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**Datasheet for the decision  
of 25 November 2011**

**Case Number:** T 0658/09 - 3.3.06  
**Application Number:** 98952766.8  
**Publication Number:** 1029124  
**IPC:** D21C 9/18, D21F 1/66,  
D21H 17/65  
**Language of the proceedings:** EN

**Title of invention:**

A process for improving the drainage of cellulosic pulps

**Patentee:**

AGA AKTIEBOLAG

**Opponents:**

Metso Fiber Karlstad AB  
L'AIR LIQUIDE S.A. A DIRECTOIRE ET CONSEIL DE SURVEILLANCE  
POUR L'ETUDE ET L'EXPLOITATION DES PROCEDES GEORGES CLAUDE

**Headword:**

Drainage of pulp/AGA

**Relevant legal provisions:**

EPC Art. 56

**Keyword:**

"Inventive step - no (all requests)"

**Decisions cited:**

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**Catchword:**

-



Case Number: T 0658/09 - 3.3.06

**D E C I S I O N**  
of the Technical Board of Appeal 3.3.06  
of 25 November 2011

**Appellant:**  
(Opponent 2)

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(Patent Proprietor)

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**Party as of right:**  
(Opponent 1)

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**Decision under appeal:**

**Decision of the Opposition Division of the  
European Patent Office posted 22 January 2009  
rejecting the opposition filed against European  
patent No. 1029124 pursuant to Article 101(2)  
EPC.**

**Composition of the Board:**

**Chairman:** P.-P. Bracke  
**Members:** G. Dischinger-Höppler  
J. Geschwind

## Summary of Facts and Submissions

I. European patent No. 1 029 124 was granted on the basis of a set of 8 claims.

II. Two notices of opposition had been filed against the granted patent, wherein the Opponents sought revocation of the patent inter alia on the grounds of Article 100(a) EPC for lack of inventive step (Articles 52(1) and 56 EPC). The oppositions were based, amongst others, on the following documents

D1 EP-A-0 281 273,

D4 The Manufacture of Paper - a review, Sveriges Skogsindustriförbund 1990, ISBN 91-7322-113-9, pages 14 and 15, and

D5 US-A-5 505 819.

III. In its decision, the Opposition Division held that the subject-matter of Claim 1 was not obvious in the light of document D1 as the closest prior art. It was convincingly shown by the experiments in document

D7 declaration by Mr Hannu Leino filed under cover of a letter dated 7 August 2008

that the introduction of carbon dioxide into the flow entering the headbox instead of to the long circulation as in document D1 improved the drainage of the pulp. However, none of the other citations contained any hint in this respect.

IV. This decision was appealed by Opponent II, now Appellant. Opponent I as party as of right did not make any comments during the appeal proceedings.

V. Oral proceedings were held before the Board on 25 November 2011, in the course of which the Patent Proprietor, now Respondent, filed amended sets of claims in a new main request and two auxiliary requests.

Claim 1 of the main request reads:

"1. A process for improving drainage of a cellulosic pulp suspension in a web forming dewatering device, characterized in that gaseous carbon dioxide is introduced directly into the flow, as close to the head box as practically possible, entering the head box which feeds the pulp suspension onto the dewatering wire (\*), said carbon dioxide being introduced in an amount sufficient to significantly improve the drainage in said dewatering device." (\* sic)

Claim 1 of the first auxiliary request differs therefrom by replacing the term "wire" by "wire section of a paper machine or a drying machine".

Claim 1 of the second auxiliary request differs from that of the first auxiliary request by adding at the end of the claim the term "and said flow comprising a paper making stock having a consistency of about 0.1 to 1.0% or a pulp stock having a consistency of about 0.9 to 2.0%".

VI. The Appellant, orally and in writing, submitted inter alia the following arguments:

The subject-matter of Claim 1 was not inventive in view of document D1 since no effect was shown for the embodiment covered by Claim 1 where the carbon dioxide still performed as an acid. Therefore it was obvious from documents D4 and D5 to add the pH adjusting acid to the short circulation, in particular into the flow just before it enters the headbox in order to provide an alternative process.

VII. The Respondent argued that the locations of carbon dioxide addition in the process of document D1 were both in the long circulation and the effect thereof consisted in adjusting the pH and saving costs but not in an improved drainage.

It was shown by the experiments in document D7 that carbon dioxide addition in the long circulation did not improve drainage. Adding carbon dioxide in the amounts required in accordance with Claim 1 was prejudiced in document D1 as uneconomical. Documents D4 and D5 did not suggest that the drainage in document D1 could be improved by adding carbon dioxide directly into the flow entering the headbox. Hence, the claimed process was inventive in view of document D1 even when combined with documents D4 and/or D5.

