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**Datasheet for the decision
of 28 February 2019**

Case Number: T 2002/16 - 3.3.05

Application Number: 99951170.2

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H01M2/02

Language of the proceedings: EN

Title of invention:
NON-AQUEOUS ELECTROLYTIC CELL AND PRODUCTION METHOD THEREFOR

Applicant:
Murata Manufacturing Co., Ltd.

Headword:
Non-aqueous electrolytic cell/MURATA

Relevant legal provisions:
EPC Art. 54(1), 54(2), 56, 83, 84, 123(2)

Keyword:

Claims - clarity - main request (no) - clarity - auxiliary request 1 (yes)

Amendments - auxiliary request 1 - allowable (yes)

Sufficiency of disclosure - auxiliary request 1 (yes)

Novelty - auxiliary request 1 (yes)

Inventive step - auxiliary request 1 (yes)

Decisions cited:

Catchword:



Beschwerdekammern
Boards of Appeal
Chambres de recours

Boards of Appeal of the
European Patent Office
Richard-Reitzner-Allee 8
85540 Haar
GERMANY
Tel. +49 (0)89 2399-0
Fax +49 (0)89 2399-4465

Case Number: T 2002/16 - 3.3.05

D E C I S I O N
of Technical Board of Appeal 3.3.05
of 28 February 2019

Appellant: Murata Manufacturing Co., Ltd.
(Applicant) 10-1, Higashikotari 1-chome,
Nagaokakyo-shi,
Kyoto 617-8555 (JP)

Representative: Müller Hoffmann & Partner
Patentanwälte mbB
St.-Martin-Strasse 58
81541 München (DE)

Decision under appeal: **Decision of the Examining Division of the
European Patent Office posted on 15 March 2016
refusing European patent application No.
99951170.2 pursuant to Article 97(2) EPC.**

Composition of the Board:

Chairman E. Bendl
Members: A. Haderlein
O. Loizou

Summary of Facts and Submissions

- I. The appeal was filed by the applicant ("appellant") against the decision of the examining division to refuse the patent application in suit ("application").
- II. According to the decision under appeal, the main request and auxiliary requests 1 to 3 did not comply with the requirements of Article 123(2) and 84 EPC. The examining division considered these provisions to be violated because claim 1 did not specify, *inter alia*, that the heat welding was carried out at the outer periphery of the case. Auxiliary requests 4 and 5 met these requirements and the subject-matter claimed by these requests was also novel over the prior art cited by the examining division and observations by a third party due to the feature relating to the burrs on the electrode terminal leads. These features were not disclosed in:

D8: JP S62 - 61268 (reference is made to the English translation filed by the third party) or

D9: US 4 278 744 A.

However, the subject-matter of claim 1 of auxiliary requests 4 and 5 lacked an inventive step when starting from D8 as the closest prior art. The mere presence of burrs could not justify an inventive step. The problem to be solved was to reduce the number of batteries which short-circuited during the heat sealing process of the battery case. If the skilled person had found that burrs cause the short circuit by penetrating through the sealant resin, it would have been immediately obvious to avoid such penetration.

- III. In a communication pursuant to Article 15(1) RPBA, the board raised objections under Article 123(2) and 83 EPC.
- IV. With its submissions dated 9 January 2019, the appellant filed a main request and auxiliary requests 1 to 5.
- V. At the oral proceedings before the board, the appellant filed a new auxiliary request 1 and renumbered the auxiliary requests filed with the letter dated 9 January 2019 as auxiliary requests 2 to 6.
- VI. The parts of claim 1 of the main request relevant to the present decision read as follows:

"A nonaqueous electrolyte battery [...] wherein [...] the sealant resin [...] is composed of upper and lower resin layers (61, 62) and the terminal leads (3, 4) [...]"

the upper resin layer (61) is in contact with a first principal plane (3a) of the electrode terminal leads (3, 4), while the lower resin layer (62) is in contact with the second principal plane (3b) of the electrode terminal leads (3, 4), wherein the surface of the upper resin layer (61) is formed into an uneven shape on which the shape of the negative-electrode terminal lead (3) is reflected whereas the lower surface of the lower resin layer (62) is flat,

the upper resin layer (61) which is in contact with the first principal plane (3a) and the lower resin layer (62) which is in contact with the second principal plane (3b) of the electrode terminal leads (3, 4) follow the shape of the electrode terminal leads (3, 4)

so that the surface of the upper resin layer (61) and the surface of the lower resin (62) correspond to the shape of the electrode terminal leads."

