

Internal distribution code:

- (A) [-] Publication in OJ
(B) [-] To Chairmen and Members
(C) [-] To Chairmen
(D) [X] No distribution

**Datasheet for the decision
of 26 September 2019**

Case Number: T 1747/15 - 3.2.06

Application Number: 09169493.5

Publication Number: 2299057

IPC: F01D5/14, F01D9/02, F01D9/04

Language of the proceedings: EN

Title of invention:
Gas Turbine

Patent Proprietor:
Ansaldo Energia IP UK Limited

Opponent:
Siemens Aktiengesellschaft

Headword:

Relevant legal provisions:
EPC Art. 56
RPBA Art. 13(1)

Keyword:
Inventive step - (no)
Late-filed auxiliary request - admitted (no)

Decisions cited:

Catchword:



Beschwerdekammern
Boards of Appeal
Chambres de recours

Boards of Appeal of the
European Patent Office
Richard-Reitzner-Allee 8
85540 Haar
GERMANY
Tel. +49 (0)89 2399-0
Fax +49 (0)89 2399-4465

Case Number: T 1747/15 - 3.2.06

D E C I S I O N
of Technical Board of Appeal 3.2.06
of 26 September 2019

Appellant: Siemens Aktiengesellschaft
(Opponent) Werner-von-Siemens-Straße 1
80333 München (DE)

Respondent: Ansaldo Energia IP UK Limited
(Patent Proprietor) 5th Floor, North Side
7/10 Chandos Street
Cavendish Square
London W1G 9DQ (GB)

Representative: Bernotti, Andrea
Studio Torta S.p.A.
Via Viotti, 9
10121 Torino (IT)

Decision under appeal: **Decision of the Opposition Division of the
European Patent Office posted on 1 July 2015
rejecting the opposition filed against European
patent No. 2299057 pursuant to Article 101(2)
EPC.**

Composition of the Board:

Chairman M. Harrison
Members: T. Rosenblatt
J. Hoppe

Summary of Facts and Submissions

- I. The appeal was filed by the appellant (opponent) against the decision of the opposition division rejecting the opposition filed against the patent in suit (hereinafter "the patent").
- II. The Board issued a summons to oral proceedings with a subsequent communication containing its provisional opinion. The Board opined *inter alia* that maintenance of the patent as granted appeared to be prejudiced by the ground of opposition under Article 100(a) in combination with Article 56 EPC, starting from

E1: EP-A-1 731 711

as the closest prior art.
- III. With its letter dated 26 August 2019 the respondent (proprietor) replied to the Board's preliminary opinion. The respondent maintained its previous main request and auxiliary request 1 and submitted new auxiliary requests 2 and 3.
- IV. Oral proceedings before the Board were held on 26 September 2019. During the oral proceedings the respondent withdrew its auxiliary requests 1 and 2.
- V. The appellant requested that the decision under appeal be set aside and the European patent be revoked.
- VI. The respondent's final requests were that the appeal be dismissed and the patent be maintained as granted, or as an auxiliary measure that the patent be maintained based on the claims of auxiliary request 3,

filed with letter dated 26 August 2019.

VII. Claim 1 of the patent as granted (respondent's main request) reads as follows:

"Gas turbine comprising at least a combustion chamber (2), a guide vane row (3) and a rotor airfoil row, said guide vane row (3) comprising a plurality of guide vane airfoils comprising a blade (7) and an inner platform (8), **characterised in that** the ratio between the pitch (P) and the leading edge diameter (D) of the guide vane airfoils is between 6.3-7.6 and the ratio between the platform length (L) and the leading edge diameter (D) of the guide vane airfoils is between 4.0-5.5, wherein the platform length (L) is defined by the axial distance between the leading edge (15) of a guide vane blade (7) and an inner guide vane platform inlet (16) measured at half high of the guide vane blade (7)."

VIII. In claim 1 of auxiliary request 3, the following features have been added:

", wherein the guide vane row (3) is the first guide vane row after the combustion chamber (2), the gas turbine comprising a hot gases pass [sic] through which during operation the hot gases pass through, wherein the area of the gases path in the zone of the first guide vane row (3) continuously decreases in the direction of the hot gases".

