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D E C I S I O N
of 13 April 1994

Case Number: T 0157/92 - 3.3.3

Application Number: 86117372.2

Publication Number: 0229993

IPC: H01B 1/12

Language of the proceedings: EN

Title of invention:
Method for the electropolymerization of conductive polymers

Applicant:
Polaroid Corporation

Opponent:
-

Headword:
-

Relevant legal norms:
EPC Art. 56

Keyword:
-

Decisions cited:
-

Catchword:
-

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Beschwerdekammern | Boards of Appeal | Chambres de recours

Case Number: T 0157/92 - 3.3.3

D E C I S I O N
of the Technical Board of Appeal 3.3.3
of 13 April 1994

Appellant: Polaroid Corporation
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Decision under appeal: **Decision of the Examining Division of the European Patent Office dated 9 September 1991, issued in writing on 14 October 1991 refusing European patent application No. 86 117 372.2 pursuant to Article 97(1) EPC.**

Composition of the Board:

Chairman: C. Gérardin
Members: R. Lunzer
F. Benussi

Summary of Facts and Submissions

I. European patent application No. 86 117 372.2, publication No. 0 229 993, was filed on 13 December 1986, having a priority date of 20 December 1985 derived from US application No. 811 692.

II. By its decision given orally on 9 September 1991, and issued in writing on 14 October 1991, the Examining Division refused the application, holding that although the alleged invention was novel over the closest prior art, (1) EP-A-0 160 207, it was not inventive, because it involved no more than applying to the problem of electrodepositing conductive polymers the well-known practice used in the electrolytic refining of copper, of using an anode of the same composition as the material being deposited. In this case, the desired product was an electrically conductive organic polymer, and the anode used was a preformed sheet of the same material.

The single independent Claim 1 filed on 12 January 1991 in the form considered by the Examining Division was in the following form:

"A method for the production of a processable electrically conductive organic polymer which comprises the steps of:

electropolymerizing an electropolymerizable monomer onto an anode in an electrolytic medium, said electrolytic medium comprising a reaction solvent for an electropolymerizable monomer; an electropolymerizable monomer exhibiting solubility in said reaction solvent; and a polymeric electrolyte having anionic surface character for affiliation with the cationic electro-polymerized polymer on said anode; said polymeric

electrolyte being present in said electrolytic medium in a dispersed phase during the electropolymerization of the electropolymerizable monomer; said anode being an electrically conductive anode processed from a processable conductive polymer having cationic character in affiliation with a polymeric counteranion particle having anionic surface character; and

processing together the electropolymerized polymer and the anode on which it is formed by shaping the electropolymerized polymer and anode or by size reducing the electropolymerized polymer and anode and dispersing the resulting size reduced material into a liquid vehicle therefor for production of a coatable composition."

III. An appeal against that decision was filed on 16 December 1991, the appeal fee was paid on the same day, and the Statement of Grounds of appeal was filed on 14 February 1992. In its grounds of appeal, and during oral proceedings held on 13 April 1994, the Appellant contended essentially that it was far-fetched to suggest that in this area, the handling of conducting organic polymers, the skilled worker would look to the wholly different area of the electrolytic refining of copper. The alleged invention had the significant advantages to which attention was drawn in the application (page 3, line 7) of convenience and economy, and the further advantage that, whereas when using metal conductive anodes, the desired polymer had to be removed by a time consuming scraping step, with the inherent risk of contamination of the polymer with the metal of the anode, both that time-consuming step and the risk of contamination were avoided.

IV. At the oral proceedings, the Appellant filed as its sole request a set of ten claims comprising in particular a revised Claim 1 in which after the words which were

already in Claim 1, "said polymeric electrolyte being present in said electrolytic medium in a dispersed phase", the further qualification was added, "comprising latex particles". There were also equivalent references to latex particles in Claims 2, 3, 4, and 5.

V. The Appellant requested that the decision under appeal be set aside, and a patent granted on the basis of Claims 1 to 10 as filed during the oral proceedings, and the description to be adapted.

Reasons for the Decision

1. The appeal is admissible.

2. *Admissibility of amendments*

The above-mentioned amendments are admissible for the purposes of Article 123(2), the use of latex particles now introduced into Claim 1 being disclosed *inter alia* at page 9, line 25; page 14, line 17, and in Claim 16 of the application as filed. As to the dependent Claims 2 to 10, Claims 2 to 5 and 7 to 10 correspond to Claims 2 to 5, 7, 9, 10 and 11 as originally filed, and Claim 6 is based on one of the features of the original Claim 6.