VII. Claim 1 of auxiliary request 1 reads as follows (amendments with respect to claim 1 as originally filed underlined or struck through):

1. A nonaqueous electrolyte battery comprising:
a case (2) constituted by a laminate film comprising a case protection layer (21), an aluminum layer (22) and a heat weld layer (23) as the innermost layer of the laminate film and accommodating a unit cell (1) such that said unit cell (1) is sealed by heat welding; and electrode terminal leads (3, 4) electrically connected to electrodes which constitute said unit cell (1) and sandwiched by a heat weld portion so as to be exposed to the outside of said case (2), wherein said electrode terminal leads (3, 4) are coated with sealant resin (6) at a position corresponding to said heat weld portion and burrs (3c) are formed on the negative-electrode terminal lead (3) wherein the burrs (3c) do not penetrate through the sealant resin (6), and
~~at least a portion of said sealant resin which is in contact with either principal plane of each of said electrode terminal leads is deformed along the shape of each of said electrode terminal leads so that at least said portion of said sealant resin is formed into an uneven shape.~~
the sealant resin (6) is composed of upper and lower resin layers (61, 62) and the negative-electrode terminal lead (3) is sandwiched between the two resin layers (61, 62) and the two resin layers (61, 62) are welded to each other with heat and the burrs are directed towards the lower resin layer (62);

the upper resin layer (61) is in contact with a first principal plane (3a) of the negative-electrode terminal lead (3), while the lower resin layer (62) is in contact with the second principal plane (3b) of the negative-electrode terminal lead (3), wherein the surface of the upper resin layer (61) is formed into an uneven shape on which the shape of the negative-electrode terminal lead (3) is reflected whereas the lower surface of the lower resin layer (62) is flat.

Dependent claims 2 to 9 concern embodiments of the battery of claim 1.

VIII. The appellant's arguments, as far as relevant to the present decision, may be summarised as follows:

At the oral proceedings before the board regarding the main request, reference was made to the written submissions. No comments were made with respect to the clarity objections relating to the last two paragraphs referred to above.

Auxiliary request 1 as filed during oral proceedings fulfilled the requirements of the EPC, in particular Articles 123(2) and 56 EPC.

IX. Requests

The appellant requested that the decision under appeal be set aside and that a patent be granted on the basis of the set of claims of the main request filed by letter dated 9 January 2019 or, in the alternative, of auxiliary request 1 filed during oral proceedings, or one of the auxiliary requests 2 to 6 filed by letter dated 9 January 2019 as auxiliary requests 1 to 5.

Reasons for the Decision

1. Main request - clarity

- 1.1 According to the penultimate paragraph of claim 1, the "surface of the upper resin layer (61) is formed into an uneven shape on which the shape of the negative-electrode terminal lead (3) is reflected whereas the lower surface of the lower resin layer (62) is flat". In contrast, according to the last paragraph of claim 1, "the surface of the upper resin layer (61) and the surface of the lower resin (62) correspond to the shape of the electrode terminal leads".

There is thus a contradiction because the lower resin layer cannot be at the same time flat and correspond to the shape of the burrs-possessing electrode terminal leads. This contradiction leads to a lack of clarity.

- 1.2 The main request hence is not allowable for lack of compliance with Article 84 EPC.

2. Auxiliary request 1 - amendments

- 2.1 Claim 1 is based on originally filed claim 1 with the additional features finding their respective basis as follows:

- "laminate film comprising a case protection layer, an aluminium layer and a heat weld layer...": page 8, last paragraph;
- "burrs are formed on the negative-electrode terminal lead...": page 6, lines 2 and 3; page 10, first full paragraph; Fig. 5;
- "the sealant resin is composed of upper and lower

resin layers and the negative-terminal lead is sandwiched between the two resin layers": page 9, penultimate paragraph;

- "the upper resin layer is in contact with a first principal plane of the negative-electrode terminal lead...": paragraph bridging pages 9 and 10; Fig. 5; "lower surface of the lower resin layer is flat": see in particular Fig. 5.

2.2 The examining division considered Article 123(2) EPC to be violated because claim 1 did not specify that the heat welding is carried out at the outer periphery of the case.

The board is not persuaded by this argument because claim 1, even in the absence of an explicit reference to the outer periphery of the case, requires that the heat seal is present at the outer periphery. This is because claim 1 requires that the terminal leads be sandwiched by a heat weld portion "so as to be exposed to the outside of said case". Furthermore, the teaching of the application as filed does not require the entire outer periphery to be sealed by heat welding. This is clear from Fig. 1, in which one side of the case is sealed by simply folding the laminate film.

2.3 The passage deleted from claim 1 (see passage struck through in VII above) can be read in two ways: (a) there is a portion on each of the electrode terminal leads, i.e. two portions, which are each formed into an uneven shape; or (b) there is at least a (one) portion which is formed into an uneven shape and is either on the negative-electrode terminal or on the positive-electrode terminal. The latter construction is reflected in the wording of other features now present in claim 1 and also finds support in several passages

of the description. For instance, the passage on page 6, first paragraph, lines 2 and 3, and third paragraph, lines 3 to 5, refers to "lead" in the singular in the context of the occurrence of a short circuit. On page 8, portions in the plural are mentioned when referring to the two electrode terminal leads, suggesting that a (single) portion can be present on one electrode terminal lead. More importantly, the passage starting on page 9, third paragraph, referring to Fig. 4 refers to one electrode terminal lead only, i.e. the negative-electrode terminal lead, and it is stated that this "is taken as an example". This passage thus refers to an embodiment of the invention which is now reflected in claim 1.