IX. The arguments of the appellant may be summarised as follows.

Claim 1 as granted - Articles 100(a) and 56 EPC

The subject-matter of claim 1 lacked an inventive step,

when starting from E1 as the closest prior art, which disclosed a gas turbine having all features of the preamble of claim 1. The guide vanes of this known turbine also had a certain diameter D at their respective leading edges, which leading edges were separated by a given pitch P and presented a given platform length L, as could be seen from Fig. 2 of E1. The presence of ratios P/D and L/D were thus implicitly disclosed. The ratios as such related anyway more to a design procedure than to a structurally distinguishing feature of the claimed gas turbine. Only the numerical ranges of the ratios specified by claim 1 were not explicitly disclosed in E1. Paragraphs 4 to 6 of E1 addressed the same problem as the patent. A particular technical effect of the selected numerical ranges of each of the two ratios or of their combination was not disclosed in the patent. Neither was the claimed guide vane row limited to a straight circumferential platform border, nor was the platform length L necessarily short, as was clear from paragraph 40 of the patent. The respondent had not provided any evidence that the numerical ranges of the claimed ratios resulted in any particular effect, noting that the burden of proof could not be shifted to the appellant to prove the absence of any such technical effect. The numerical ranges of the ratios were thus arbitrary and their selection therefore did not involve an inventive step.

Auxiliary request 3 - Admittance

The request was late filed and not substantiated. It should not be admitted into the proceedings. The respondent had not indicated a technical effect associated with the added features when seen in combination with the two ratios. The allegation that the features resulted in being able to dispense with

seals was technically not plausible and the technical considerations around this alleged effect were also highly complex and thus not suitable for discussion for the first time during oral proceedings before the Board.

- X. The arguments of the respondent may be summarised as follows.

Claim 1 as granted - Articles 100(a) and 56 EPC

Although E1 and the patent solved the same problem, the solutions were different. E1 suggested making the platform length L as long as possible and to provide a complex wave-shaped platform border upstream of the leading edge of the blades as highlighted in particular by its independent claim. In contrast, the patent proposed the reduction of gas ingestion with a simpler, (axially) shorter and more efficient guide vane row. Even though upstream-side wave-shaped platform borders were not explicitly excluded by the wording of claim 1, the skilled person understood from the patent in its entirety that conventional blades with straight platform borders were intended. The two ratios P/D and L/D were not mentioned in E1. They defined a particular configuration for the guide vane row according to the patent. A larger diameter D at the leading edge resulted in a higher impingement area for hot gases and thus in an increased static pressure upstream of the edge, as could be derived from paragraphs 8 and 9 of the patent. According to paragraph 10, static pressure increase was in particular high in front of the leading edges, and this could be reduced by increasing the distance, i.e. the pitch P, between adjacent guide vane leading edges. High static pressure increased the risk of gas ingestion as disclosed in paragraph 15.

Paragraph 40 in turn explained the effect of an increased platform length L on the reduction of the static pressure and consequently on the risk of hot gas ingestion. The two ratios defined a balanced relationship between the three parameters, which avoided hot gas ingestion.

Auxiliary request 3 - Admittance

The request was filed in reply to the preliminary opinion of the Board. The preliminary opinion contained new issues raised by the Board for the first time since it had considered the subject-matter of claim 1 to lack an inventive step, contrary to the previous conclusions of the examining division and of the opposition division. Amended claim 1 was based on a combination of only granted claims. It could therefore not be considered to be complex, nor did it introduce any new subject-matter. The request was substantiated in the letter accompanying it, where the technical effect achieved by the added feature was pointed out. It was implicit from the statement in that letter that no document of the prior art disclosed this feature, otherwise such claim would not have been submitted.

Reasons for the Decision

Main request - claim 1 as granted

1. The subject-matter of claim 1 of the patent in suit does not involve an inventive step (Article 56 EPC).
2. It was not contested that E1 discloses (see e.g. Figure 1) a gas turbine comprising the features defined

in the preamble of claim 1, which gas turbine can thus be considered to constitute the closest prior art.

3. As the Board stated in its communication setting out its preliminary opinion, the distinguishing features of claim 1 are the numerical values of the claimed specific ranges of the ratios between the pitch P and the leading edge diameter D , P/D , and between the platform length L and D , L/D . In regard to the diameter D , the respondent argued that this should be understood as being double the radius of curvature so as to account for leading edges with no circular-arc-shaped leading edge, which, for the purposes of considering inventive step, the Board has accepted to the benefit of the respondent.

