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Datasheet for the decision of 13 December 2018

Case Number: T 0717/14 - 3.3.05

Application Number: 03251897.9

Publication Number: 1349228

IPC: H01M8/24, H01M8/02, H01M8/04

Language of the proceedings: EN

Title of invention:
Polymer electrolyte fuel cell, method of manufacturing the same and inspection method therefor

Applicant:
Panasonic Corporation

Headword:
Polymer electrolyte fuel cell/Panasonic

Relevant legal provisions:
RPBA Art. 13(1)

Keyword:
Late-filed requests - clearly allowable (no)

Decisions cited:

Catchword:

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Beschwerdekammern

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Case Number: T 0717/14 - 3.3.05

D E C I S I O N
of Technical Board of Appeal 3.3.05
of 13 December 2018

Appellant: (Applicant)	Panasonic Corporation 1006, Oaza Kadoma Kadoma-shi Osaka 571-8501 (JP)
Representative:	D Young & Co LLP 120 Holborn London EC1N 2DY (GB)
Decision under appeal:	**Decision of the Examining Division of the European Patent Office posted on 4 November 2013 refusing European patent application No. 03251897.9 pursuant to Article 97(2) EPC.**

Composition of the Board:

Chairman	E. Bendl
Members:	G. Glod
	P. Guntz

Summary of Facts and Submissions

I. The present appeal lies from the decision of the examining division to refuse European patent application EP 03 251 897.9.

II. With the statement of grounds of appeal, the appellant (applicant) filed a main request, corresponding to the first auxiliary request rejected by the examining division for not meeting the requirements of Articles 84 and 56 EPC. An auxiliary request was also filed.

III. The following documents are referred to in the present decision.

D2: EP 1 255 315
D3: WO 01/059864

IV. In the communication under Article 15(1) RPBA, the board was of the preliminary opinion that the appeal was likely to be dismissed.

V. By letter of 26 November 2018, the appellant filed a new main request and first auxiliary request and indicated that it would not attend the scheduled oral proceedings.

The only claim of the main request is as follows:

"*1. A method of manufacturing a polymer electrolyte fuel cell, comprising processes of:*
forming a plurality of unit cells; stacking the plurality of unit cells to form a cell stack; and tightening the cell stack in a stacking direction of the stack; the process of forming the plurality of unit cells comprising steps of: placing, on opposite major

surfaces of a hydrogen ion conductive polymer electrolyte membrane (541), a first and a second electrode (540a, 540b), each electrode (540a, 540b) comprising a gas diffusion layer and a catalyst layer, to form an electrolyte membrane-electrode assembly; placing a first electrically conductive separator plate (502) contacting the first electrode (540a) and having a first gas flow channel (521) for supplying and exhausting a fuel gas to and from the first electrode (540a); and placing a second electrically conductive separator plate (503) contacting the second electrode (540b) and having a second gas flow channel (531a) for supplying and exhausting an oxidant gas to and from the second electrode (540b); wherein the process of forming the plurality of unit cells further comprises, before the step of forming each electrolyte membrane-electrode assembly, a step of smoothing both major surfaces of each gas diffusion layer, wherein:
said gas diffusion layer is a carbon cloth; and
said step of smoothing comprises a treatment of preliminary reducing roughness and thickness variations of the surface of said gas diffusion layer by subjecting said gas diffusion layer to preliminary pressing or preliminary flame treatment at the surface thereof."

Claim 1 of the first auxiliary request includes in addition the underlined feature:

"*1. [...]second electrode (540b); and tightening the stack with a tightening pressure of about 4 to 8 kgf/ cm^2 of contact area between each of the electrodes (540a, 540b) and its respective electrically conductive separator plate (502, 503), wherein the process of forming [...]*"

VI. Oral proceedings took place on 13 December 2018 in the absence of the appellant.

VII. The arguments of the appellant may be summarised as follows:

The values of the roughness and the thickness variations after the smoothing treatment did not need to be specified in the claim. The person performing the process could observe whether, after treatment, the roughness and the thickness variations had been lessened. The requirements of Article 84 EPC were fulfilled.

