

COMMISSIONER'S DECISION

Rule 52 - Electro-Chemical Treatment of Liquid Effluent

An equivalence between carbon fiber electrodes and conductive fiber electrodes of any material was found acceptable in this application because the disclosure showed that the carbon electrode was not consumed in the process, and the prior art demonstrated that at the time of filing an inert electrode may be of any fibrous material. Rejection withdrawn.

Patent application 245,193 was filed on February 6, 1976 in Class 204 subclass 89.5 for an invention entitled: Electro-Chemical Treatment of Liquid Effluent. A review without a Hearing was requested by Applicant.

The invention is directed to the electrolytic purification of water. The original disclosure showed the use of carbon fibres as the anode (and of other carbon particles). The applicant now wishes to broaden the disclosure and claims to cover any fibrous anode. The issue is whether he is entitled to do so.

The Examiner rejected the application for the following reasons:

1. New matter found on pages 5 and 6 not inferable from the original specification is not acceptable under Rule 52 of the Patent Rules.
2. Claims 1 and 3-9 are not fully supported by the disclosure with respect to carbon fibres contrary to Rule 25 of the Patent Rules as well as inoperative.

Applicant's invention relates to a process of treating paper waste water by flowing it through a carbon fibre anode on a diaphragm. The organic waste compounds are oxidized electrochemically with gases being produced which give rise to turbulence and thereby improve the mass transfer rate. The purified water is discharged into a natural water source. The Supplementary Disclosure includes reference to a reactor apparatus including a housing, carbon fibre anode restricted by a diaphragm and a cathode on the other side of the diaphragm.

1. The subject matter of page 5 line 30 - page 6 line 1 remains rejected as amended by applicants correspondence dated January 21, 1980 because it cannot be reasonably inferred from the specification as originally filed.

The disclosure as filed, referred to a carbon fibre anode on page 8 line 18 even though attorneys were of the opinion that reference to this passage was made through inadvertence. No materials other than carbon

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were considered at that time, as also evident from page 6 line 1, 8 and 15 as well as page 10, line 23. The pages filed on November 27, 1978 were similar and page 6, line 1 and 11 of September 10, 1979 still referred to carbon.

2. Claims 2 and 3-9 are rejected as not fully supported by the disclosure (as exemplified above) with respect to carbon fibres. The use of this material appears essential and no alternative has ever been envisaged to provide the desired results. Claims of this scope were introduced by the amendment of September 10, 1979.

The application is refused in view of applicant's failure to remove the new matter. Claims 1 and 3-9 are rejected as not fully supported by the disclosure and claims 1 and 3-9 are additionally inoperative.

In responding to the Final Action the Applicant stated (inter alia):

Before dealing with the Examiner's main reasons for rejecting the application, the Examiner has also commented that Claims 1 and 3 to 9 are rejected because they are inoperative. Applicant is uncertain why this statement is made and a review of the claims does not prompt amendments because Claims do not in Applicant's view suffer from any lack of elements or description which would suggest that they include inoperative combinations. Applicant therefore submits that this comment by the Examiner is incorrect. The claims clearly identify treatment of an effluent emanating from a specific type of process and, as explained in the introduction, the exact constituents of this effluent are extremely difficult to analyse due to their complexity. In these circumstances, it is submitted that a statement of the type of effluent should be sufficient and if the Examiner is directing his comments towards a lack of definition of the effluent, then applicant submits that this is improper and that, in fact it is impossible to comply with such a requirement due to the nature of the effluent.

Turning now to the main rejection, the Examiner takes the position that it is essential that the claims define anodes of carbon fibres (or possibly carbon particles as previously defined). Applicant disagrees with this contention for the following reasons:

In the original application, applicant defined two aspects of the invention both of which included the use of carbon particles which were defined as follows:

The term 'carbon particles' as used in this specification includes carbon fibres, carbon chips, carbon granules and any carbon which is in a form having a large surface area compared with the volume of the carbon."

It is important to recognize that the definition includes the physical relationship, i.e. that the carbon particles have a large surface area compared with the volume of the carbon. Next, after introducing two aspects of the invention and including a definition of terminology in those aspects, Applicant has described a preferred embodiment in compliance with the Patent Act. There is no statement anywhere in the disclosure which would suggest that

Applicant is restricting its right to claim either to carbon, or to carbon fibres. The teaching of the disclosure is to a preferred embodiment of an anode which has a high surface area to volume ratio and which in the preferred embodiment is of carbon. It will be evident to a person skilled in the art that there is an equivalency between carbon fibres or any other high surface area to volume carbon electrode and an electrode made up of conductive fibres of any material. Certainly carbon fibres are desirable and this is why they are described as a preferred embodiment. Nevertheless Applicant's claims should be restricted only in terms of prior art and specific limitations in the disclosure. Applicant submits that the only specific limitation in the disclosure for the purposes of the present discussion is that the electrode should have a high surface area to volume ratio and that this is achieved by a fibrous electrode. Claims 1 and 3 to 9 are in fact restricted to a fibrous electrode and it is submitted that this is clearly within the boundaries of the disclosure regardless of the fact that other materials were not explicitly defined.