The definition of the guide vane row's geometry in the claimed gas turbine by these ratios as such, i.e. irrespective of the specified numerical values, does not constitute a distinguishing feature of a gas turbine. Although these ratios have indeed not been explicitly indicated in E1, the parameters P , D and L and, as a consequence, their respective ratios are inevitably present since they are structural parameters of the prior art guide vane row.

These parameters are *inter alia* necessarily fixed during the design stage of the guide vane row. Although the ratios P/D and L/D may not necessarily have been considered during the design of the closest prior art gas turbine, the turbine itself necessarily has a guide vane row with selected values for D , P and L , and consequently implements a turbine with a guide vane row having fixed, though undisclosed, values for the ratios P/D and L/D . Since claim 1 is directed to a product, rather than to a method of manufacture or design of a

gas turbine, the definition of the ratios as such cannot be considered to constitute a distinguishing feature of claim 1; only the numerical ranges could constitute such difference.

4. No particular technical effect achieved by the numerical ranges of the two ratios is mentioned in the patent.

The claim refers to gas turbines in general. It does not specify the location of the guide vane row in any such gas turbine (e.g. whether it is located in a high pressure stage or in a low pressure stage, or before or after the combustor or some rotor vane) nor does it refer to any particular operating conditions (including e.g. the pressure of sealing air).

There is no indication or evidence in the patent that the specified ranges of the ratios have a superior influence in preventing gas ingestion in such generality than, for example, sealing air pressure.

Under these circumstances the burden of proof for such alleged other or superior effects lies with the proprietor, i.e. here the respondent. The achievement of a plausible technical effect linked to the selected numerical ranges of the two ratios was challenged by the appellant in its appeal grounds (pages 15 and 16). The Board also highlighted this issue in its communication setting out its preliminary opinion (point 3.3). The respondent did not however supply any argument, let alone any evidence making it at least plausible that the selected numerical ranges had some particular technical effect (see also point 6. below).

As also acknowledged by the respondent, E1 addresses

the same problem as the patent, namely reducing the risk of hot gas ingestion in the gap upstream of the blades' leading edges between the blades' platform borders and the ends of the wall of the combustion chamber facing the platform borders (see paragraph 19 of the patent and paragraph 6 of E1). Moreover, the Board finds that E1 states the same reason for an increased risk of hot gas ingestion as indicated in the patent, namely the obstruction of the gas flow passage through the blades themselves, in particular by their leading edges (see E1, column 2, lines 21-31).

In the absence of any particular effect shown in the patent for the numerical values of the ranges defined in the claim, the Board concludes that an objective technical problem, when starting from E1 as the closest prior art, can only be seen to be the provision of an alternative configuration of the platform and guide vane arrangement in a gas turbine in which the risk of gas ingestion caused by high static pressure upstream of the guide vane airfoil leading edges is addressed.

5. Based on the foregoing, the Board finds (as mentioned in item 3.3. of the communication containing the Board's provisional opinion) that the claimed numerical values of the ranges indeed constitute nothing more than an arbitrary selection, which as such requires no inventive activity. The subject-matter of claim 1 of the patent thus does not involve an inventive step.
6. The respondent's counter arguments do not alter the Board's finding, for the following reasons.
 - 6.1 As also acknowledged by the respondent, claim 1 does not specifically exclude guide vane blades with upstream-side wave-shaped platform borders (as known

from E1). The Board also cannot find in the passages of the patent indicated by the respondent, such as in paragraph 17, let alone in the wording of the claim, any statement supporting a limitation of the claimed subject-matter to gas turbines with a guide vane row having upstream-side straight platform borders. Nor does the Board accept the respondent's argument that the ratios and their numerical values would necessarily lead to shorter and more compact platform extensions, upstream of the leading edge, compared to those disclosed in E1. To the contrary, paragraph 40 of the patent suggests having long platform extensions upstream the leading edges, "[n]evertheless as the gap is far away from the leading edges..." (underlining by the Board). As regards the respondent's alleged increase in efficiency obtained with guide vane rows respecting the claimed ratios, there is no evidence for this on file, as mentioned before. Therefore the alleged technical effects considered to be achieved by the respondent and the problems formulated on the basis of these effects, i.e. to provide a gas turbine which is compact (due to short upstream platform length L), simpler (due to straight upstream-side platform borders) and more efficient, lack any basis.

