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Datasheet for the decision of 2 August 2012

Case Number: T 0238/09 - 3.3.05

Application Number: 00935657.7

Publication Number: 1111705

IPC: H01M 10/48, G01R 31/36

Language of the proceedings: EN

Title of invention:
Method for detecting deterioration of electrochemical device, method for measuring remaining capacity, charger comprising them, and discharge controller

Applicant:
Panasonic Corporation

Headword:
Detecting battery deterioration/PANASONIC

Relevant legal provisions:
EPC Art. 84

Keyword:
"Clarity (main request and auxiliary requests): no"

Decisions cited:
T 0630/93, T 0412/03

Catchword:
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Beschwerdekammern | Boards of Appeal | Chambres de recours

Case Number: T 0238/09 - 3.3.05

D E C I S I O N
of the Technical Board of Appeal 3.3.05
of 2 August 2012

Appellant: (Applicant)
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Decision under appeal:
Decision of the Examining Division of the European Patent Office posted 20 June 2008 refusing European patent application No. 00935657.7 pursuant to Article 97(2) EPC.

Composition of the Board:

Chairman: G. Raths
Members: B. Czech
C. Vallet

Summary of Facts and Submissions

I. The appeal is from of the decision of the examining division refusing European patent application No.00935657.7.

II. The examining division found that the claimed subject-matter according to all the requests then on file lacked novelty or at least did not involve an inventive step in view of the cited prior art. Moreover, the examining division considered that the respective independent claims 1 lacked clarity, since it was "not clear, how the result of the comparison leads to an estimation of the degree of deterioration" and there was "no link between this comparison result and a degree of deterioration can be seen".

III. Under cover of its statement of grounds of appeal, the appellant filed two amended sets of claims as new main and first auxiliary requests. Arguments were presented with regard to *inter alia* the clarity of the claims.

IV. In a communication issued in preparation of the oral proceedings, the board questioned in particular the allowability of some of the amendments under Article 123(2) EPC, as well as the clarity of the claims and their support by the description under Article 84 EPC.

V. In response to the communication, the appellant filed two new sets of amended claims as new main and first auxiliary requests. In its view, the amendments to the former claims overcame the objections raised by the board.

VI. Oral proceedings were held on 2 August 2012, in the course of which the appellant filed two further sets of claims as main and auxiliary requests, replacing the requests previously on file. The issue of clarity of the respective independent claims 1 was discussed extensively.

Claim 1 according to said newly filed main request reads as follows:

"*1. A deterioration detecting method for a secondary battery comprising electrodes and an ion conductor, comprising the steps of:*
(i) detecting a discharge curve X_0 of said secondary battery in the initial state,
(ii) fitting a model representing a state of said electrodes and/or said ion conductor of said secondary battery based on an electrochemical parameter of said electrodes and/or said ion conductor to the discharge curve X_0,
(iii) detecting a discharge curve X_n of said secondary battery in an n-th cycle,
(iv) fitting said model to the discharge curve X,
(v) comparing the parameter derived from the discharge curve X_0 and the parameter derived from the discharge curve X_n, and
(vi) estimating the degree of deterioration of said secondary battery based on the comparison result in said step (v)."

Claim 1 according to said newly filed auxiliary request differs from claim 1 according of the main request in that the following features were appended to the former:

"*, wherein said parameter is an internal resistance of said ion conductor (R_{ele})*".

VII. Insofar as they concern the pending requests and the decisive aspects of the clarity issue, the arguments of the appellant can be summarised as follows:

More particularly, concerning steps (v) and (vi) of the claimed method, it argued in writing that the comparison of the two parameters referred to in step (v) of claim 1 may lead to a quantitative (numerical) comparison result, and not merely to a "is higher than" or "is lower than" rating, and that the estimated degree of deterioration based on the comparison result, as obtained in step (vi), "may also be quantitative (numerical)". At the oral proceedings, when questioned by the board, it held that the skilled person in the field was perfectly able to relate the magnitude of the numerical difference between the two parameter values (termed "gap" by the appellant and hereinafter) to an estimated degree of deterioration. There was no need for establishing, in some further steps, the general relation between parameter values and the corresponding deterioration degrees, since the parameter values to be compared were derived from discharge curves. In this context, the appellant also referred to decision T 0630/93 of 27 October 1993.

VIII. The appellant requested that the decision under appeal be set aside and that a patent be granted on the basis of the main request or, alternatively, on the basis of the auxiliary request, both requests filed at the oral proceedings.

Reasons for the Decision

1. Admissibility of the appellant's requests

1.1 The two sets of claims filed at the oral proceedings comprised amendments that were made in response to objections raised by the board having regard to two sets of claims previously on file. Compared to the claims previously on file the new amended claims were narrowed down in a converging manner. They did not raise any complex issues that could not be dealt with at the oral proceedings.

1.2 Under these circumstances, the board decided to admit the two requests despite their late filing (Article 13(1)(3) RPBA).

Main request

2. Clarity

2.1 Article 84 EPC reads as follows (emphasis added):

"The claims shall define the matter for which protection is sought. They shall be **clear** and concise and be supported by the description."

