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Datasheet for the decision of 8 January 2015

Case Number: T 0048/12 - 3.3.05

Application Number: 02710692.1

Publication Number: 1362383

IPC: H01M8/04, H01M8/06

Language of the proceedings: EN

Title of invention:
FUEL CELL SYSTEM

Patent Proprietor:
Ceramic Fuel Cells Limited

Opponent:
Opposition withdrawn

Headword:
SOFC/Ceramic fuel cells

Relevant legal provisions:
EPC Art. 54(1), 54(2), 54(3)

Keyword:
Novelty - main and first auxiliary request - implicit disclosure (yes) - second auxiliary request - implicit disclosure (no)

Decisions cited:

Catchword:

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Case Number: T 0048/12 - 3.3.05

D E C I S I O N
of Technical Board of Appeal 3.3.05
of 8 January 2015

Appellant: (Patent Proprietor)	Ceramic Fuel Cells Limited 170 Browns Road Noble Park, VIC 3174 (AU)
Representative:	Jones, Helen M.M. Gill Jennings & Every LLP The Broadgate Tower 20 Primrose Street London EC2A 2ES (GB)
Respondent (Oppnent)	Opposition withdrawn
Decision under appeal:	**Decision of the Opposition Division of the European Patent Office posted on 26 October 2011 revoking European patent No. 1362383 pursuant to Article 101(3)(b) EPC.**

Composition of the Board:

Chairman	G. Raths
Members:	J.-M. Schwaller
	C. Vallet

Summary of Facts and Submissions

I. The present appeal lies from the decision of the opposition division revoking European patent No. 1 362 383, independent claim 1 of which reads as follows:

"*1. A process for producing electricity in a fuel cell which comprises:*
a) pre-reforming a higher carbon (C_{2+}) hydrocarbon fuel in a pre-reformer under conditions effective to achieve 97.5% or greater conversion of higher carbon (C_{2+}) hydrocarbons to produce a pre-reformed fuel stream;
b) subjecting the pre-formed fuel stream to methanation under conditions effective to produce a fuel stream having an increased concentration of methane relative to the pre-reformed fuel stream; and
c) supplying the fuel stream and an oxidant to a high temperature fuel cell in which methane is reformed and electricity is produced by reacting the fuel stream at an anode of the fuel cell and reacting the oxidant at a cathode of the fuel cell, wherein the methane content of the fuel stream resulting from methanation is at least 40% by volume measured on a dry basis."

II. In its decision, the opposition division held in particular that the above claimed subject-matter lacked novelty over the disclosure of document

E7: English translation of JP-A-11025997

III. With its statement of grounds of appeal dated 2 March 2012, the appellant contested the decision and submitted an amended set of claims as an auxiliary request, claim 1 of which reads as follows:

"*1. A process for producing electricity in a* ***solid oxide*** *fuel cell which comprises:*
a) pre-reforming a higher carbon (C_{2+}) hydrocarbon fuel in a pre-reformer under conditions effective to achieve 97.5% or greater conversion of higher carbon (C_{2+}) hydrocarbons to produce a pre-reformed fuel stream;
b) subjecting the pre-formed fuel stream to methanation under conditions effective to produce a fuel stream having an increased concentration of methane relative to the pre-reformed fuel stream; and
c) supplying the fuel stream and an oxidant to a high temperature fuel cell in which methane is reformed and electricity is produced by reacting the fuel stream at an anode of the fuel cell and reacting the oxidant at a cathode of the fuel cell, wherein the methane content of the fuel stream resulting from methanation is at least 40% by volume measured on a dry basis."

IV. By letter dated 20 July 2012, the opponent withdrew its opposition.

V. In a communication dated 17 December 2014, the board expressed its preliminary opinion that claim 1 as granted lacked novelty over the disclosure of document E7 and that the claimed subject-matter of both requests on file lacked novelty over document

E1: WO 01/13452

VI. By letter of 6 January 2015, the appellant contested the board's preliminary opinion, arguing in particular that the claimed subject-matter was novel over E1 or E7. Further, since the board introduced E1 at a late stage into the appeal's proceedings, the appellant requested to have an opportunity to submit a new request at the oral proceedings, in the event that the

board found the claims of either request to lack novelty over E1.

