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Datasheet for the decision of 16 November 2017

Case Number: T 1960/15 - 3.3.05

Application Number: 09837483.8

Publication Number: 2387093

IPC: H01M10/48, B60L11/18, H02J7/00, H02J7/04, H01M10/44

Language of the proceedings: EN

Title of invention:
NONAQUEOUS ELECTROLYTE TYPE SECONDARY BATTERY SYSTEM AND VEHICLE

Applicant:
TOYOTA JIDOSHA KABUSHIKI KAISHA

Headword:
Secondary battery system/Toyota

Relevant legal provisions:
RPBA Art. 13(1)
EPC Art. 123(2), 84, 111(2)

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It can be changed at any time and without notice.

Keyword:
Late-filed request - admitted (yes)
Amendments - allowable (yes)
Claims - clarity (yes)
Appeal decision - remittal to the department of first instance (yes)

Decisions cited:

Catchword:

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Case Number: T 1960/15 - 3.3.05

D E C I S I O N
of Technical Board of Appeal 3.3.05
of 16 November 2017

Appellant: (Applicant)	TOYOTA JIDOSHA KABUSHIKI KAISHA 1, Toyota-cho, Toyota-shi, Aichi-ken, 471-8571 (JP)
Representative:	Kuhnen & Wacker Patent- und Rechtsanwaltsbüro Prinz-Ludwig-Straße 40A 85354 Freising (DE)
Decision under appeal:	**Decision of the Examining Division of the European Patent Office posted on 22 April 2015 refusing European patent application No. 09837483.8 pursuant to Article 97(2) EPC.**

Composition of the Board:

Chairman	J.-M. Schwaller
Members:	G. Glod
	P. Guntz

Summary of Facts and Submissions

I. The appeal lies from the decision of the examining division to refuse European patent application 09 837 483.8 because it found that the then main and auxiliary requests did not meet the requirements of Article 84 EPC.

II. In its communication pursuant to Article 15(1) RPBA, the board was of the preliminary opinion that the then single request did not meet the requirements of Article 84 EPC.

III. In response to the board's preliminary opinion, on 16 October 2017 the appellant filed two sets of claims as a main and first auxiliary request.

IV. During the oral proceedings, which were held on 16 November 2017, the appellant filed a set of claims 1 to 12 as a main request and withdrew the other requests.

The independent claims of said request read as follows:

"*1. A nonaqueous electrolyte type secondary battery system comprising:*
a nonaqueous electrolyte type secondary battery; and
a control part for controlling the nonaqueous electrolyte type secondary battery,
wherein
the control part includes:
a charge and discharge hysteresis value calculating part for calculating, at predetermined time intervals, a charge hysteresis value Cc representing a history of charge determined by digitizing the history of charge for a period Tc in which a current of the nonaqueous

electrolyte type secondary battery measured by the control part exceeds a predetermined charge threshold current Ic, and
a discharge hysteresis value Cd representing a history of discharge determined by digitizing the history of discharge for a period Td in which a current output from the the [sic] control part falls below a predetermined discharge threshold current Id; and
a current limiting part switching from a first mode to a second mode in which only less charge current or less discharge current is allowed than in the first mode after a difference between the charge hysteresis value Cc and the discharge hysteresis value Cd is determined to be larger than a predetermined degree, and
when the charge hysteresis value Cc is larger than the discharge hysteresis value Cd, the current limiting part is arranged to limit the charge current so that a difference between the charge hysteresis value Cc and the discharge hysteresis value Cd is reduced, and
when the charge hysteresis value Cc is smaller than the discharge hysteresis value Cd, the current limiting part is arranged to limit the discharge current so that the difference between the charge hysteresis value Cc and the the discharge hysteresis value Cd is reduced and wherein
the charge and discharge hysteresis value calculating part uses,
as the charge hysteresis value Cc, a value defined by the following expression:
$Cc = \left|\int [I(t)-Ic(t)]dt\right|$
where an integral interval is an interval of time "t" in which $I(t) \geq Ic(t)$ *is established and*
$Ic(t)$ *is a predetermined charge threshold current, and as the discharge hysteresis value Cd, a value defined by the following expression:*
$Cd = \left|\int [I(t)-Id(t)]dt\right|$

where an integral interval is an interval of time "t" in which I(t)≤Id(t) is established and Id(t) is a predetermined charge threshold current."

"*12. A vehicle comprising:*
an electric motor configured to supply power to tyres of the vehicle and configured to serve as power generator to generate power when the vehicle is decelerated;
a nonaqueous electrolyte type secondary battery system according to any of claims 1 to 11 configured to supply electric power to the electric motor and configured to store the energy generated by the electric motor."

Claims 2 to 11 relate to preferred embodiments of claim 1.

