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D E C I S I O N
of 20 August 2003

Case Number: T 0944/00 - 3.3.6

Application Number: 92900256.6

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Language of the proceedings: EN

Title of invention:
Pulp bleaching method and reactor

Patentee:
UNION CAMP PATENT HOLDING, INC.

Opponent:
ANDRITZ AG

Headword:
Pulp bleaching/UNION CAMP

Relevant legal provisions:
EPC Art. 54, 84, 123, 111(1)

Keyword:
"Admissibility of amendments - yes; claims duly supported by the description"
"Admissibility of amendments - yes; particular combination of features disclosed in the application as filed"
"Novelty - yes; no clear and unambiguous disclosure in the prior art."

Decisions cited:
T 0204/83, T 0896/92

Catchword:
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Case Number: T 0944/00 - 3.3.6

D E C I S I O N
of the Technical Board of Appeal 3.3.6
of 20 August 2003

Appellant: UNION CAMP PATENT HOLDING, INC.
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Decision under appeal: Decision of the Opposition Division of the
European Patent Office posted 18 July 2000
revoking European patent No. 0512098 pursuant
to Article 102(1) 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 revoke European patent No. 0 512 098 relating to a pulp bleaching method and reactor. The decision was based on amended sets of claims according to a main request and three auxiliary requests.
- II. A notice of opposition had been filed against the granted patent, wherein the Respondent (Opponent) sought revocation of the patent on the grounds of Article 100(c) for extension of the subject-matter beyond the content of the application as filed (Article 123(2) EPC), and Article 100(a) EPC for lack of novelty and inventive step (Articles 52(1), 54(2) and 56 EPC). The opposition was based *inter alia* on document
- (6) US-A-4 363 697.
- III. In its decision, the Opposition Division found that the subject-matter of apparatus Claim 27 according to the amended main request was not novel in view of document (6). Three auxiliary requests were found inadmissible under Articles 84 EPC and 123(2) EPC, respectively.

The Opposition Division held in particular that the apparatus disclosed in document (6) comprised all the apparatus features of Claim 27 and that all the other features of the claim related to a particular use or mode of operation of the apparatus or a desired result to be obtained and were, therefore, not suitable to distinguish the claimed apparatus from the known one.

IV. During the oral proceedings held before the Board of Appeal on 20 August 2003, the Appellant (Proprietor) filed amended sets of claims in a new main and two auxiliary requests. The independent claims of the main request read:

"1. A method for bleaching pulp which comprises introducing pulp having a high consistency of greater 20% into a reaction zone; introducing an ozone containing gaseous bleaching agent into the reaction zone; and advancing the pulp through the reaction zone in a plug-flow manner for a time sufficient to obtain bleaching of the pulp;

characterized in that the pulp is in the form of particles having a size sufficient to facilitate substantially complete penetration by the ozone containing gaseous bleaching agent when exposed thereto; by using in a shell a paddle conveyor comprising smaller-than-CEMA standard size paddles mounted in a non-overlapping paddle configuration the pulp particles are lifted, displaced and tossed in a radial direction as they pass through the reaction zone to disperse the pulp particles into the ozone containing bleaching agent and to expose substantially all surfaces of a majority of the pulp particles to the ozone containing gaseous bleaching agent; while the dispersed pulp particles are advanced through the reaction zone at a dispersion index of less than 8 for a predetermined pulp residence time sufficient to maintain a fill level of at least 10% of said dispersed particles in said shell to form a substantially uniform bleached pulp having an increased GE brightness.

8. Use of a reactor apparatus (14) comprising: a shell (14) having a pulp inlet (34) and a pulp outlet (46); means (12) for introducing high consistency pulp (16) into the shell (14); means (18) for introducing a flow of an ozone containing gaseous bleaching agent into the shell (14); and means (22) for advancing the pulp (16) through the shell (14) in a plug-flow manner; wherein the means for advancing the pulp comprises one of

- a paddle conveyor comprising smaller-than-CEMA standard size paddles mounted in a non-overlapping paddle configuration;
- a continuous screw flight having a plurality of portions which are cut out from the flight to form openings therein, said cut out portions being bent at an angle with respect to the flight;
- a continuous screw flight having one or more lifting elements attached thereto;
- a ribbon blade;
- an inclined ribbon blade having infinite pitch;
- a series of wedge shaped flights mounted on the shaft, said wedge shaped flights being spaced at a sufficient distance to avoid bridging or plugging of the pulp particles therebetween;
- a series of elbow shaped lifter elements mounted on the shaft, said lifter elements being spaced at a sufficient distance to avoid bridging or plugging of the pulp particles therebetween;

for ozone bleaching of high consistency pulp having a consistency of greater than 20%, wherein the advancing means (22) of the apparatus includes dispersing means for lifting, displacing and tossing the pulp (16) in a radial direction as it passes through the shell (14) to disperse the pulp into the ozone containing gaseous bleaching agent and to expose substantially all surfaces of a majority of the pulp to the ozone containing gaseous bleaching agent and to advance the dispersed pulp through the shell in a plug-flow manner and at a dispersion index of less than 8 for a predetermined pulp residence time sufficient to maintain a fill level of at least 10% of said dispersed particles in said shell to form a substantially uniformly bleached pulp having an increased GE brightness.

