BESCHWERDEKAMMERN DES EUROPÄISCHEN PATENTAMTS

BOARDS OF APPEAL OF THE EUROPEAN PATENT OFFICE

CHAMBRES DE RECOURS DE L'OFFICE EUROPEEN DES BREVETS

Internal distribution code:
(A) [ ] Publication in OJ
(B) [ ] To Chairmen and Members
(C) [X] To Chairmen

D E C I S I O N
of 16 January 2001

Case Number: T 1089/99 - 3.4.2

Application Number: 94304445.3

Publication Number: 0639863

IPC: H01M 2/16, H01M 4/12, H01M 4/02, H01M 6/18

Language of the proceedings: EN

Title of invention:
Covered electrode for electrochemical cells

Applicant:
WILSON GREATBATCH LTD.

Opponent:
-

Headword:
-

Relevant legal provisions:
EPC Art. 54, 56

Keyword:
"Novelty and inventive step (yes)"

Decisions cited:
-

Catchword:
-

Europäisches Patentamt | European Patent Office | Office européen des brevets

Beschwerdekammern | Boards of Appeal | Chambres de recours

Case Number: T 1089/99 - 3.4.2

D E C I S I O N
of the Technical Board of Appeal 3.4.2
of 16 January 2001

Appellant: WILSON GREATBATCH LTD.
10,000 Wehrle Drive
Clarence
New York 14031 (US)

Representative: Colmer, Stephen Gary
Mathys & Squire
100 Gray's Inn Road
London WC1X 8AL (GB)

Decision under appeal: **Decision of the Examining Division of the European Patent Office posted 6 July 1999 refusing European patent application No. 94 304 445.3 pursuant to Article 97(1) EPC.**

Composition of the Board:

Chairman: E. Turrini
Members: A. G. Klein
V. Di Cerbo

Summary of Facts and Submissions

I. European patent application No. 94 304 445.3 (publication number 0 639 863) was refused by decision of the examining division on the grounds that it did not meet the requirements of Articles 123(2), 84, 52 and 54 EPC.

The examining division in particular held that the expression "a non-fabric continuous film" in at that time current claims 17, 18 and 29 was not supported by the contents of the application documents as originally filed, that the feature "having a uniform unit weight" in at that time current claims 1, 17, 18 and 29 was unclear because of the relative term "uniform" and that the subject-matter of claim 1 lacked novelty in view of the electrochemical cell disclosed in document

D1: EP-A-0 312 330,

the porous or open mesh electrode covering material of which was understood to have perforations.

For the sake of completeness, the examining division further held that even if novelty could be acknowledged the independent claims would not support an inventive step in view of document D1 either. The use of another type of porous or perforated film or a particularly uniform distribution of unit weight was regarded as representing a non-inventive selection out of the general teaching of document D1, since the slight decrease of the mean cell impedance shown in Table II of the application could not be considered an unexpected effect which would support the presence of an inventive step.

II. The appellant (applicant) filed an appeal against the decision, requesting as his main request that a patent be granted on the basis of an amended set of claims, of which claims 1, 16, 17 and 27, the independent claims, read as follows:

"1. An electrochemical cell comprising anode and cathode electrodes and an operatively associated electrolyte and including an electrode covering at one or more interfaces of the electrodes and the electrolyte characterised in that the covering is obtainable by perforating a film of ion impermeable, synthetic polymeric substrate material to provide for ion flow therethrough and coating the resultant perforated substrate material with an organic electron donor material.

16. An anode for an alkali metal-halogen electrochemical cell comprising:

(a) an anode body of alkali metal having a surface for operative contact with a solid electrolyte of the cell;

(b) an electrical conductor means operatively associated with the anode body; and

(c) a covering on the anode surface wherein the covering is obtainable by perforating a film of ion impermeable, synthetic polymeric substrate material to provide for ion flow therethrough and coating the resultant perforated substrate material with an organic electron donor material.

