent applications filed under the EPC could be considered as such under Article 54(3) EPC. As shown in the annex to the European Search Report, such a European patent application corresponding to D1 JP-A-2000161006 does, however, not exist.

4. Since the decision of refusal was based on the grounds of lack on novelty vis-à-vis D1(e) and lack of clarity,

now removed, the board finds it appropriate to remit the case to the first instance for further prosecution.

Given the many differences existing between the subject matter now stipulated in the claims and the specification as originally filed, the description should be carefully adapted to the claims.

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 claims 1 to 10 filed during the oral proceedings.

The Registrar:

The Chairman:

V. Commare

T. K. H. Kriner.