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D E C I S I O N
of 28 May 2002

Case Number: T 0433/98 - 3.3.6

Application Number: 92911890.9

Publication Number: 0591264

IPC: D21C 9/153

Language of the proceedings: EN

Title of invention:
Ozone bleaching process

Patentee:
Andritz Oy

Opponent:
Kvaerner Pulping AB

Headword:
Ozone bleaching/ANDRITZ

Relevant legal provisions:
EPC Art. 114(2), 56

Keyword:
"Late-filed documents - not admitted"
"Inventive step - yes: no incentive in the prior art for the claimed solution of the technical problem"

Decisions cited:
T 0538/88

Catchword:
-

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Case Number: T 0433/98 - 3.3.6

D E C I S I O N
of the Technical Board of Appeal 3.3.6
of 28 May 2002

Appellant: (Opponent)
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Representative:
-

Respondent: (Proprietor of the patent)
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Decision under appeal:
Decision of the Opposition Division of the European Patent Office posted 17 March 1998 rejecting the opposition filed against European patent No. 0 591 264 pursuant to Article 102(2) EPC.

Composition of the Board:

Chairman: P. Krasa
Members: G. Dischinger-Höppler
C. Rennie-Smith

Summary of Facts and Submissions

I. This appeal is from the decision of the Opposition Division to reject the opposition and to maintain European patent No. 0 591 264 on the basis of 18 claims as granted, with Claims 1 to 9 relating to a method and Claims 10 to 18 relating to an apparatus, the independent Claim 1 reading:

"1. A method of ozone bleaching of a cellulosic fiber suspension having a consistency between 5 and 20 % in the following steps:

a) pressure feeding said fiber suspension and an ozone containing carrier gas to a mixer (14; 114);

b) intimately and uniformly mixing said fiber suspension and said ozone in said mixer (14; 114);

c) passing said intimate and uniform mixture of fiber suspension and ozone into a first reaction vessel (23; 123);

d) separating said gas from said fiber suspension by moving said fiber suspension into a second, relatively larger reaction vessel (32; 132); and

e) removing said fiber suspension from said second reaction vessel (32; 132), characterized in

adding a bleaching chemical to said fiber suspension during at least one of said steps (c) and (d)."

II. The notice of opposition, based on lack of novelty and lack of inventive step (Articles 100(a), 54 and 56 EPC)

was confined to the method claims only and cited the following three items of prior art, namely documents

(1) DE-A-4 039 099,

(2) EP-A-0 426 652 and

(3) WO-A-90/13705.

III. In its decision, the Opposition Division found the subject-matter as claimed to be novel and to involve an inventive step as against documents (2) and (3). Citation (1) was found not to be a prior art document within the meaning of Articles 54(2)(3) and 89 EPC, and was not considered further by the Opposition Division.

IV. In the appeal proceedings, the Appellant (Opponent) filed the following two further documents with its letter of 2 April 2002:

(4) Åke Backlund, "A Modern Fibre Line for Fully Bleached Chemical Pulp", Kamyr Technical Symposium, Kamyr Management Symposium, Jakarta, Indonesia, November 23-24, 1990, pp 55 to 75 and

(5) CA-A-1 112 813.

V. Oral proceedings were held before the Board of Appeal on 28 May 2002.

VI. The Appellant's arguments submitted orally and in writing can be summarised as follows:

- In view of document (2) as the closest prior art, the technical problem was to enhance the

efficiency of the bleaching process by avoiding too many steps in the bleaching sequence.

- The solution to this problem by incorporating a further bleaching chemical into the ozone stage of document (2) was obvious because:

  (a) document (2) alone gave a person skilled in the art the incentive to perform ozone steps (Z) in combination with extraction steps (E) as (ZE)-steps; or

  (b) it was the common general knowledge in the technical field of pulp bleaching that the efficiency of a bleaching stage could be boosted by the addition of a further bleaching chemical; or

  (c) any of documents (3), or (4) and (5) (being late-filed but relevant documents), or US-A-4 450 044 cited in the patent in suit showed that it was known to combine an ozone step with another bleaching step.

VII. The Respondent's arguments can be summarized as follows:

- Documents (4) and (5) were not prima facie relevant in respect of the claimed subject-matter. Moreover, there was no evidence that citation (4) had ever been published at all. These documents should therefore not be admitted in the appeal proceedings.

- Starting from the medium consistency (MC) process

disclosed in document (2) as the closest prior art, a skilled person would not have applied to it the teaching of document (3) which either required a dewatering step between a low consistency (LC) Z-stage and an MC E-stage or wherein the Z stage was carried out at a high consistency (HC).

VIII. The Appellant requested that the decision under appeal be set aside and that the patent be maintained in amended form on the basis of Claims 10 to 18 as granted.

The Respondent requested that the appeal be dismissed.

Reasons for the Decision

1. *Late filed documents*

1.1 Approximately four years after commencing the appeal proceedings, and about six years after expiry of the opposition period, and only about two months before the oral proceedings, the Appellant for the first time sought to rely on documents (4), (5) and US-A-4 450 044 without giving any reasons for doing so. When questioned during oral proceedings before the Board, the Appellant offered as an explanation that a change in its management had led to further investigations and a new search which eventually produced these documents.

