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**D E C I S I O N**  
**of 22 January 2002**

**Case Number:** T 0891/98 - 3.3.5

**Application Number:** 93924842.3

**Publication Number:** 0666831

**IPC:** C01B 15/01

**Language of the proceedings:** EN

**Title of invention:**

Process associated with the gasification of cellulose spent liquors

**Applicant:**

Kvaerner Pulping AB

**Opponent:**

-

**Headword:**

Gasification of cellulose spent liquors/KVAERNER

**Relevant legal provisions:**

EPC Art. 56

**Keyword:**

"Inventive step-yes, non-obvious combination of process steps"

**Decisions cited:**

-

**Catchword:**

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Boards of Appeal

Chambres de recours

**Case Number:** T 0891/98 - 3.3.5

**D E C I S I O N**  
**of the Technical Board of Appeal 3.3.5**  
**of 22 January 2002**

**Appellant:** Kvaerner Pulping AB  
Box 1033  
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**Representative:** Karlsson, Leif Karl Gunnar  
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**Decision under appeal:** Decision of the Examining Division of the  
European Patent Office posted 3 June 1998  
refusing European patent application  
No. 93 924 842.3 pursuant to Article 97(1) EPC.

**Composition of the Board:**

**Chairman:** R. K. Spangenberg  
**Members:** G. J. Wassenaar  
M. B. Günzel

## Summary of Facts and Submissions

- I. European patent application No. 93 924 842.3, based on the International Application No. PCT/SE93/00778, published under No. WO 94/10085, was refused by a decision of the Examining Division. The decision was taken on the basis of the set of claims 1 to 13, filed with the letter dated 9 January 1997 as main request and a corresponding set of claims with an amended claim 1, filed with a letter dated 14 October 1997, as auxiliary request.

Claim 1 of the main request read as follows:

"Process for producing hydrogen peroxide, characterized in that cellulose spent liquors produced on site are used as raw material, oxidised partially or gasified in a reactor at a temperature exceeding 500°C under formation of a gaseous product containing hydrogen gas and carbon monoxide, and that the gaseous product is made to react with water under formation of carbon dioxide and hydrogen gas, said hydrogen gas being fed to a plant for production of hydrogen peroxide for bleaching of pulp on site."

Claim 1 of the auxiliary request read as follows:

"Process for bleaching cellulose with hydrogen peroxide in a mill comprising a spent liquor combustion/gasification plant, a water gas reforming plant, a plant for production of hydrogen peroxide, and a bleaching plant, the process comprising:

- diverting spent liquor from pulp produced in the mill;

- feeding said liquor to said combustion/gasification plant; partially oxidising or gasifying said liquor at a temperature exceeding 500°C, thereby forming a gas containing hydrogen and carbon monoxide;
- feeding said gas to said reforming plant;
- reforming said gas to increase its hydrogen content;
- feeding hydrogen in said reformed gas to said plant for producing hydrogen peroxide;
- forming hydrogen peroxide from said hydrogen;
- feeding said hydrogen peroxide to said bleaching plant;
- bleaching said pulp with said hydrogen peroxide."

II. The Examining Division held that the subject matter of claim 1 of the main and auxiliary request lacked an inventive step over

D1: EP-A-0 459 963.

In its decision, the Examining Division considered the claimed process to be a juxtaposition or association of known processes functioning in their normal way and not producing any non-obvious working inter-relationship. The subject-matter of claim 1 of the auxiliary request was considered to be the same as that of claim 1 of the main request and that the differences were merely linguistic and in the sequence of presenting the

features.

- III. The appellant lodged an appeal against this decision. With the statement of grounds of appeal the appellant filed a new set of amended claims 1 to 13 as an auxiliary request. Claim 1 thereof was limited with respect to claim 1 of the main request by including a specification of the pressure (1 to 25 bar) in the reactor and the additional feature, that the formed gaseous product was cooled by direct contact with a cooling liquid.
- IV. In a communication under Article 110(2) EPC, the Board expressed the preliminary opinion that the subject-matter of claim 1 of both the main and auxiliary request lacked an inventive step over D1 in combination with the common general knowledge in the art. It was essentially argued that it was obvious to a skilled person to produce hydrogen peroxide needed for bleaching pulp on site of a paper mill. If on the paper mill site there was already a partial combustion reactor for the recovery of black liquor providing a hydrogen containing gas, as disclosed in D1, it was obvious to use this hydrogen for the production of hydrogen peroxide.
- V. In reply the appellant essentially argued that the problem which the skilled person was faced with was the costs of purchasing and transporting hydrogen peroxide and the environmental risks related to the transport. It was not denied that in addressing this problem he could find his way to the invention, but it was argued that in the absence of any incentive in the state of the art to link the recovery of black liquor by partial combustion as known from D1 with the hydrogen peroxide

bleaching process, the skilled person involved in the hydrogen peroxide bleaching would not have considered the production of hydrogen peroxide on site with the use of fuel gas obtained by partial combustion of black liquor. Reference was made to the presentation of Lars Stigsson during the Kamyr Symposium on April 17 to 18, 1991, in Lisbon, Portugal (see pages 124 to 134 of the publication thereof). From this presentation it was evident that the combustible gas obtained in the black liquor gasification plant was only regarded to be suitable for heating purposes such as in the lime kiln or in the production of process steam and electrical power.