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

From paragraphs [0101] to [0115] the skilled person knew that the charge threshold current I_c and the discharge current I_d depended on the battery temperature and the SOC (state of charge) and so knew how to predetermine the threshold currents I_c and I_d. Figure 3 gave an example, wherein Ic was 75A, while Id was -75A.

It was clear from the wording of the terms "first mode" and "second mode" that these modes were different operation modes for the inventive battery system, and so no further specification had to be given.

VI. The appellant requests that the examining division's decision be set aside and that a patent be granted on

the basis of the main request filed during the oral proceedings on 16 November 2017.

Reasons for the Decision

1. Article 13(1) RPBA

The present request was submitted during oral proceedings before the board. It was submitted as a reaction to objections raised against the first auxiliary request, which had been filed in reaction to the communication pursuant to Article 15(1) RPBA. The changes with respect to that request are only minor and lead to a set of claims that overcomes the objections on which the impugned decision was based. Therefore, the board exercises its discretion such as to admit the request.

2. Article 123(2) EPC

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

Claim 1 is based on claims 1 and 6 in combination with paragraphs [0053], [0064] and [0065] of the application as filed.

Claims 3 to 11 are based on claims 2 to 5 and 11 to 16 of the application as filed.

Claim 12 is based on paragraph [0001] in combination with paragraphs [0035] and [0036] of the application as filed. It is unambiguous from paragraph [0001] that the non-aqueous electrolyte-type secondary battery system is not limited to hybrid cars. Therefore the skilled person understands that the clarification introduced in

claim 12 on the basis of paragraphs [0035] and [0036] is not limited to the hybrid car described in those paragraphs.

3. Article 84 EPC

The requirements of Article 84 EPC are met for the following reasons:

Claim 1 relates to a non-aqueous electrolyte-type secondary battery system that is defined by the way the control part controls the charge and discharge currents.

To perform this control, a charge hysteresis value Cc and a discharge hysteresis value Cd are first calculated using the formulas present in claim 1. In these formulas, Ic(t) and Id(t) represent a predetermined charge and discharge threshold current, respectively. These values are considered to represent current values that the skilled person can choose as needed. In other words, it can be any current that the skilled person sets in advance (see step S102 in figure 5) and that is subsequently used to determine Cc and Cd. This is illustrated in figure 3, wherein Ic is set to 75A and Id to -75A (page 23, lines 1 and 2). Then the values of Cc and Cd are compared. If the difference exceeds a predetermined degree, either the charge current or the discharge current is limited. Again this predetermined degree can be set in advance by the skilled person as needed. This is also indicated in paragraphs [0077] and [0078]. The change of charge current or discharge current is considered to be the point when the system is switched from a first mode to a second mode. The second mode is understood as the

period when the charge current or discharge current is limited.

Although the predetermined current values are not further defined in claim 1, they do not give rise to a problem of clarity, since they simply represent a current value, which in the present case can be any value. The same applies to the predetermined degree setting the allowable difference between Cc and Cd.

I_C and I_d are dependent on the battery temperature and the state of charge (see paragraph [0098]). Whether the application contains enough information to enable the skilled person to correctly choose the predetermined current values and the predetermined degree is considered to be a question of sufficiency of disclosure rather than of clarity.

The further objections raised during the appeal procedure are considered to be overcome by the amendments made in claims 3 to 9 and 12.

In particular, it is now excluded from claims 3 to 5 that the charge hysteresis value Cc is equal to the discharge hysteresis value Cd. Claim 6 relates to an accumulated charge or discharge hysteresis value, wherein a charge or discharge hysteresis value calculated according to the formula present in claim 1 is added to previously calculated charge or discharge hysteresis values (see also paragraph [0083]). Claims 7 to 10 relate to special embodiments regarding the functioning of the current limiting part. Claim 11 is understood as taking into consideration the dependence of Ic and Id on the battery temperature and the state of charge. Claim 12 now contains a reference to claim 1

and clarifies that the motor is essential for the functioning of the vehicle.

The question whether the skilled person knows how to choose for example the smaller and larger values recited in claim 11 is considered to be possibly relevant under Article 83 EPC, but not under Article 84 EPC.

4. Article 111(2) EPC

The decision under appeal is based on Article 84 EPC only. Although Article 56 EPC (inventive step) was mentioned in the decision (points II.1.5 and II.2.6), the examining division did not include an inventive step assessment based on the problem-solution approach (see Guidelines for Examination, G-VII, 5), so the board considers that the Article 84 objection was the only ground substantiated in the decision. In addition, the current request has been considerably changed compared to the requests underlying the impugned decision.

Therefore, in order to give the applicant the possibility to defend its case before two instances, if needed, the board exercises its discretion to remit the case to the examining division.

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 on the basis of the set of claims of the main request as submitted during the oral proceedings.

The Registrar: The Chairman:

C. Vodz J.-M. Schwaller

Decision electronically authenticated