- 2.4 Even if the passage deleted from claim 1 were construed to require that the sealant resin be formed into an uneven shape on both electrode terminal leads, the skilled person would readily recognise that, to avoid short circuits, i.e. contact between the negative- and the positive-electrode terminal leads, it suffices that the penetration of burrs is avoided on either electrode terminal lead. The avoidance of short circuits is one of the two problems to be solved according to the application (see page 4, first paragraph). The other problem, i.e. to improve sealing characteristics, is solved by the presence of sealant resin on both electrode terminal leads (see page 5, second full paragraph), which is also the case in claim 1 requiring both electrode terminal leads to be coated with sealant resin. In conclusion, there is a direct and unambiguous basis in the application as filed for the sealant resin being present as a layer on both electrode terminal leads and formed in an uneven shape on the negative-electrode terminal lead (only).

- 2.5 Thus, the subject-matter of claim 1 is directly and unambiguously derivable from the application as originally filed.
- 2.6 The dependent claims correspond to their originally filed counterparts.
- 2.7 The requirement set forth in Article 123(2) EPC is thus met.
3. Auxiliary request 1 - Articles 83 and 84 EPC
- 3.1 Claim 1 now clearly states that the burrs do not penetrate through the sealant as this is the case for instance in Figure 5.
- 3.2 The examining division also raised an objection of lack of clarity because the location of the heat weld portion was not exactly defined.
- The board considers the location of the heat weld portion sufficiently clearly defined because of the considerations set out at 2.2 above.
- 3.3 The requirements of clarity (Article 84 EPC) and sufficiency of disclosure (Article 83 EPC) are thus met.
4. Auxiliary request 1 - novelty
- 4.1 In the decision under appeal, the examining division held that the claimed subject-matter was novel in particular because of the feature "burrs which do not penetrate [through] the sealant resin". The board agrees with this finding. Likewise, the feature according to which the burrs are directed towards the

lower resin layer is not disclosed in the prior art.

4.2 Moreover, D8 discloses that the electrode terminal leads are coated with sealant resin (numeral 7 in Figs. 1 and 2) at a position corresponding to the heat weld portion resulting in gaps being filled between the packaging material and the electrodes (see page 9, lines 16 and following and page 15, lines 11 and following). However, D8 does at least not directly and unambiguously disclose that the lower layer of the sealant resin is flat (see Fig. 7, which relates to the prior art discussed in D8 but is said to be modified only to the extent that a covering material 7 fills the gaps "a" shown in the figure; see the aforementioned passages).

4.3 Similar considerations apply to D9 (see Fig. 2).

4.4 The requirement of novelty is thus met (Article 54(1), (2) EPC).

5. Auxiliary request 1 - inventive step

5.1 The invention concerns a nonaqueous electrolyte battery.

5.2 In the impugned decision, D8 was considered to represent the closest prior art. The board shares this view.

5.3 According to the application, the problem to be solved was to improve the sealing characteristics and prevent short circuits (see page 4, first paragraph).

5.4 Claim 1 proposes solving this problem with a nonaqueous electrolyte battery characterised by burrs being formed

on the negative-electrode terminal lead in which the burrs do not penetrate through the sealant resin and are directed towards the lower resin layer, the lower surface of the lower resin layer being flat and the burrs being directed towards the lower resin layer.

- 5.5 The problem mentioned in 5.3 above is already solved in D8 (see page 6, line 22 to page 8, line 12). Moreover, as D8 does not disclose burrs on the leads, the problem of short circuits formed due to such burrs does not occur in D8.

The problem thus needs to be reformulated and consists in the provision of an alternative nonaqueous electrolyte battery.

- 5.6 As to obviousness, none of the cited prior art documents disclose burrs on terminal leads, let alone burrs that do not penetrate through the sealant resin. The decision under appeal considers what the skilled person would have done if confronted with the problem of burrs forming short circuits (see page 13 of the decision). The closest prior art, however, neither discloses such burrs nor the observation that such burrs lead to short circuits. Moreover, none of the documents cited in the proceedings before the examining division deal with the problem of short circuits due to the presence of burrs. Thus, it was not obvious to arrive at the battery according to claim 1 in view of this prior art.

- 5.7 Thus, the subject-matter of claim 1 involves an inventive step within the meaning of Article 56 EPC. The same holds true for the dependent claims.

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 with the order to grant a patent on the basis of the claims of auxiliary request 1 as filed during oral proceedings and a description to be adapted thereto.

The Registrar:

The Chairman:



C. Vodz

E. Bendl

Decision electronically authenticated