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**Datasheet for the decision  
of 4 September 2014**

**Case Number:** T 2493/10 - 3.3.05

**Application Number:** 03758973.6

**Publication Number:** 1557894

**IPC:** H01M8/02, H01M8/10

**Language of the proceedings:** EN

**Title of invention:**

FUEL CELL

**Applicant:**

HONDA MOTOR CO., LTD.

**Headword:**

Fuel cell/HONDA

**Relevant legal provisions:**

EPC Art. 123(2), 54(1), 54(2), 56, 84

**Keyword:**

Amendments - allowable (yes)  
Clarity (yes)  
Novelty (yes)  
Inventive step (yes) - non-obvious modification

**Decisions cited:**

**Catchword:**



**Beschwerdekammern  
Boards of Appeal  
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Case Number: T 2493/10 - 3.3.05

**D E C I S I O N  
of Technical Board of Appeal 3.3.05  
of 4 September 2014**

**Appellant:** HONDA MOTOR CO., LTD.  
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**Representative:** Taylor, Adam David  
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**Decision under appeal:** **Decision of the Examining Division of the  
European Patent Office posted on 23 July 2010  
refusing European patent application No.  
03758973.6 pursuant to Article 97(2) EPC.**

**Composition of the Board:**

**Chairman:** G. Rath  
**Members:** J.-M. Schwaller  
C. Vallet

## **Summary of Facts and Submissions**

- I. This appeal lies from the decision of the examining division refusing European patent application No. 03 758 973.6.
- II. Claim 1 of the main request underlying the decision was held to lack clarity because of the presence of the term "substantially".

The claims of the auxiliary requests were held to meet the requirements of novelty over documents

D1: JP 2000/164230 and its PAJ abstract and

D2: US 2001/044042 A1.

The claimed subject-matter, however, was held to be obvious in the light of the disclosure of document D1.

- III. With the grounds of appeal dated 26 November 2010, the appellant filed four sets of amended claims as a main request and as auxiliary requests 1 to 3.
- IV. In a communication dated 2 September 2013, the board expressed its preliminary opinion that the requests filed with the grounds of appeal did not meet the requirements of Articles 123(2), 84 and 56 EC.
- V. With letter of 7 March 2014, the appellant filed three new sets of claims that the board still objected to under Articles 56, 84 and 123(2) EPC.
- VI. On 10 July 2014, the appellant replaced all the requests then on file with two new requests which had the same claims but differed from one another in that

the description of the main request comprised at page 29 the following passage: *"the reference to triangular buffers in the appended claims covers the buffers described herein as substantially triangular or trapezoidal and shown in Figures 1, 3 to 7, 10 and 11."*

Claim 1 of both requests reads as follows:

*"1. A fuel cell formed by stacking an electrolyte electrode assembly (12) and separators (13) alternately, said electrolyte electrode assembly (12) including a pair of electrodes (28,30) and an electrolyte (26) interposed between said electrodes (28,30), wherein a reactant gas supply passage (20a) and a reactant gas discharge passage (20b) extend through said fuel cell in a stacking direction of said fuel cell;*  
*a reactant gas flow field (32) is formed for supplying a reactant gas along an electrode surface;*  
*said reactant gas flow field (32) includes a plurality of serpentine flow grooves (38a), said serpentine flow grooves (38a) including an even number of turn regions formed on a surface of said separator (13);*  
*a triangular inlet buffer (34) for connecting said serpentine flow grooves (38a) and said reactant gas supply passage (20a);*  
*a triangular outlet buffer (36) for connecting said serpentine flow grooves (38a) and said reactant gas discharge passage (20b); and*  
*one side (34b) of said inlet buffer (34) and one side (36b) of said outlet buffer (36) are perpendicular to terminal portions of said serpentine flow grooves (38a);*  
*characterised in that said inlet buffer (34) and said outlet buffer (36) are formed symmetrically with each other;*

*each of said reactant gas supply passage (20a) and said reactant gas discharge passage (20b) has at least one oblique side (37a,37b); and in that said oblique side (37a) of said reactant gas supply passage (20a) faces and is parallel to an oblique section (34c) of said inlet buffer (34), and said oblique side (37b) of said reactant gas discharge passage (20b) faces and is parallel to an oblique section (36c) of said outlet buffer (36), wherein said oblique sides (37a,37b) and said oblique sections (34c, 36c) are oblique to said perpendicular sides (34b,36b); and wherein said serpentine flow grooves (38a) each have the same length."*

Dependent claims 2 and 3 relate to specific embodiments of the subject-matter of claim 1.

VII. On 25 July 2014, the board drew the appellant's attention to the fact that the main request did not meet the requirements of Article 84 EPC because of the discrepancy between claim 1 and the description concerning the form of the inlet and outlet buffers. The board also informed the appellant that the grant of a patent could be expected on the basis of the auxiliary request.

VIII. With letter dated 1 August 2014 the appellant withdrew the main request, so that the first auxiliary request became the main and sole request.

