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Datasheet for the decision of 18 May 2021

Case Number: T 0598/19 - 3.3.05

Application Number: 01922748.7

Publication Number: 1273061

IPC: H01M8/04, H02J3/14, B60L11/18, H01M8/04955, H01M8/04014, H01M8/04828, H01M8/04089, B60L3/00, H01M8/04746, H01M8/249, H01M8/0432, H01M8/04537

Language of the proceedings: EN

Title of invention:
FUEL CELL SYSTEM WITH LOAD MANAGEMENT

Patent Proprietor:
NAVAL GROUP

Opponent:
ThyssenKrupp Marine Systems GmbH

Headword:
Fuel cell system/NAVAL GROUP

Relevant legal provisions:
EPC Art. 123(2), 84, 56
EPC R. 103(4)(c)

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Keyword:

Amendments - allowable (yes)
Claims - clarity (yes)
Inventive step - (yes)
Partial reimbursement of appeal fee - (yes)

Decisions cited:

T 0488/18, T 0795/19

Catchword:

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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 0598/19 - 3.3.05

D E C I S I O N
of Technical Board of Appeal 3.3.05
of 18 May 2021

Appellant: (Opponent)	ThyssenKrupp Marine Systems GmbH Werftstrasse 112-114 24143 Kiel (DE)
Representative:	Tetzner, Michael Tetzner & Partner mbB Patent- und Rechtsanwälte Van-Gogh-Strasse 3 81479 München (DE)
Respondent: (Patent Proprietor)	NAVAL GROUP 40-42 rue du Docteur Finlay 75015 Paris (FR)
Representative:	Lavoix 2, place d'Estienne d'Orves 75441 Paris Cedex 09 (FR)
Decision under appeal:	**Decision of the Opposition Division of the European Patent Office posted on 21 December 2018 rejecting the opposition filed against European patent No. 1273061 pursuant to Article 101(2) EPC.**

Composition of the Board:

Chairman	E. Bendl
Members:	G. Glod
	O. Loizou

Summary of Facts and Submissions

I. The opponent's (appellant's) appeal lies from the opposition division's decision rejecting the opposition against European patent No. EP-B-1 273 061.

II. The following documents cited in the decision are of relevance here:

E1: EP 0 052 265 B1
E5: EP 0 559 816 B1

III. In the appeal proceedings the respondent (patent proprietor) maintained the patent as granted as its main request, along with auxiliary requests 1 to 13 submitted during the opposition proceedings on 21 September 2018.

IV. By letter of 7 October 2019 the appellant submitted the following documents:

E46: US 5 997 594 A
E47: US 5 861 137 A

V. By letter dated 24 March 2021 the appellant withdrew its request for oral proceedings and announced that if oral proceedings were held it would not be attending.

VI. In the communication pursuant to Article 15(1) RPBA of 1 April 2021, the board expressed the preliminary opinion that auxiliary request 3 was allowable.

VII. In response, the respondent also withdrew its request for oral proceedings, along with the main request and auxiliary requests 1 and 2, and accepted the

maintenance of the patent on the basis of auxiliary request 3.

VIII. The independent claims of the third auxiliary request, which is now the highest-ranked request, read as follows:

"*1. A fuel cell system with stack redundancy, comprising:*
a fuel processing assembly (62) adapted to produce a product hydrogen stream (66) from a feedstock; and a fuel cell stack assembly (77) adapted to receive at least a portion of the product hydrogen stream (66) from the fuel processing assembly (62) and to produce an electric current therefrom to at least partially satisfy an applied load having a magnitude, wherein the fuel cell stack assembly (77) includes a plurality of fuel cell stacks (76) that each have a maximum rated power output,
wherein each of the fuel cell stacks (76) has a plurality of operational states that include at least a first operational state, in which the fuel cell stack receives at least a portion of the product hydrogen stream from the fuel processing assembly and produces an electric current therefrom, and a second operational state, in which the fuel cell stack is not producing an electric current; and wherein the fuel cell stack assembly (77) has a plurality of operational states that include at least a first operational state in which all of the fuel cell stacks (76) are receiving at least a portion of the product hydrogen stream from the fuel processing assembly and producing an electric current therefrom, a second operational state, in which none of the fuel cell stacks are producing an electric current, and a third operational state, in which at least one of the plurality of fuel cell stacks is