2.2 In the board's judgement, claim 1 does not meet the clarity requirement of Article 84 EPC because claim 1 does not clearly express how the "***degree** of deterioration*" (emphasis added) is to be estimated in accordance with step (vi), i.e. "*based on the comparison result in said step (v)*", even when the

totality of the features recited in claim 1 is taken into account.

2.2.1 The board can accept, at least for the sake of argument, that claim 1 in its present wording requires (steps (i) to (iv)) that two numerical values of a parameter, for instance two values of the internal resistance of the electrolyte R_{ele}, are derived from the two detected discharge curves X_0 (initial state) and X_n (state after n charge/discharge cycles) by fitting a model thereto. The board also acknowledges that such a comparison (step (v) of claim 1) of two numerical values may give a numerical result, i.e. a value expressing the "gap" between said two numerical values.

2.2.2 As the secondary battery is subjected to charge and discharge cycles, it will inevitably deteriorate gradually. Said deterioration will be reflected by a change in the value of the parameter used, e.g. an increase of the resistance R_{ele}. However, merely noting that, unsurprisingly, the value of R_{ele} changes and that, hence, some deterioration of the battery occurs during repeated cycles of charge and discharge cannot be equated to "*estimating a **degree** of deterioration*" (emphasis added). In the context of the application in suit, an estimated degree of deterioration must thus be understood as some kind of estimated **numerical** value, expressing the deterioration in comparison to the capacity of the battery in its "*initial state*", i.e. when the first discharge curve X_0 is detected.

2.2.3 However, step (vi) of claim 1 merely refers to "*estimating the **degree** of deterioration ... **based on** the comparison result*" (emphasis added), but is silent

about the way in which the result of the comparison, e.g. an increase in the R_{ele} value, is to be "*based on*" or, in other words, translated into the "*degree of deterioration*". In the absence of corresponding indications in claim 1, the method feature recited in steps (i) to (iv) do not even implicitly permit an estimation of the deterioration degree according to step (vi) "*based on the comparison result in step (v)*" alone. Even taking into account the totality of claim 1, the meaning of the features "*estimating the* ***degree*** *of deterioration ...* ***based on*** *the comparison result*" (emphasis added) is not clear. Consequently, claim 1 lacks clarity insofar as it is not apparent from its wording how the very purpose of the claimed method, i.e. the detection of a **degree** of deterioration, is to be achieved.

2.2.4 At the oral proceedings, the appellant argued that the skilled person would be able to attribute a degree of deterioration to the "gap" between the two parameter values, e.g. two values of the internal resistance of the electrolyte R_{ele}.

This argument does not convince the board since the appellant has not submitted evidence corroborating this allegation. Moreover, the board is not aware of a general relationship, belonging to or stemming from common general knowledge, that could be considered to represent/express the relationship between, for instance, computed internal electrolyte resistance values R_{ele}, and a numerical value for the degree of battery deterioration, i.e. its loss of capacity.

2.2.5 The appellant also held that the method steps indicated in claim 1 permitted an estimation of the degree of capacity deterioration since the compared parameter values stood for respective discharge curves, the latter being representative for the state of the battery.

The board does not accept this argument either. The mere fact that the compared parameter values are derived from detected discharged curves, which curves depend on the state of the battery, does not imply that the skilled person can attribute a deterioration degree value to the detected change in the parameter value.

2.2.6 According to the jurisprudence of the boards (see e.g. T 0412/03 of 16 June 2005 (point 2.4.1 of the reasons), claims have to be clear per se for the skilled person in the light of common general knowledge in the technical field concerned. As set out above, this is not the case for claim 1 at issue.

The reference, by the appellant, to decision T 0630/93, is thus of no avail. In said decision (see point 3.1 of the reasons), the board held that according to Article 84 EPC the claims shall define the subject-matter for which protection is thought, primarily in order "to set out the scope of protection sought", and that therefore it was "**not always** necessary to identify technical features or steps in all detail" (emphasis added).

As apparent from the above reasoning, in the board's judgement it would have been necessary in the present case to identify, in claim 1, features permitting a

clear understanding of the features "*estimating the **degree** of deterioration ... **based on** the comparison result*" (emphasis added).

2.3 Since claim 1 lacks clarity (Article 84 EPC), the main request is not allowable.

Auxiliary request

3. Clarity

3.1 Claim 1 according to this request only differs from claim 1 according to the main request in that the "*parameter*" to be used in the "*deterioration detection method*", namely the "*internal resistance of the ion conductor (R_{ele})*", is expressly specified.

3.2 Hence, the reasoning already given under points 2.2 to 2.2.6, which takes into account taking "R_{ele}" as said "*parameter*", equally applies to claim 1 according to the auxiliary request.

3.3 Consequently, in the board's judgement, claim 1 according to the auxiliary request does not meet the requirement of clarity either (Article 84 EPC).

3.4 The auxiliary request is thus not allowable either.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar | The Chairman

K. Götz | G. Raths