17. An anode for an alkali metal-oxyhalide electrochemical cell comprising:

a) an anode body of alkali metal having a surface for operative contact with a liquid electrolyte of the cell;

b) anode electrical conductor means operatively associated with the anode body; and

c) a covering on the anode surface wherein the covering is obtainable by perforating a film of ion impermeable, synthetic polymeric substrate material to provide for ion flow therethrough and coating the resultant perforated substrate material with an organic electron donor material.

27. A method of forming an anode as claimed in any one of claims 16 to 26 comprising the steps of:

a) perforating a film of ion impermeable, synthetic polymeric substrate material to provide for ion flow therethrough;

b) coating the film with an organic electron donor material; and

c) applying the coated film to the anode operative surface."

The description has been adapted to the wording of the new set of claims and supplemented with a reference to the relevant document WO-A-92/10860.

Reasons for the Decision

1. The appeal is admissible.

2. *Compliance of the amendments with the requirements of Article 123(2) EPC*

The expression "a non-fabric continuous film" as objected to by the examining division in the appealed decision was removed from the claims.

The present independent claims 1, 16, 17 and 27 correspond respectively to independent claim 1, 17, 18 and 29 as originally filed, with the following amendments:

(i) the substrate material of the covering film is further specified to be of the "synthetic polymeric" type, as was disclosed e.g. page 8, lines 4 to 7 and page 12, lines 17 to 20 of the description as originally filed;

(ii) the expressions "the covering comprises a film ... that is perforated" and "providing a film ... that is perforated" are replaced by the statement that the covering "is obtainable by perforating a film" or by the method step consisting in "perforating a film". These changes were made by the appellant in order to better distinguish the film of its invention and the method of obtaining it from the closest prior art as disclosed in document D1, which involves the use of a porous open mesh fabric material. They do not introduce subject-matter extending beyond the content of the application as originally filed,

since according to established case law of the Board's of appeal, the definition in the original claims of a product by reference to the way it is achieved (here a film that is perforated) must be interpreted merely such that the product can be so obtained.

The dependent claims each have a counterpart in the dependent claims as originally filed.

The description was merely supplemented with a short summary of the contents of the closest prior art documents, and adapted to the amended wording of the claims, for compliance with the requirements of Rule 27(1)(b) and (c) EPC.

3. The expression "having a uniform unit weight" as objected to by the examining division in the appealed decision no longer appears in the claims which, in the Board's opinion, now adequately meet the requirements of Article 84 EPC.

4. *Novelty*

4.1 Document D1 discloses an electrochemical cell which, like the device of present claim 1, comprises anode and cathode electrodes 30 and 22 (see Figures 1 to 3) and an operatively associated electrolyte 68 and which includes an electrode covering 70, 72 at one or more interfaces of the electrodes and the electrolyte, the covering being provided with an organic electron donor material (see the abstract).

The electrode covering of document D1 comprises a thin film of substrate material impregnated with the organic

electron donor material. The only examples of adequate substrate materials disclosed in the document are synthetic open mesh fabric materials (see column 4, lines 34 to 49).

Such open mesh fabric materials cannot be obtained by perforating a film of ion impermeable material.

Thus, the subject-matter of claim 1 is distinguished from the electrochemical cell disclosed in document D1 in that the covering is obtainable by perforating a film of ion impermeable, synthetic polymeric substrate material to provide for ion flow therethrough and coating the resultant perforated substrate material with an organic electron donor material, as is set out in the characterising portion of the claim.

4.2 The other documents cited in the search report do not come closer to the claimed subject-matter.

In particular, document WO-A-92/10 860 discloses an electrochemical cell with an electrode covering integrally made of a self-supporting extruded film of an ion permeable organic donor material. In the embodiment disclosed with reference to Figure 5, perforations having a diameter of 3.2 mm (1/8 inches) are provided to achieve a controlled reduction of coating coverage in a range between 10% and 60% of the operative anode surface in such a way as to affect cell voltage characteristics during discharge (see page 3, lines 1 to 8 and page 9, lines 11 to 18). In contrast with the device of claim 1, this cell does not comprise a film of ion impermeable substrate material coated with an organic electron donor material.