VIII. The Appellant requested that the decision under appeal be set aside and the patent be revoked.

The Respondent requested that the decision under appeal be set aside and that the patent be maintained on the

basis of the main request or one of the first or second auxiliary request, all of them filed during the oral proceedings.

## **Reasons for the Decision**

### 1. *Amendments, sufficiency of disclosure and novelty*

The Board is satisfied that the claims of all requests fulfil the requirements of Article 123(2) EPC and that the subject-matter claimed therein is sufficiently disclosed (Article 83 EPC) and not anticipated by the cited prior art (Article 54 EPC).

Since the appeal succeeds for other reasons, there is no need to give further details.

### 2. *Main request*

#### 2.1 The patent in suit relates to a process for improving the drainage or dewatering of cellulosic pulps in a papermaking or drying machine (paragraph 1).

According to the patent, conventional techniques for improving the dewatering, e.g. adjusting vacuum under the wire, using mechanical devices or adding chemical aids, still leave a desire for further improving the drainage of cellulosic pulp.

The technical problem underlying the patent in suit consists therefore in providing a process for improving the drainage of the pulp (paragraph 9).

2.2 The relevant prior art mentioned in the patent in suit includes document D1 which is said to disclose a paper making process wherein gaseous carbon dioxide has been introduced into the pulp at locations before and after refining in order to regulate the pH of the pulp suspension (paragraph 19).

The teaching of document D1 starts from a prior art which uses sulphuric acid for raising the initial alkaline pH of the pulp from about 12 to 10 to a pH ranging from 9.5 to 7.5 which is appropriate for effective treatment of the pulp with additives. It is mentioned that processing the pulp with additives at pH 4.5 to 7 would be advantageous. Hence, it is the aim of document D1 to improve the adjustment of the pH of the pulp (column 1, line 48 to column 2, line 5).

This is achieved by a process for manufacturing paper from alkaline delignified cellulosic pulp which is fibrillated in a refiner to form paper-forming pulp and wherein gaseous carbon dioxide is introduced into the delignified pulp prior to fibrillation in an amount to raise the pH of the pulp to about 8.5 to 6.5. In a preferred embodiment gaseous carbon dioxide is further introduced into the fibrillated pulp until a pH of 7 to 5.5 is reached (Claims 1 and 7, column 2, lines 6 to 19).

In addition, it is explicitly stated in document D1 that this invention makes possible better pulp drainage (column 2, lines 20 to 24).

The Board agrees therefore with both parties that document D1 is a suitable starting point for the assessment of inventive step.

- 2.3 In the process of document D1 both carbon dioxide addition points are prior to dilution of the pulp to low consistency of about 1% and hence in the long circulation where the consistency of the pulp is about 4% (Examples and Figure), whereas in the claimed process carbon dioxide is added to the low consistency pulp in the short circulation (as close to the headbox as practically possible).

No direct comparison shows that the claimed process provides better drainage of the pulp than the process of document D1.

- 2.4 The Respondent, however, pointed to several passages in document D1 where the effect of carbon dioxide addition is stated to consist in an adjustment of pH and saving of costs but where the drainage of the pulp is not mentioned.

On the other hand, so it was argued, the experiments in document D7 showed that carbon dioxide addition to the short circulation in accordance with the claimed process improved drainage of the pulp whereas carbon dioxide addition to the long circulation did not. Hence, it was credible that the claimed process was superior to that disclosed in document D1 with respect to drainage.



2.5 The arguments are not convincing.

Firstly, document D1 teaches in a general note (point 2.2 above) that drainage is improved by its invention.

Secondly, the experiments in document D7 are conducted such that carbon dioxide is added to the pulp at pH 5, i.e. after pretreating the original alkaline pulp with a suitable acid, whereas document D1 teaches carbon dioxide addition to a pulp at the initial pH of 12 to 10 or, subsequent to a first carbon dioxide addition, to a pulp of pH 8.5 to 6.5. While an improvement of the drainage may be plausible from the experiments in document D7 in those instances where the pulp is already in an acidified state before carbon dioxide is added, the Board finds nothing suggesting that the same effect might be obtained when the pulp is still alkaline at the point of carbon dioxide addition.

Since the subject-matter of Claim 1 is not limited to a situation where the pulp is acidic when the carbon dioxide is added, the purpose mentioned in Claim 1 "for improving drainage" or "in an amount sufficient to significantly improve the drainage" has to be disregarded as feature distinguishing from the prior art those embodiments of Claim 1 where the pulp is alkaline when carbon dioxide is added.

2.6 For those embodiments, the claimed process differs from that disclosed in document D1 only in that the gaseous carbon dioxide is added as close to the headbox as practically possible, hence to the low consistency stock which is present in the short circulation of a

paper mill or which is fed to the drying machine of pulp mill.