1.2 The Boards of Appeal at the EPO often exercise their discretion under Article 114(2) EPC to admit late-filed evidence into the proceedings provided that it is beyond any doubt that such evidence was publicly available at the priority date of the patent in suit,

that it is prima facie and at first sight more relevant with regard to the claimed invention than the citations already on file, and that it might change the outcome of the decision to be taken by the Board.

1.3 As appears from its title, document (4) is a written report of a symposium held by the Kamyr company in Indonesia on 23 to 24 November 1990 concerning technical and management matters. The report itself being undated, its actual date of production let alone publication (if any) remains unclear and could have been at any unspecified and unknown date before or after the symposium actually took place. On its own submissions, the present Appellant has as a result of certain corporate transactions, inherited some or all of Kamyr's business, hence its document (4). However, the Appellant was none the less unable to provide any evidence as to whether the document has ever been made available to the public.

1.4 As regards document (5), the Board does not see in it any particular relevance to the method of MC ozone bleaching claimed in the patent in suit. This document is concerned with a different issue, namely an improved extraction of ozone treated pulp by performing the E stage at temperature and pH conditions similar to those in the Z stage (see page 3, line 21 to page 5, line 15). MC-ozonation is not mentioned in this document, nor is it evident that a technique for performing this kind of ozonation existed at its publication date (1981). Or, as put by the Respondent and not contested by the Appellant, unlike other bleaching stages, ozone bleaching at medium consistency was not fully developed at that time.

1.5 The Board holds, therefore, that documents (4) and (5) should not be taken into consideration either for lack of evidence as to public availability or as not being prima facie technically more relevant than the documents already on file (Article 114(2) EPC).

1.6 The situation is different as regards US-A-4 450 044. This document is one of only two items of prior art which are both cited and acknowledged in the patent in suit in relation to the technical problem set out in the description (column 1, line 16 to column 2, line 8). This prior art is, thus, on the evidence of the patent itself, essential for a correct understanding of the subject-matter claimed in the patent. This prior art, in the Board's opinion, forms part of the opposition and appeal proceedings even if it was not expressly cited within the opposition period (see T 536/88, OJ EPO, 1992, 638).

2. *Inventive step*

Lack of novelty being no longer in dispute, the only issue to be decided is whether or not the claimed method is based on an inventive step.

2.1 The claimed subject-matter and its technical background

The patent in suit is concerned with the efficiency of an ozone bleaching operation of medium consistency paper pulp. According to the patent in suit, such efficiency is increased by the incorporation of an additional bleaching chemical into the ozone bleaching stage (column 1, lines 5 to 10 and 21 to 28). To this end, the additional chemical is added during steps c) and d) of Claim 1, i.e. whilst the mixture of fibre

suspension and ozone is passed into and through a first reaction vessel including the directly following step where the said suspension is moved, under expansion, into a second, relatively larger, reaction vessel to separate gas from the said fibre/gas mixture (see also column 2, line 47 to column 3, line 1).

From the wording of Claim 1 it is thus clear that the claimed subject-matter, contrary to the Appellant's opinion, does not cover embodiments where the additional chemical is added anywhere in the second vessel, even after gas separation, on completion of the ozone treatment or during an extra washing step.

The Board would observe that it is immaterial that, as the Appellant observed, the Respondent has, during the proceedings, advanced arguments inconsistent with this; if the meaning of the claims as such is clear, the Board can only adopt that meaning as presented in the claims.

2.2 Closest prior art

As is stated in the patent in suit (column 1, lines 29 to 47), the bleaching of MC pulp with ozone is known from document (2). The process disclosed therein combines all the features of the preamble of Claim 1 of the patent in suit (see Figures in combination with page 5, lines 19 to 33 and Claim 1). This process may be performed several times consecutively with an alkaline extraction stage in between (page 4, lines 45 to 47) and it is evident from the examples (see in particular Examples 7 and 8) that the alkaline extraction stage increases the efficiency of the bleaching operation in terms of pulp brightness.

Thus, document (2) qualifies as a suitable starting point for assessing inventive step as was agreed by both parties.

2.3 Technical problem and its solution

The Appellant argued that there were many ways of improving the efficiency of a bleaching process. He repeatedly emphasized, however, that the patent in suit does not contain any examples at all. Therefore, no effects of the process on the product obtained have been shown and, hence, no improved efficiency in terms of product quality has been demonstrated.

Thus, the need for increased efficiency, referred to in the patent in suit as a problem in the technical field of ozone bleaching, may simply be a question of process economy, the solution to which would be to reduce the number of bleaching steps in the sequence.

The Board sees no reason to disagree with this line of argument nor indeed did the Respondent disagree with it. However, in the Board's view, the technical problem to be solved over document (2) is not to be seen just as providing a more economical MC ozone bleaching process but also as providing the market with an acceptable quality product.