3. *Novelty*

Novelty was not challenged by the Examining Division. Having reviewed the cited documents, the Board is satisfied that none of them discloses a method having all the features defined in Claim 1. Therefore the subject-matter of Claim 1 is considered to be novel within the meaning of Article 54 EPC.

4. *The closest prior art*

The Board agrees with the Examining Division in regarding document (1) as the closest prior art. In fact, it discloses a process for the electrodeposition of conductive polymers which is in all respect the same as that of the application in suit, save only that in the prior patent a conductive metal anode was used. In practice, after the polymer has been deposited on the anode, the latter is removed from the electrolytic medium for recovery of the polymer, which can be scraped, peeled or otherwise removed, and subsequently washed with water and allowed to dry (page 12, lines 20 to 28). Specifically, in Examples 1 to 9 inclusive a platinum working anode is disclosed, and the step of scraping the deposited material off the anode is mentioned at page 16, line 13. Although this process overcomes most of the shortcomings of the prior methods mentioned in the introduction of the specification (page 1, lines 13 to 19), the sequence of operations was regarded as too cumbersome and time consuming.

5. *Problem*

Seen against that prior art, the problem underlying the application in suit can be regarded as providing a process in which the removal of the deposited polymer from the anode can be achieved simply, without the need for any scraping step and without any risk of possible contamination of the deposit by the anode material.

6. *Solution*

According to Claim 1 of the application in suit, this problem is solved by using an anode, being an anode made of the polymer more specifically defined in Claim 1, and processing together the polymer and anode, again as

specified. In the light of the Examples, the Board accepts that an effective solution to that problem is provided by the claimed method.

7. *Inventiveness*

7.1 The issue of inventiveness turns on whether a skilled person, having as his starting point the disclosure of the use of metal anodes as in document (1), and confronted with the technical problem stated in the above paragraph, would have turned to the use of an anode of the same composition as the material to be deposited. No prior art document was cited mentioning the deposition of copper onto thin sheets of refined copper during electrolytic refining. In the Board's view none needed to be, because this practice is part of the common general knowledge of anyone who is concerned with deposition from an electrolytic cell. Consequently, the Board cannot accept the Appellant's argument that the refining of copper is knowledge taken from too remote a field to be applicable to the consideration of obviousness in the present case, because the technical concept is the same.

7.2 The Appellant's second argument was that if the use of such an electrode had been contemplated at all, the skilled person would have been deterred from its use by his awareness of the much higher electrical resistivity of a conductive polymer anode than the platinum anode it was intended to replace. That higher resistivity would inevitably call for the use of a higher voltage, if the existing rate of deposition with a platinum anode were to be matched, with consequent generation of heat in the cell. There would also be non-uniformity of the thickness of the deposit from top to bottom of the electrode, due to the diminishing flow of current as the electrode extends deeper into the cell. Unlike the

relatively flat deposits obtained during copper refining, in this case the high resistivity would result in an essentially wedge-shaped deposit.

7.3 The Board readily accepts that all of those effects would at once have been foreseen by the skilled person contemplating the use of conductive polymer anode, before even attempting to put the idea into practice. However, in its view, the advantages and disadvantages of using an anode of the same composition as the material being deposited are so well known, that they would have been contemplated by the skilled person. His choice of whether to use such an anode or not would have been based on whether he judged that the wholly foreseeable balance of advantages, already mentioned above, compensated for the equally foreseeable drawbacks resulting from its lower conductivity.

7.4 For the above reasons, the Board concludes that it was obvious to turn to the use of an anode of the kind identified in Claim 1 for the solution of the above-defined technical problem and that, therefore, the subject-matter of Claim 1 does not involve an inventive step.

8. *Conclusion*

In the absence of a separate request directed to the specific features mentioned in dependent Claims 2 to 10, the latter must fall with the main claim, since a request can only be considered as a whole. Besides, no argument in favour of the inventiveness of any of these features has been provided by the Appellant.

Order

For these reasons, it is decided that:

The appeal is dismissed.

The Registrar: The Chairman:

E. Görgmaier C. Gérardin