2.7 Therefore, the Board agrees with the Appellant that the technical problem credibly solved by the claimed subject-matter over the disclosure of D1 has to be reformulated as providing an alternative papermaking process.

2.8 It remains to be decided whether, in view of the available prior art documents, it was obvious for someone skilled in the art to solve that technical problem by the means claimed, namely by adding carbon dioxide as close to the headbox as practically possible, hence to the low consistency stock which is present in the short circulation of a paper mill or which is fed to the drying machine of a pulp mill instead of to the long circulation as in document D1 where the consistency of the pulp is considerably higher.

2.9 Document D1 does not consider any other points of carbon dioxide addition than those situated in the long circulation before and after the refiner.

However, it is known from document D5 that acid may be added to the pulp of low consistency in the short circulation which is fed to the headbox, in order to adjust the pH of the pulp within the range of 6.7 and 7.5 (e.g. column 1, lines 43 to 55, column 1, lines 58 to 64 and Figure 1).

Hence, the Board considers that a person skilled in the art seeking to provide an alternative papermaking process to that disclosed in document D1 would consider

adjusting the pH as late as possible, i.e. at the headbox of the papermaking machine as suggested in document D5 as one option, thus arriving in an obvious manner at the claimed subject-matter.

- 2.10 The Respondent argued that document D1 contained a prejudice against the using of carbon dioxide for adjusting the pH of the pulp to a value of less than 5.5 due to the uneconomically increasing amounts of carbon dioxide (column 6, line 58 to column 6, line 4). Further, document D5 did not teach any other acid than phosphoric acid for adjusting the pH of the pulp (column 3, lines 14 to 24).

Therefore, the claimed process did not derive in an obvious manner from document D1 in combination with document D5.

- 2.11 The Board is not convinced by those arguments, on the one hand because the pH of the pulp is not a feature of Claim 1 and since there is no evidence concerning the economy of the claimed process when compared with that of document D1. On the other hand, it may be true that document D5 teaches phosphoric acid for adjusting the pH of the pulp. However, it is clear from the paragraph preceding the one cited by the Respondent (column 3, lines 5 to 13) that normally any acid could be used for that purpose but that phosphoric acid has been found particularly useful to maintain the pH in the range of 6.9 to 7.5 due to its excellent buffering effect when chalk is used as a filler (see also column 1, lines 43 to 55).

Therefore, the Board concludes that the skilled person would not be prevented from considering the short circulation suggested in document D5 for pH adjustment if the acid is carbon dioxide as in document D1.

- 2.12 For these reasons the Board finds that the subject-matter of Claim 1 is not based on an inventive step and does not comply with the requirements of Articles 52(1) and 56 EPC.

3. *Auxiliary requests*

- 3.1 Claim 1 of the first auxiliary request differs from that of the main request only in that the dewatering wire is defined as wire section of a paper machine or drying machine and Claim 1 of the second auxiliary request additionally contains the feature that the consistency of the stock is low (0.1 to 1.0% for papermaking stock, respectively 0.9 to 2.0% for pulp stock) when carbon dioxide is added (see point V above).

However, for the reasons set out below, the newly introduced features do not add anything on which an inventive step could be based.

The feature of feeding the pulp from the headbox to a wire section of the papermaking machine according to the first auxiliary request does not further distinguish the claimed process from that of document D1 and, as a consequence, does not contain any contribution with respect of inventive step. This was not contested by the Respondent.

Concerning the consistency feature introduced in Claim 1 of the second auxiliary request, the Appellant pointed to document D4 and argued that the claimed consistency of the pulp in the headbox was usual in the art (document D4, page 14, lines 3 to 4). The Respondent contested that a skilled person would combine document D4 with document D1 since the former was not specifically concerned with drainage.

However, document D4 which is a review on the manufacture of paper dated 1990, has to be considered as representing the general technical knowledge of those skilled in the art. Thus, the statement in document D4 that the consistency of the stock required in the headbox may be as low as 0.2 to 0.4%, is nothing more than what is generally known in the art. The indication of the consistency of the pulp in the headbox is, therefore unsuited as feature distinguishing the claimed subject-matter from the prior art or as a basis for inventive step.

Therefore, the above conclusions with respect to Claim 1 of the main request apply, *mutatis mutandis*, also to Claim 1 of the auxiliary requests.

4. Since all of the Respondent's requests fail, the patent has to be revoked.

**Order**

**For these reasons it is decided that:**

1. The decision under appeal is set aside.
2. The patent is revoked.

The Registrar:

The Chairman:

D. Magliano

P.-P. Bracke