- 6.2 The remaining arguments of the respondent, based on the effects attributed to the parameters P, D, and L, their ratios and alleged synergies, based on e.g. paragraphs 8, 9, 10, 15, 39 and 40 of the patent, are not found persuasive either. None of the cited passages indicates any effect in relation to the ratios, let alone any synergies between the selected numerical ranges for P/D and L/D. The two ratios together with their respective claimed and preferred numerical ranges are mentioned in the patent only in paragraphs 30 and 31, however (as indicated previously), without any

comment as to the significance thereof. The arguments relying on those other passages cited by the respondent do not reply to the crucial question raised in the appeal grounds in regard to the lack of a particular technical effect achieved by the claimed numerical ranges.

7. The opposition ground under Article 100(a) in combination with 56 EPC therefore prejudices maintenance of the patent as granted.

Auxiliary request 3

8. This auxiliary request was filed in reply to the Board's preliminary opinion, hence after the time limit for filing the reply to the appeal. It therefore constitutes an amendment to the respondent's case (Article 13(1) RPBA).

Any amendment to a party's case may be admitted and considered at the Board's discretion. The discretion shall be exercised in view of inter alia the complexity of the new subject-matter submitted, the current state of the proceedings and the need for procedural economy.

9. The Board cannot accept the respondent's argument that the filing of auxiliary request 3 was occasioned by a new issue raised for the first time by the Board in its preliminary opinion. To the contrary, the Board's negative preliminary opinion as well as its final conclusion on inventive step of the subject-matter of granted claim 1 was based entirely on arguments submitted by the appellant in its appeal grounds. Auxiliary request 3 could and should have been filed therefore already in reply to the appeal grounds. The mere fact that the Board gave a preliminary opinion on

the matter of inventive step which was different to that given by the opposition division, and was opposite to what the examining division (albeit without having considered arguments from another party) had decided, does not constitute a change of the facts underlying the case. Parties to appeal proceedings should be fully aware that a Board may opine, and ultimately find, differently to the opposition division. This is indeed the purpose of the appellant's case. Thus, neither the Board's preliminary opinion nor the Board's finding, can be seen as justifying an additional opportunity for the respondent to react at such a late stage of the appeal procedure.

Although the amendment of claim 1 is based essentially on the combination of granted claims 1 and 6, the resulting subject-matter involves further complex considerations concerning the technical effects possibly achieved by the added features, in particular in combination with the claimed numerical ranges for the ratios P/D and L/D. In its letter accompanying the submission of its auxiliary request 3, the respondent stated, notably without further substantiation, that the added features defined a more specific structure at a first stage guide vane row of a gas turbine providing the advantage of reduced gas ingestion without the need of relying on seals. In the oral proceedings before the Board, during the discussion of whether such a request might nevertheless have been *prima facie* allowable, the respondent pointed to paragraphs 33 to 35 and 41 to 45 of the patent in support of this alleged effect. However, at least on a *prima facie* basis, these passages do not provide any plausible evidence that the alleged effect is achieved. On the contrary, the effect appeared to the Board to be *prima facie* technically highly questionable, as also pointed out by the

appellant, having regard to the complexity of gas turbines (in either field of application, aviation or stationary for power generation). In particular, further discussion would have been required for the first time at a very late stage of the appeal proceedings on evidently complex technical relationships between the relevant claimed features and their potential impact on the provision of seals at a specific location in a gas turbine. Since none of this was addressed by the respondent in its letter accompanying the filing of the request, such complex submissions would have had to be heard for the first time during the oral proceedings before the Board.

Moreover, in its letter accompanying the submission of this request, the respondent had also not even taken into account the objections under Article 56 EPC raised originally in the notice of opposition against granted claim 6, to which the appellant had referred in the appeal grounds. The respondent's short statement regarding the alleged technical effect did not shed light on the issue of obviousness of the claimed subject-matter in view of the available prior art or the common general knowledge. The Board therefore, also from this standpoint, saw no evidence that the request was *prima facie* allowable in regard to the requirement of Article 56 EPC.

Under these circumstances the Board exercised its discretion under Article 13(1) RPBA not to admit auxiliary request 3 into the proceedings.

10. In the absence of any set of claims complying with the requirements of the Convention, the patent has to be revoked (Article 101(3)b EPC).

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.
2. The patent is revoked.

The Registrar:

The Chairman:



M. H. A. Patin

M. Harrison

Decision electronically authenticated