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**Datasheet for the decision
of 28 May 2015**

Case Number: T 1621/11 - 3.4.02

Application Number: 03788331.1

Publication Number: 1563287

IPC: G01N27/26, H01M8/14,
C07C211/62, G01N33/00

Language of the proceedings: EN

Title of invention:

ELECTROCHEMICAL CELLS, AND GAS SENSOR AND FUEL CELL DEVICES
COMPRISING SAME

Applicant:

Life Safety Germany GmbH

Headword:

Relevant legal provisions:

EPC 1973 Art. 111(1)

Keyword:

Remittal for further prosecution

Decisions cited:

Catchword:



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European Patent
Office
D-80298 MUNICH
GERMANY
Tel. +49 (0) 89 2399-0
Fax +49 (0) 89
2399-4465

Case Number: T 1621/11 - 3.4.02

D E C I S I O N
of Technical Board of Appeal 3.4.02
of 28 May 2015

Appellant: Life Safety Germany GmbH
(Applicant) Elsenheimerstraße 43
80687 München (DE)

Representative: Weickmann & Weickmann
Postfach 860 820
81635 München (DE)

Decision under appeal: **Decision of the Examining Division of the European Patent Office posted on 9 February 2011 refusing European patent application No. 03788331.1 pursuant to Article 97(2) EPC.**

Composition of the Board:

Chairman B. Müller
Members: F. Maaswinkel
F. J. Narganes-Quijano

Summary of Facts and Submissions

- I. The appeal is against the decision of the examining division refusing European patent application number 03788331.1. This patent application is related to an electrochemical cell gas sensor. In its decision, the examining division held that the subject-matter of neither one of claim 1 of the then pending Main, First or Second Auxiliary Requests involved an inventive step having regard to the disclosure in document D5, considered to be the closest prior art. This document is an article by Cai Qi et al., entitled "Studies on a Sulfur Dioxide Electrochemical Sensor with Ionic Liquid as Electrolyte". It was published in the Journal of East China Normal University (Natural Science), No. 3, September 2001, at pp. 57 - 60.

- II. In the statement of grounds of appeal the appellant requested that the decision under appeal be set aside and a patent be granted on the basis of the Main Request or any of the First or Second Auxiliary Requests filed with this letter and being identical to the sets of claims addressed in the decision under appeal. Furthermore, the appellant filed an auxiliary request for oral proceedings.

- III. In a communication pursuant to Rule 100(2) EPC the Board provisionally found that claim 1 of all three requests lacked an inventive step.

With reference to claim 1 of the Main Request, its subject-matter differed over the electrochemical cell gas sensor disclosed in document D5 in that it comprised a 3-electrode or 4-electrode arrangement instead of one using 2 electrodes. The advantages and disadvantages of the different electrode arrangements were generally

known to the skilled person. In particular, selecting a 3-electrode arrangement was an ordinary measure to improve long-term stability of the electrochemical gas sensor, which, therefore, did not involve an inventive step.

The sensor according to claim 1 of the First Auxiliary Request further comprised a chemically selective filter. This filter was arranged to remove interferent gas components. It was pointed out that the inclusion of a chemically selective filter was not related to the 3-electrode arrangement and did not result in a synergetic effect. The problem addressed by such a filter was: how to improve the selectivity of the electrochemical gas sensor for detecting a particular target species. The use of a chemically selective filter to solve this problem was general common practice, as e.g. shown by document D6 (EP 0531 745 B1).

Claim 1 according to the Second Auxiliary Request further defined constructional elements, in particular a dust filter and separators between the electrodes. Document D6 disclosed filters that implicitly also served as dust filters. As to separators, it was an ordinary measure for the skilled person to separate electrodes by means of separators to prevent short circuits.

- IV. The appellant responded with a letter of 8 December 2014. With that letter, the appellant filed a new Main Request and a new Auxiliary Request IV. The requests on file thus far were re-labelled as First, Second and Third Auxiliary Requests, respectively.

According to claim 1 of the new Main Request the ionic liquid was characterised in that it comprises "at least

one salt that is liquid at room temperature in a mixture together with aluminium halides or other salts that increase the conductivity of the electrolytic medium". Claim 10 was also amended.

Claim 1 of the new Fourth Auxiliary request comprised an electrochemical cell gas sensor which was arranged to electrochemically reduce a target gas species in a gas environment monitored by the sensor. Claim 10 was also amended.

Common to claim 1 according to both the new Main and Fourth Auxiliary Request was that the 3- or 4-electrode arrangement and the features added in the previous First and Second (i.e. now Second and Third) Auxiliary Requests were no longer present. According to the appellant the new features were added from original dependent claims and the description. The appellant argued in favour of inventive step of the claims of all five requests, both the three requests filed with the statement of grounds of appeal and the new Main and Fourth Auxiliary Request, filed with the letter of 8 December 2014.