receiving at least a portion of the product hydrogen stream from the fuel processing assembly (77) and producing an electric current therefrom, and at least one of the plurality of fuel cell stacks is not producing an electric current,
wherein the fuel cell system further includes means for controlling the operational states of the plurality of fuel cell stacks (76), wherein the fuel processing assembly includes a fuel processor (64) adapted to produce the produce hydrogen stream (66) from a feed stream containing a carbon containing feedstock and water, said fuel processor (64) being a steam reformer (150) or an autothermal reformer, and
wherein the fuel processor includes a reforming region (152), the reforming region (152) including a steam reforming catalyst in the case where the fuel processor is a steam reformer (150) and the reforming region including an autothermal reforming catalyst in the case where the fuel processor is an autothermal reformer, the reforming region (152) being configured for producing a reformate stream (156) from the feed stream containing the carbon containing feedstock and water, the reformate stream (156) containing hydrogen gas and impurities, and being delivered to a separation region (158) configured for purifying the hydrogen gas, the separation region (158) being configured for separating the hydrogen-containing stream into one or more byproduct streams (160) and a hydrogen-rich stream (162) by a pressure-driven separation process."

"*37. The use of fuel cell stack redundancy in a fuel cell system comprising:*
a fuel processing assembly (62) adapted to produce a product hydrogen stream (66) from a feedstock; and
a fuel cell stack assembly (77) which includes a plurality of fuel cell stacks (76) that each give a

maximum rated power output adapted to receive at least a portion of the product hydrogen stream (66) from the fuel processing assembly (62) and to produce an electric current therefrom to at least partially satisfy an applied load having a magnitude, said redundancy being achieved in that the sum of the maximum rated power outputs of the plurality of fuel stacks (76) is greater than a maximum desired power output of the fuel cell stack assembly (77),
wherein the fuel processing assembly includes a fuel processor (64) adapted to produce the produce hydrogen stream (66) from a feed stream containing a carbon containing feedstock and water, said fuel processor being a steam reformer (150) or an autothermal reformer, and wherein the fuel processor includes a reforming region (152), the reforming region (152) including a steam reforming catalyst in the case where the fuel processor is a steam reformer (150) and the reforming region including an autothermal reforming catalyst in the case where the fuel processor is an autothermal reformer, the reforming region (152) being configured for producing a reformate stream (156) from the feed stream containing the carbon containing feedstock and water, the reformate stream (156) containing hydrogen gas and impurities, and being delivered to a separation region (158) configured for purifying the hydrogen gas, the separation region (158) being configured for separating the hydrogen-containing stream into one or more byproduct streams (160) and a hydrogen-rich stream (162) by a pressure-driven separation process."

Claims 2 to 36 and 38 relate to preferred embodiments of the above claims.

IX. As the parties withdrew their requests for oral proceedings, the oral proceedings scheduled for 16 July 2021 were cancelled and the decision is to be given in writing.

X. The appellant's relevant arguments can be summarised as follows:

The requirements of Article 123(2) EPC were not met. There was no disclosure that the reforming region (152) should include an autothermal reforming catalyst.

There was a problem of clarity under Article 84 EPC since "steam reforming" included "autothermal reforming". There was no indication of how to differentiate between these terms.

The subject-matter of claims 1 and 37 was obvious in view of E1 in combination with E5 and the teaching of E45 or E46.

XI. The respondent's arguments are reflected in the reasoning below.

XII. The appellant (opponent) requested that the impugned decision be set aside and that the patent be revoked.

The respondent (patent proprietor) requested that the patent be maintained in amended form on the basis of one of auxiliary requests 3 to 13 submitted on 21 September 2018 during the opposition proceedings.

Reasons for the Decision

Auxiliary request 3

1. Article 123(2) EPC

The requirements of Article 123(2) EPC are met for the following reasons:

The only point of debate is whether there is disclosure of the feature "autothermal reforming catalyst" being part of the reforming region.
The features added compared with claim 1 as granted are based on page 5, lines 1 to 4 and page 21, lines 17 to 26 of the application as filed, in which it is explicitly disclosed that the reformer may be an autothermal reformer that includes an autothermal reforming catalyst (page 21, lines 18 and 19).
Therefore it is directly and unambiguously derivable for the skilled person that, in cases where the fuel processor is an autothermal reformer, the reforming region contains an autothermal reforming catalyst.

2. Article 84 EPC

The expression "a steam reformer or an autothermal reformer" is clear to the skilled person since "steam reformer" is a broad expression that covers two possibilities (autothermal and allothermal), an autothermal reformer being considered to be the preferred option. Although "autothermal reformer" could be deemed redundant, its presence per se does not lead to an unclear claim.