VII. During the oral proceedings, which took place on 8 January 2015, the novelty issue was discussed in the light of documents E1 and E7. The appellant then filed an amended set of claims as an auxiliary request 2, with claim 1 thereof reading as follows:

"*1. A process for producing electricity in a* ***solid oxide*** *fuel cell which comprises:*
a) pre-reforming a higher carbon (C_{2+}) hydrocarbon fuel in a pre-reformer under conditions effective to achieve 97.5% or greater conversion of higher carbon (C_{2+}) hydrocarbons to produce a pre-reformed fuel stream;
*b) subjecting the pre-****re****formed fuel stream to methanation under conditions effective to produce a fuel stream having an increased concentration of methane relative to the pre-reformed fuel stream; and*
c) supplying the fuel stream and an oxidant to a high temperature fuel cell in which methane is reformed and electricity is produced by reacting the fuel stream at an anode of the fuel cell and reacting the oxidant at a cathode of the fuel cell, wherein the methane content of the fuel stream resulting from methanation is at least 40% by volume measured on a dry basis,
wherein the fuel pre-reforming and methanation are carried out either
a) in a single reactor having a first heating zone for fuel pre-reforming and a second zone for methanation; or
b) in two separate reactors provided in series."

VIII. The appellant requested that the decision under appeal be set aside or, alternatively, that the patent be maintained as granted or in amended form on the basis

of the claims according to auxiliary request 1 dated 2 March 2012 or, alternatively, auxiliary request 2 filed at the oral proceedings.

Reasons for the Decision

1. Main request - novelty

1.1 Document E1 discloses (see claim 1) a process for producing electricity in a fuel cell comprising reacting a higher carbon (C_{2+}) hydrocarbon fuel with steam in a pre-reformer at a temperature of no greater than 500°C to produce a fuel stream including hydrogen and not less than 20% by volume methane measured on a wet basis, and supplying the fuel stream and an oxidant to a high temperature fuel cell in which the methane is reformed and electricity is produced by reacting the fuel stream at an anode of the fuel cell and reacting the oxidant at a cathode of the fuel cell.

E1 further discloses (see claims 3 and 14) that the fuel stream includes most preferably not less than 60% by volume methane, measured on a wet basis and that the reaction in the pre-reformer results in the conversion of at least 97.5% of the C_{2+} hydrocarbon fuel.

1.2 The appellant argued that the subject-matter of claim 1 at issue was novel over E1, because this document did not disclose the claimed multi-step processing in which a hydrocarbon fuel was first pre-reformed to produce a pre-reformed fuel stream which then was subjected to methanation to produce a fuel stream with an increased methane concentration.

The board cannot accept this argument because claim 1 at issue includes the possibility of performing both

the pre-reforming step and the methanation step in a single zone of a single reactor, as in document E1, which furthermore discloses (see page 5) that the following sequence of reactions occurs in the pre-reformer:

C_xH_{2x+2} ---> (CO, CO_2, H_2) ---> (CH_4, CO_2, CO, H_2)

For the board, this sequence of reactions consists in a first step of pre-reforming of a fuel stream followed by a second step of methanation of the resulting pre-reformed fuel stream, from which the subject-matter of claim 1 at issue is not technically distinguishable, so that said claim 1 (also claim 1 as granted) is no longer novel.

1.3 It follows from the above considerations that the main request is not allowable under Article 54(1) and (3) EPC.

2. Auxiliary request 1 - novelty

Claim 1 of this request is distinguished from claim 1 as granted in that the fuel cell is defined as being a "solid oxide" fuel cell.

This type of fuel cell being the one which is of "primary interest for the invention" disclosed in E1 (see E1: page 1, lines 29 to 31), the subject-matter of claim 1 of this request is thus not novel for the same reasons as those indicated in points 1.1 and 1.2 above, and so said claim 1 lacks novelty under Article 54(1) and (3) EPC.

3. Auxiliary request 2 - amendments

Claim 1 of auxiliary request 2 is based on the subject-matter of claims 10 and 11 as filed.

The board is satisfied that the requirements of Article 123 (2) EPC are met.

4. Auxiliary requests 2 - novelty

Claim 1 of this request is distinguished from claim 1 of both previous requests in that the fuel pre-reforming and methanation "are carried out either

a) in a single reactor having a first heating zone for fuel pre-reforming and a second zone for methanation;

or

b) in two separate reactors provided in series."

In E1, as explained above, the fuel pre-reforming and methanation are performed in a single zone of a single reactor. It follows that the subject-matter of claim 1 at issue is novel over the disclosure of E1.

The same conclusion applies with respect to document E7, which does not disclose a process for producing electricity in a solid oxide fuel cell, but in an "internally reforming molten carbonate type" fuel cell (see E7: page 3, first seven lines). This type of fuel cell is different from the one claimed. So, claim 1 at issue is novel over the disclosure of E7.

5. Since the reasons which led to the revocation of the patent no longer apply, the board exercises its discretion under Article 111(1) EPC and remits the case to the opposition division for further prosecution.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.

2. The case is remitted to the opposition division for further prosecution on the basis of the second auxiliary request filed at the oral proceedings.

The Registrar: The Chairman:

C. Vodz G. Raths

Decision electronically authenticated