Applicant also suggests that the Examiner is applying proper chemical examination procedure to a structure and method which are not strictly chemical. In chemical examination procedure it is accepted that a claim is proper only if it defines the starting products which are combined to produce an end product. This is not analogous to the present claims which are more mechanical than chemical. Here we are considering the effect of a high surface area to volume ratio applied to an anode used in a process of treating waste water and, although some of the actions may be chemical in nature, the anode is not a constituent of the chemical action in the sense of a chemical claim but is merely used in an electro-chemical sense causing breakdown of components which then may combine chemically with one another. For these reasons, Applicant submits that the approach taken by the Examiner in reviewing these claims is improper.

In summary, applicant submits that claims 1 and 3 to 9 are allowable in their present form. Applicant should not be required to restrict the claims to the preferred embodiment and should have the right to claim sufficiently broadly to encompass all equivalents not taught by the prior art. In view of the fact that the Examiner has not found art to reject these claims, it is therefore submitted that all of the claims, including claim 2 which was accepted by the Examiner, are in allowable form and that the application should proceed to allowance.

The issue before the Board is whether or not the application as amended by Applicant's response to the Final Action is open to rejection under Rule 52.

Rule 52 is reproduced below:

No amendment to the disclosure shall be permitted that describes matter not shown in the drawings or reasonably to be inferred from the specification as originally filed, and no amendment to the drawings shall be permitted that adds thereto matter not described in the disclosure.

The Rule poses the following questions: Under what conditions should the reasonable inference be made and by whom shall it be made? The clear answer to this question is: The man skilled in the art at the time the application was filed.

We now turn to the amended application to examine the new matter which has been entered at pages 5 and 6 in a single paragraph as follows:

In one of its aspects the invention provides an electrochemical process for treating a stream of waste water as it emanates from pulp and paper manufacturing plants. The waste water has unacceptable biochemical and chemical oxygen demands, an unacceptable toxicity level, and an unacceptable colouration. The process comprises the steps of flowing the waste water through an electro-chemical reactor which has a fibrous anode and a cathode. The fibrous anode has a high surface area to volume ratio and a relatively large oxygen overpotential. Electrolytic continuity is provided between the anode and the cathode and the anode is at a generally constant electrical potential different from that of the cathode. As a result at least some of the compounds present in the stream are electrochemically oxidized at the anode and gases are produced at the anode. These gases produce turbulence and movement in the hydrodynamic boundary layers so that these layers are broken down to further increase the mass transfer rates at the anode. The quality of the waste water is thereby improved for the purpose of discharging the waste water stream into natural water sources.

The matter in dispute has been underlined.

The rejection by the Examiner, as we understand it, was based on the reasoning that the original disclosure was limited to various carbon anodes in the form of chips, granules, particles or fibers. He considered that the Applicant was not entitled to broaden his original description of carbon fiber anodes by deleting the modifying word "carbon"; though he might delete reference to anodes made of carbon particles, granules or chips. He also stated that carbon appeared to be essential, and no alternative has ever been envisaged to provide the desired result. The applicant's rebuttal, as we understand it, is that it will be evident to a person skilled in the art that there is an equivalence between carbon fiber electrodes and conductive fiber electrodes of any material.

To resolve this matter, we must analyze the disclosure from the point of view of one skilled in the art to determine if carbon is essential. From this viewpoint, we have determined that the main feature of the process is to produce an excess of oxygen at the anode. The gas thus produced will then oxidize many organic components including lignin; and in this way pulp and paper plant waste water will be clarified and detoxified. The disclosure as filed clearly does not teach that carbon is consumed as part of the process. Therefore we have determined that carbon is not essential and should not enter chemically into the reaction. We are supported in this view by United States Patent 3,652,433 of March 28, 1972 entitled: Electrolytic Softening Of Water. The patent reads at column 1 line 18: "The anode is formed in an inert but electrically conductive material such as platinum or other inert heavy metal or alloy, carbon, graphite, or the like." Again at column 2 lines 41 to 47:

Similarly, the anode 18 comprises a porous disk of fabric 35 supported by a ring 36 and secured in an annular inner space 37. The anode, however, is formed of material that is inert to and not attacked by any electrolytic action set up in the operation of my system. For this purpose the anode can be of platinum, or of carbon or graphite, a graphite fabric or a graphitized glass fiber fabric being suitable.

From the point of view of one skilled in the art, the above evidence clearly indicates that inert electrodes in an electro-chemical process may well be made of fibrous material other than carbon. We are consequently satisfied that one skilled in the art would realize that any fibrous anodes may be used in the present process.

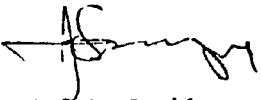
We are satisfied that amendments restricting the apparatus to fibrous anodes, which are not necessarily made of carbon, are acceptable amendments. We are also satisfied that the claims are supported by the revised disclosure.

We therefore recommend acceptance of the amendments.



G.A. Asher
Chairman
Patent Appeal Board, Canada

I have reviewed the prosecution of this application and I concur with the reasoning and findings of the Patent Appeal Board. Accordingly, I accept the amendments and return the application to the Examiner.



J.H.A. Gariépy
Commissioner of Patents

Dated at Hull, Quebec
this 2nd. day of April, 1982

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