- V. In a communication attached to the summons for oral proceedings, the Board provisionally maintained its negative view regarding inventive step of the subject-matter of claim 1 of Auxiliary Requests I, II and III. The Board also doubted the admissibility of the new Main and Fourth Auxiliary Request, the reason being that claim 1 of both new requests included a feature, respectively, that had not been addressed during the first-instance proceedings and, on the other hand, the feature defining a 3- or 4-electrode arrangement was no longer a feature of the claims. This feature had been

claimed in the sets of claims of all requests filed with the statement of grounds of appeal.

- VI. In a response to the communication the appellant, with a letter of 28 April 2015, submitted additional Auxiliary Requests V and VI. It maintained the previously filed Main Request and Auxiliary Requests I to IV.

The appellant noted that, as to Auxiliary Request V, it had restricted the claimed subject-matter as compared to the Main Request filed with the statement of grounds. All essential features of the Main Request were still present, but were supplemented by additional features specifying the composition of the ionic liquid.

- VII. Oral proceedings took place on 28 May 2015. In the oral proceedings the appellant requested that a patent be granted on the basis of the Main Request comprising the claims of the request filed as "Auxiliary Request V" with the letter dated 28 April 2015, or that the case be remitted to the department of first instance for further prosecution.

- VIII. Independent claim 1 of the Main Request reads as follows:

"Electrochemical cell gas sensor, comprising an electrochemical cell including an electrolyte therein in electrical contact with electrochemical cell electrodes, said electrolyte consisting of an ionic liquid, wherein the ionic liquid electrolyte comprises at least one salt that is liquid at room temperature in a mixture together with aluminum halides or other salts that increase the conductivity of the electrolytic medium, and wherein the electrochemical cell gas sensor comprises a 4-electrode arrangement or a 3-electrode

arrangement."

Claims 2 to 16 are dependent claims.

IX. The arguments of the appellant can be summarised as follows:

Claim 1 of the present set of claims is based on the Main Request filed with the grounds of appeal, but specifies the ionic liquid in accordance with the disclosure in the paragraph bridging pages 7 and 8 of the published patent application and original claim 23. Accordingly, the ionic liquid electrolyte is now defined as comprising at least one salt that is liquid at room temperature in a mixture together with aluminum halides or other salts that increase the conductivity of the electrolytic medium. The option of the ionic liquid electrolyte comprising a mixture was also included in the dependent claims of the Main Request filed with the grounds of appeal. In this respect, applicant refers to claim 11 of that Main Request which defines the ionic liquid electrolyte as comprising a mixture of salts, wherein one salt is liquid at room temperature. Further, claim 18 of that Main Request specifies that the ionic liquid electrolyte comprises aluminum halide.

Thus, in the present Main Request, the claimed subject matter has been restricted as compared to the Main Request filed with the grounds of appeal. All essential features of the previous Main Request are still present but have been supplemented with additional features specifying the composition of the ionic liquid.

In further support of its arguments the appellant, during the oral proceedings, filed a partial translation of document D5.

Reasons for the Decision

1. The appeal is admissible.
2. Admissibility of the Main Request

The set of claims amended according to the present Main Request was submitted by the appellant in response to the preliminary view expressed by the Board in its previous communication (see points III and V supra). In the circumstances of the case (see points IV, VI and VII supra), the Board considered it appropriate to admit this amended set of claims into the proceedings.

3. Amendments
 - 3.1 According to the appellant, the additional features in claim 1 are supported by the paragraph bridging pages 7 and 8 of the published patent application and by original claim 23. In addition, original claim 30 supports the feature that the ionic liquid comprises an aluminum halide.
 - 3.2 The Board agrees. Hence the provisions of Article 123(2) EPC are satisfied.
4. Further prosecution
 - 4.1 In the decision under appeal neither claim 1 of the Main Request, nor the independent claim of one of the Auxiliary Requests then on file included the additional features that the ionic liquid electrolyte comprises at least one salt that is liquid at room temperature in a mixture together with aluminum halides or other salts that increase the conductivity of the electrolytic medium. Thus

the first instance could not express its view on the merits of the new claim.

- 4.2 For this reason the Board finds it appropriate under Article 111(1) EPC 1973 to remit the case to the department of first instance for further examination of the compliance of the claims of the Main Request with the provisions of the EPC, other than Article 123(2) EPC, to be examined in the light of document D5 with the partial translation provided by the appellant during the oral proceedings and possible other prior art.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.
2. The case is remitted to the department of first instance for further prosecution.

The Registrar:

The Chairman:



M. Kiehl

B. Müller

Decision electronically authenticated