Further, the appellant requested that the contested decision be set aside, that a patent be granted on the basis of the claims 1 to 3 filed with letter of 10 July 2014, and that the case be remitted to the examining division for the description to be adapted.

## Reasons for the Decision

### 1. Amendments

The claims underlying the present decision have a basis as follows in the application as filed:

Claim 1: in claims 1 and 4 as well as in paragraphs [0029] and [0031] and Figure 3 as filed;

Claims 2 and 3: in claims 2 and 5 as filed, respectively.

It follows that the requirements of Article 123(2) EPC are met.

### 2. Clarity

The ambiguous term "substantially" having been deleted throughout the claims, the clarity objection raised under Article 84 EPC no longer applies.

### 3. Novelty

#### 3.1 One distinguishing feature between the claimed subject-matter and documents D1 and D2 is that the oblique sides of the supply and discharge passages and the oblique sections of the inlet and outlet buffers were oblique to the buffer side which was perpendicular to the terminal portions of the serpentine flow grooves.

The above feature, acknowledged by the examining division, is not the only feature distinguishing the claimed subject-matter from documents D1 and D2.

- 3.2 D1 does not disclose that
- the inlet and outlet buffers are symmetrical
  - the grooves have a serpentine flow
  - the gas supply passages or gas discharge passages have an oblique side.

- D2 does not disclose that
- the inlet/outlet buffers are triangular or trapezoidal, let alone that they are formed symmetrically with each other,
  - the serpentine flow grooves each have the same length,
  - each reactant gas supply/discharge passage has an oblique side.

- 3.3 It follows that claim 1 on file, and claims 2 and 3 which depend thereon, meet the requirements of Article 54(1) and (2) EPC.

4. Inventive step

- 4.1 The invention concerns a fuel cell formed by stacking an electrolyte electrode assembly and separators alternately, the electrolyte electrode assembly including a pair of electrodes and an electrolyte interposed between said electrodes.

- 4.2 As to the starting point for assessing inventive step, document D1, which discloses a separator for fuel cells and a fuel cell having a stacking of the type disclosed in point 4.1 above, represents the closest state of the art.

- 4.3 According to the application in suit (paragraphs [0014] and [0015] of the A1 application), the problem was the provision of a fuel cell in which the flow resistance

in a reactant gas flow field is uniform, the reactant gas can be distributed over the entire electrode surface, the desired power generation performance can be maintained and, by designing the shape of a buffer, the desired function of the buffer is achieved with a relatively small area, the output density is improved suitably, and the fuel cell is downsized easily.

4.4 As a solution to this problem, the invention proposes the fuel cell assembly according to claim 1 at issue, which is in particular characterised in that:

- the reactant gas flow field includes a plurality of serpentine flow grooves each having the same length,
- the inlet and outlet buffers for connecting the serpentine flow grooves and the reactant gas supply/discharge passages are triangular or trapezoidal and formed symmetrically with each other,
- each of the reactant gas supply and discharge passages has at least one oblique side,
- the oblique side of the reactant gas supply passage faces is parallel to an oblique section of the inlet buffer, and the oblique side of the reactant gas discharge passage faces is parallel to an oblique section of the outlet buffer, with the oblique sides and the oblique sections being oblique to the buffer sides which are perpendicular to terminal portions of the serpentine flow grooves.

4.5 As to whether the problem identified in the application in suit has been solved, the board would refer in particular to paragraphs [0017] and [0019] of the application in suit which describe that when the



serpentine flow grooves have the same length, this renders more uniform the flow resistance in each of the serpentine flow grooves, and thus the reactant gas is distributed more efficiently in the reactant gas flow field. Therefore, the power generation performance of the fuel cell is maintained effectively. Further, when the buffer has a triangular shape, this improves the output density per unit area in the entire fuel cell in comparison with a buffer having a square or rectangular shape, and makes it possible to downsize the buffer structure.

Hence, the problem identified under 4.3 has indeed been solved, and there is no need to reformulate the problem.

4.6 As to obviousness, the question is whether the solution proposed in claim 1 at issue was derivable from the state of the art, in particular document D2. Document D2 does not disclose a fuel cell having:

- symmetrical triangular inlet and outlet buffers;
- serpentine flow grooves each having the same length;
- gas supply or gas discharge passages with an oblique side.

D2 is exclusively concerned with sealing problems between the membrane electrode assembly and the separators. It is not concerned with the problems identified in paragraphs [0014] and [0015] of the application.

It follows from the above considerations that the skilled person faced with the problem underlying the application would not arrive at the solution defined in claim 1 from the disclosure of document D2.

The board is satisfied that there are also no incentives in the other prior-art documents cited in the search report which could help the skilled person to resolve the technical problem in the same way as the application.

- 4.7 It follows that the subject-matter of claim 1 of the main request meets the requirements of Article 56 EPC.

The subject-matter of claims 2 and 3 derives its patentability from that of claim 1 on which these claims depend.

## 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 with the order to grant a patent on the basis of claims 1 to 3 filed with letter of 10 July 2014, and a description to be adapted.

The Registrar:

The Chairman:



C. Spira

G. Rath

Decision electronically authenticated