Document DE-A-2 945 711 and US-A-4 166 887 disclose electrochemical cells comprising coverings of an organic electron donor material applied directly, after mixing with a suitable solvent, onto the anode surface.

Finally, document US-A-4 677 041 discloses an electrochemical cell in which a layer 66 of an electrically insulating material provided with perforations 70 is placed between the anode 60 and a metallic substrate 52 (see Figure 5 and column 4, lines 13 to 55). This perforated layer is not provided at the interfaces of the electrodes and the electrolyte, and it does not comprise any organic electron donor material.

4.3 For these reasons, the subject-matter of claim 1 is novel within the meaning of Article 54 EPC.

5. *Inventive step*

5.1 The closest prior art is constituted by the electrochemical cell disclosed in document D1, as is acknowledged in the introductory portion of the description. This is infact the only prior art document to describe an electrode covering comprising an organic electron donor material provided on a substrate material allowing ion flow therethrough.

The covering of document D1 comprises a thin film of synthetic open mesh fabric material having the organic electron donor material impregnated therein. The Board sees no reason to question the appellant's submission, adequately supported by the experimental results shown in Table II of the patent application, that due to an increased uniformity of the density of the claimed

substrate formed of a perforated film of ion impermeable, synthetic polymeric material, the electrochemical cell of claim 1 achieves not only higher voltages and lower impedances at 1000 Hz on average, but also standard deviations for these characteristics which are roughly half the corresponding prior art values.

5.2 Thus, the technical problem underlying the claimed subject-matter can be seen in improving the electrical characteristics and uniformity of the electrochemical cell disclosed in D1.

The above definition of the technical problem does not by itself contribute to inventive step, since it only expresses a most common endeavour of the skilled person in the technical field considered.

5.3 The teaching of document D1 with respect to the constitution of the substrate material for the organic electron donor material is that it should be porous, so as to allow ion flow therethrough, and the specific examples offered in the document all comprise a substrate material which has an inherent porosity due to its open mesh fabric structure, like the # 3251 Hollytex-Paper polyester, the polyester-polyethylene combination commercially available from Filtration Unlimited Inc., Akron, New York under the designation Reemay 2250 or Crave or Manning glass fibre sheets (see column 4, lines 34 to 49, column 7, lines 49 to 54 and column 8, lines 31 to 37).

The document does not however hint at using instead an inherently ion impermeable substrate film, which is perforated in such a way as to provide for ion flow

therethrough. Neither does the document suggest that replacing the disclosed fabric material with such perforated film could achieve any benefit whatsoever in terms of the electrical characteristics of the cell and of their uniformity.

The other citations as summarized under point 4.2 above do not disclose or suggest the use of a covering obtainable by perforating a film of ion impermeable synthetic polymeric material as a substrate for an organic electron donor material either.

Thus, the skilled person in the Board's opinion had no obvious reason to replace the fabric material disclosed in document D1 with the film set out in present claim 1, if not with the benefit of hindsight.

The subject-matter of claim 1 thus involves an inventive step within the meaning of Article 56 EPC.

The above conclusion also applies to the subject-matter of independent claims 16 and 17 which define an anode comprising the inventive covering defined in claim 1, to the subject-matter of independent claim 27 which is directed to a method of forming the anode of claims 16 or 17, and to the subject-matter of the dependent claims, by virtue of their appendence to the above independent claims.

6. Since for the above reasons the present application and the invention to which it relates meet the requirements of the Convention, a European patent can be granted in accordance with the appellant's main request (Article 97(2) EPC).

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 the following documents:

Claims: 1 to 29 filed as main request with the statement of the grounds of appeal dated 15 November 1999.

Description: pages 1 and 2 filed with the letter dated 6 October 2000;
pages 2a, 3, 16, 17, 19 and 20 filed with the letter dated 15 October 1996;
pages 4 to 15 and 18 as originally filed.

Drawings: Sheets 1/4 to 4/4 as originally filed.

The Registrar: The Chairman:

P. Martorana E. Turrini