D2 did not disclose a carbon cloth as a gas diffusion layer and did not discuss the preliminary smoothing treatment. D2 did not disclose that the smoothing of the surface of the gas diffusion layer reduced the generation of micro short-circuits in the polymer electrolyte membrane.

VIII. The appellant requests that the decision under appeal be set aside and that a patent be granted on the basis of the main request or, in the alternative, on the basis of the first auxiliary request. Both requests were filed by letter of 26 November 2018.

Reasons for the Decision

1. Article 13(1) RPBA

1.1 The main and first auxiliary requests including amendments originating from the description were submitted on 26 November 2018, approximately two and a half weeks before the oral proceedings. According to

established case law (Case Law of the Boards of Appeal of the EPO, 8th edition 2016, IV.E.4.2.5, page 1133), a request filed after the grounds of appeal may be admitted and considered at the board's discretion if the amended request is clearly or obviously allowable.

In the present case, this condition is not fulfilled for either request for the following reasons:

1.2 Claim 1 relates to a method of manufacturing a polymer electrolyte fuel cell. Each electrode comprises a gas diffusion layer (line 6 of claim 1). The gas diffusion layer is a carbon cloth that has to be smoothed by preliminary pressing or preliminary flame treatment. This preliminary step relates thus to the preparation of one of the materials to be used for the manufacturing of the fuel cell.

Claim 1 does not provide any details on the preliminary pressing and preliminary flame treatment steps and does not specify the degree of desired reduction in roughness and thickness variations. The final state after smoothing is also not defined. Claim 1 does not exclude that the preliminary pressing is only done at a low pressure without flame treatment and that the reduction in roughness and thickness variations is only minor.

1.3 In view of this broad wording of the smoothing step, it is not immediately apparent that the requirements of Article 56 EPC are met.

1.3.1 Although D2 (in English), which corresponds to D3 (in Japanese), which is prior art under Article 54(2) EPC, does not disclose a carbon cloth and a smoothing step of the gas diffusion layer, there is no evidence that

the alleged problem of reduction of micro short-circuits is solved over the whole range claimed.

Example 8 of the present application was conducted with a carbon cloth and included pretreatment of the carbon cloth by pressing at 30kgf/cm^2 for 5 minutes or hot pressing at 150°C and 30kgf/cm^2 for 5 minutes or hot pressing under the same conditions with an additional flame treatment (page 41, line 31 to page 42, line 7). The preliminary pressing was thus done at a considerably higher pressure than the tightening pressure of the cell stack that was found to be good (4 kgf/cm^2 to 8 kgf/cm^2)(see paragraph [0121]). There is no evidence and it is also not credible that the same results are obtained for preliminary pressing at any pressure. At low pressures, the effect of preliminary pressing would even be lower than the tightening pressure itself.

Consequently, the objective technical problem can only be seen as the provision of an alternative method for making a fuel cell. Since carbon cloth was known to be used as a gas diffusion layer (see background of the invention) and the preliminary pressing is superfluous if not conducted at an elevated pressure, claim 1 has to be considered an obvious alternative to D2.

1.3.2 Claim 1 of auxiliary request 1 further includes the tightening pressure of 4 to 8 kgf/cm^2. Although example 2 in combination with Figure 12 could be seen as providing some indications that said tightening pressure is beneficial for the short-circuit conductivity, the example refers to specific parameters such as a thickness of the carbon cloth of 300 µm and there is no information on whether the data given also apply if preliminary smoothing is done. This is in line

with the disclosure in paragraph [0043] of the published application specifying that a smoothing treatment reduced the influence of the tightening pressure. Further, it is confirmed by the appellant's submission of 26 November 2018 (page 4) that the tightening pressure is not an essential feature for achieving the technical effect. Consequently, the conclusion of point 1.3.1 (above) still applies and the tightening pressure range is considered an arbitrary range that the skilled person would apply as needed.

1.4 In conclusion, none of the requests can be considered clearly allowable.

1.5 Since the requests are not clearly allowable, the board exercises its discretion in accordance with established case law and does not admit them into the proceedings.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar: The Chairman:

C. Vodz E. Bendl

Decision electronically authenticated