VI. In a second communication posted 6 July 2001 the Board raised objections under Article 84 EPC against claim 1 of the main request but indicated that claim 1 of the auxiliary request dated 14 October 1997 would overcome the objection under Article 84 EPC and that its subject-matter would also involve an inventive step. In the Board's communication a time limit for reply of 4 months was set. Hereupon the appellant submitted a new set of claims 1 to 13 and an amended description with a letter dated 5 December 2001, received at the office on 8 December 2001. Fee for further processing was paid through deposit account. Claim 1 of this set was identical with claim 1 of the auxiliary request submitted with the letter dated 14 October 1997 (see point I above).

VII. The appellant requested that the decision under appeal be set aside and that a patent be granted with claims and description filed with the letter dated 5 December 2001.

## Reasons for the Decision

1. The appeal is admissible.
  
2. The appellant's reply to the Board's communication posted 6 July 2001 was received on 8 December 2001, ie after the application had been deemed to be withdrawn under Article 110(3) EPC. The paying of the fee for further processing together with the submission of amended claims and description can be considered as a request for further processing. The omitted act was completed within the period set in Article 121(2) EPC so that the application is no longer deemed to be withdrawn.
  
3. The features of present claim 1 in their present context are disclosed in claims 1, 2 and 5 in connection with page 4, lines 10 to 14; page 4, line 35 to page 5, line 33; page 5, line 38 to page 6, line 2 and page 6, lines 19 to 20 of the PCT application. Claim 1, therefore, does not contain subject-matter which extends beyond the content of the application as filed. Its subject-matter also does not form part of the state of the art. Since the amendments and novelty of this claim were not contested by the Examining Division no further observations need to be made with respect to these issues.
  
4. *Inventive step*
  - 4.1 The only document cited in the decision under appeal is D1, which discloses a process for the partial combustion of cellulose spent liquor. The contested decision does not contain a clear statement of which technical problem has been the basis for consideration

of inventive step. Since the present application is related to the bleaching of pulp by hydrogen peroxide the technical problem underlying the invention cannot be easily defined starting from D1, which document is completely silent about the bleaching of pulp and the production of hydrogen peroxide. Taking into account the observations made by the appellant, the Board holds that D1 does not represent the closest prior art with regard to the subject-matter of the present application. In the absence of any prior art citation disclosing the bleaching of pulp by hydrogen peroxide, the Board considers the undisputable prior use of hydrogen peroxide for bleaching pulp in existing pulp mills, as discussed on page 2 of the application in suit, to represent the closest state of the art.

4.2 In agreement with the description of the present application, starting from the known hydrogen peroxide bleaching process, the problem underlying the invention can be seen in reducing costs and environmental charge of the bleaching of pulp by hydrogen peroxide (page 2, lines 23 to 33 and page 3, line 30 to page 4, line 1). The application proposes to solve this problem by producing the hydrogen peroxide on site according to claim 1, whereby the hydrogen is generated by gasification of cellulose spent liquors. Since the starting product for the production of hydrogen peroxide is made on site from a biomass waste product, the Board is satisfied that the process according to claim 1 actually solves the above-mentioned problem.

4.3 A skilled person trying to economise the bleaching process would normally not consider documents relating to the recovery of cellulose spent liquor such as D1. But even if he would have had knowledge of D1, he could

not find therein any suggestion for producing hydrogen peroxide on site. D1 is silent about the further use of the generated combustion gas. The Kamyrr Symposium document, the author of which is the inventor of the process disclosed in D1, mentions as use for the combustible gas only its use as a fuel for internal use such as the lime kiln, process steam and electrical power generation (page 125, last paragraph to page 126 first paragraph and Figures 5, 6 and 9). Only with a clear incentive to use the combustion gas for the production of hydrogen is it obvious to react it with water to increase the amount of hydrogen. Without such an incentive, as in this case, the skilled person would not consider optimizing the hydrogen content. Therefore, the skilled person in the pulp bleaching technology, who is not an expert on the production of hydrogen peroxide, would not realise, without exercising inventive skill, that the information in D1 that the partial combustion of black liquor generates a combustible gas comprising hydrogen, carbon monoxide and carbon dioxide can be linked with the production of hydrogen peroxide. Thus the claimed combination of process steps, which are in themselves known in different areas of technology, requires more than average skill and is not obvious to a person skilled in the art of pulp bleaching. The Board agrees with the Examining Division that the claimed process makes use of conventional processes but holds that it was not obvious to combine these processes in the manner as indicated in present claim 1 to solve the above mentioned problem.

- 4.4 The subject-matter of claims 2 to 13, defining subject-matter of more limited scope, comprising all the features of claim 1, likewise involves an inventive

step as required by Article 56 EPC.

5. The formulation of the subclaims is, however, not very well adapted to present claim 1. For instance in claims 2 and 4 there is no antecedent for "the gaseous product", in claim 3 there is no antecedent for "the shift reaction", and in claim 9 there is no antecedent for "the reactor". In claim 8 it is not clearly indicated where the support fuel is adduced. The amended description contains unclear expressions such as "øC" and "ÿbar" which should be corrected. The application is thus not yet in order for grant. The Board, therefore, makes use of its power under Article 111(1) EPC and refers the case back to the Examining Division for further prosecution on the basis of present claim 1.

## **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 for further prosecution on the basis of claim 1 filed with the letter dated 5 December 2001.

The Registrar:

The Chairman:

U. Bultmann

R. Spangenberg