Despite the fact that no effects of the claimed process on product quality are on file, it was open to the Appellant to prove that the products of the claimed process do not comply with such an acceptable quality level or, at least, to provide arguments which shed doubts on this. However, the Appellant itself indicated that the number of steps in a bleaching sequence and

the quality of the product are interrelated in as much as quality decreases as the more steps are carried out. Thus, in keeping with the consistent jurisprudence of the Boards of Appeal, the Patent Proprietor (in this case the Respondent) must be given the benefit of doubt with regard to a reasonable outcome of the claimed method (see also "Case Law of the Boards of Appeal of the European Patent Office", 4th edition 2001, Chapter VI.J.6.1).

It follows that the technical problem to be solved as against document (2) may be seen as improving the process economy without unduly worsening the quality of the product obtained, a problem which is credibly solved by the proposed solution of adding a bleaching chemical during the ozone treatment (see 2.1 above) according to the characterizing portion of Claim 1 of the patent in suit, thereby saving an extra bleaching step.

2.4 It remains to be decided whether, in view of the available relevant prior art documents, it was obvious for someone skilled in the art to solve that technical problem in the claimed manner.

2.5 The Appellant argued that it was within the general knowledge of those skilled in the art to boost bleaching stages by the addition of other bleaching chemicals. It was, for example, common knowledge to enhance the efficiency of an extraction stage with oxygen or peroxide or of an oxygen stage by adding peroxide. Therefore, and since a skilled person would seek to combine bleaching steps whenever possible, it was obvious to boost the Z stage in document (2) with an additional bleaching chemical, thereby improving the

process economy by reducing the bleaching steps. Moreover, since the process of document (2) did not require any consistency changes between the different bleaching stages, there was nothing at all to deter a skilled person from performing combined (ZE) stages.

In fact, document (2) mentions boosted steps, namely an alkaline oxygen stage enhanced by peroxide (EOP) (Examples 1 to 6), an alkaline extraction stage boosted with oxygen or peroxide (EO or EP) (Examples 7 and 8 and, page 4, lines 46 to 47) and a peroxide stage boosted with oxygen (page 4, lines 52 to 53). However, the only stage which is not mentioned in document (2) in combination with an additional bleaching agent is the Z stage. Thus, by suggesting additional bleaching at a number of alternative stages but not the Z stage, document (2) if anything teaches away from such additional bleaching in the Z stage.

Moreover, it is undisputed that the ozone bleaching of MC pulp poses particular process technology difficulties in the form of the requirement for thorough mixing under pressurisation in a special mixing device (see patent in suit, column 2, lines 2 to 4 in combination with lines 12 to 37 and column 4, lines 7 to 13; in document (2), page 4, lines 5 to 44).

The Board therefore concludes that, for those reasons (namely, the difficulties associated with ozone bleaching of MC pulp and in particular the absence of any suggestion of boosting the Z stage), the skilled person would not have simply added an additional chemical at the Z stage. This was not, as the Appellant argued, an obvious step to take in the light of document (2).

2.6 The Appellant further argued that the performance of a Z stage in the presence of a further bleaching chemical was known from document (3), in particular Example 57, and from US-A-4 450 044 cited in the patent in suit.

Concerning the US citation, the Board observes that this relates to HC bleaching only (consistency of at least 25%; see Claim 1 and examples) which is hardly suitable for combination with the MC bleaching process of document (2). Moreover, the Board understands from the disclosure in column 3, lines 3 to 9, according to which the Z stage is carried out in a particular "ozone reactor" whereas the alkaline treatment is performed in a special "high consistency maturation reactor", that in the process of this citation Z and E are not combined in one stage but are in fact performed separately.

Similarly, document (3), which generally relates to a DZED bleaching sequence with water washing between each stage, does not disclose MC ozonation. Instead, in document (3) the Z stage is carried out at LC conditions whereas D and E are performed at MC conditions (see page 7, first full paragraph and page 8) which requires an undesirable change of pulp consistency between the different stages. Only Example 57 relates to an embodiment in which ozonated pulp is processed directly to an oxygen enhanced alkaline extraction stage (denoted as E_0) without an intervening washing stage. In this Example, a different consistency is given for the Z stage, namely 34%, which however means HC conditions (Table 7). Thus, even if one accepted this Example as disclosing a combined (ZE_0) stage, its combination with the process of document (2) would not result in the claimed method but rather in

the inclusion of an enhanced HC Z stage in the process of document (2) since neither of documents (2) and (3) contains anything encouraging the skilled person to directly enhance the Z stage under MC conditions.

3. The Board, therefore, holds that none of the prior art documents, either individually or in combination, renders the claimed solution of the above identified technical problem obvious and concludes that the process of Claim 1 is based on an inventive step as required by Article 56 EPC.

Dependent Claims 2 to 9 which refer to preferred embodiments of Claim 1, are based on the same inventive concept and derive their patentability from that of Claim 1.

4. The apparatus Claims 10 to 18, having never been attacked during the opposition or appeal proceedings, form no part of the decision in the present appeal.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar: The Chairman:

G. Rauh P. Krasa