3. Article 56 EPC

3.1 The invention relates to fuel cell systems including a plurality of fuel cell stacks.

3.2 E1 is the closest prior art since it also discloses a system of this kind and deals with cell stack redundancy.

3.3 The problem to be solved is to provide more compact fuel cells (see point 6.3 of the impugned decision).

3.4 The parties did not dispute that the problem is solved by a fuel cell system according to claim 1 characterised in that the system comprises a fuel processing assembly (62) adapted to produce a product hydrogen stream (66) from a feedstock, wherein the fuel processing assembly includes a fuel processor (64) adapted to produce the product hydrogen stream (66) from a feed stream containing a carbon-containing feedstock and water, said fuel processor (64) being a steam reformer (150) or an autothermal reformer, and wherein the fuel processor includes a reforming region (152), the reforming region (152) including a steam reforming catalyst in the case where the fuel processor is a steam reformer (150) and the reforming region including an autothermal reforming catalyst in the case where the fuel processor is an autothermal reformer, the reforming region (152) being configured for producing a reformate stream (156) from the feed stream containing the carbon-containing feedstock and water, the reformate stream (156) containing hydrogen gas and impurities, and being delivered to a separation region (158) configured for purifying the hydrogen gas, the separation region (158) being configured for separating the hydrogen-containing stream into one or more

byproduct streams (160) and a hydrogen-rich stream (162) by a pressure-driven separation process.

3.5 The board also agrees that the problem is successfully solved.

3.6 The solution to the problem is not obvious for the following reasons:

The skilled person trying to solve the stated problem will consult E5 since it also deals with submarines and addresses the same problem. E5 discloses that reforming fuels is a very apt way of providing hydrogen in order to avoid storage problems (column 8, lines 20 to 45). However E5 is silent about the separation region that is able to purify hydrogen. Separation regions of this kind are known from E46 and E47, which generally teach the purification of hydrogen. Nevertheless, when starting from E1 and applying the teaching of E5 in an attempt to solve the stated problem, the skilled person would not have considered E46 and E47 as these documents do not relate to the specific case of submarines.

3.7 Similar reasoning as for claim 1 applies to claim 37, which was objected to for the same reasons as claim 1.

3.8 For the same reasons, the subject-matter of claims 1 and 37 and dependent claims 2 to 36 and 38 involves an inventive step.

3.9 In view of the considerations above, the issue of whether E46 and E47 were to be considered during these appeal proceedings need not be addressed.

Auxiliary requests 4 to 13

4. Since auxiliary request 3 (highest ranked request) is allowable, the auxiliary requests 4 to 13 need not be discussed.

5. Rule 103(4)(c) EPC

According to Rule 103 (4)(c) EPC the appeal fee shall be reimbursed at 25% if any request for oral proceedings is withdrawn within one month of notification of the communication issued by the Board of Appeal in preparation for the oral proceedings, and no oral proceedings take place.

In the case in hand, the appellant had already withdrawn its request for oral proceedings before being notified of the communication pursuant to Article 15(1) RPBA 2020 issued by the board in preparation for the oral proceedings. The respondent withdrew its request within one month of the notification of said communication. Therefore the oral proceedings could be cancelled and the decision issued in writing.

The situation is very similar to that in T 488/18 (Reasons 8) except that in that case the appellant had not filed a request for oral proceedings at all. The board agrees with the rationale of that decision that the wording "any" (or "ein etwaiger" in German or "une" in French) in Rule 103(4)(c) EPC does not imply that the request for oral proceedings has to be the appellant's request for oral proceedings.

Furthermore as a result of the appellant’s (opponent’s) withdrawal of its request for oral proceedings, it is obvious that it had itself already

become active and would not, only, benefit of the withdrawal of the request for oral proceedings of the respondent (patent proprietor) which occurred after the notification of the Board's communication. In this respect, this case differs from the facts of T 0795/19 and the appeal fee under Rule 103 (4)c) EPC is to be refunded.

Therefore 25% of the appeal fee is reimbursed.

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 with the order to maintain the patent in amended form on the basis of auxiliary request 3 submitted on 21 September 2018 during the opposition proceedings and a description to be adapted accordingly.

3. 25% of the appeal fee is reimbursed.

The Registrar: The Chairman:

C. Vodz E. Bendl

Decision electronically authenticated