9. A high consistency pulp/ozone bleaching reactor apparatus (14) for ozone bleaching of high consistency pulp particles having a consistency of more than 20%, a first GE brightness, and a particle size sufficient to facilitate substantially complete penetration of a majority of the pulp particles by ozone when exposed thereto, to a second, higher GE brightness, said apparatus comprising:

a shell (14) having a pulp inlet (34) and a pulp outlet (46); means (12) for introducing high consistency pulp (16) into the shell (14); means (18) for introducing a flow of an ozone containing gaseous bleaching agent into the shell (14); a shaft (20) extending through the shell (14) along a longitudinal axis thereof and having a first end adjacent to the pulp inlet (34) and a second end adjacent to the pulp outlet (46); advancing

and dispersing means (22) associated with the shaft for advancing the pulp (16) through the shell (14) in a plug-flow manner; means (28) for recovering residual gaseous bleaching agent and means (30) for recovering the bleached pulp; and characterized in that the advancing means (22) includes a plurality of smaller-than CEMA size paddles (22A, 22B, 22C) mounted in a non-overlapping configuration, and positioned and oriented in a predetermined pattern defining a pitch of the advancing and dispersing means for lifting, displacing and tossing the pulp particles (16) in a radial direction as they pass through the shell (14) to disperse the pulp particles (16) into the ozone containing gaseous bleaching agent to expose substantially all surfaces of a majority of the pulp to the ozone containing gaseous bleaching agent while advancing the dispersed pulp through the shell in a plug-flow manner at a dispersion index of less than 8 for a predetermined pulp residence time sufficient to maintain a fill level of at least 10% of said dispersed particles in said shell to form a substantially uniform bleached pulp having the second GE brightness."

Dependent Claims 2 to 7 and 10 to 17 relate to specific embodiments of Claims 1 and 9, respectively.

The first auxiliary request differs from the main request in that Claims 8, 10, 11 and 13 to 17 have been omitted and in that the apparatus claim includes the features of Claim 12 of the main request.

The second auxiliary requests consists of claims 1 to 7 of the main request.

V. The Appellant submitted the following arguments:

- The amendments made to the claims met the requirements of Articles 123(2)(3) and 84 EPC.
- The claimed apparatus was novel since the cited prior art, in particular document (6), did not clearly and unambiguously disclose a bleaching reactor comprising smaller-than CEMA size paddles mounted in a non-overlapping configuration.

VI. The arguments submitted by the Respondent can be summarised as follows:

- The amended claims were still open to objection under Articles 123(2) and 84 EPC.
- The claimed bleaching reactor was not novel over that known from document (6) which also disclosed the now claimed particular paddle size and configuration as a possible design option.
- The subject-matter of the independent method and use claim was obvious in view of the prior art.

VII. The Appellant requested that the decision under appeal be set aside and that the case be remitted to the first instance for further prosecution on the basis of the main or alternatively the first or second auxiliary requests filed during the oral proceedings.

The Respondent requested that the appeal be dismissed.

Reasons for the Decision

Main Request

1. *Amendments*

- 1.1 The Respondent objected to the amended claims under Article 84 EPC for lack of support in the description of the term "dispersion index of less than 8".

It further raised objections under Article 123(2) EPC with respect to the feature of using a paddle conveyor having smaller-than-CEMA size paddles mounted in a non-overlapping paddle configuration in combination with the particular dispersion index (DI) of less than 8 in the independent Claims 1, 8 and 9. In its opinion, it was at least doubtful whether this combination of features was originally disclosed.

- 1.2 The Board agrees with the Respondent insofar as, in order to be permissible under Articles 84 and 123(2) EPC, amendments made to a European patent must not create a problem under Article 84 EPC and/or contain subject-matter extending beyond the content of the application as filed.
- 1.3 The original application as well as the patent in suit refer in the widest sense to a reactor apparatus and method for bleaching pulp particles wherein the apparatus used comprises a shell, means for introducing pulp particles into the shell, means for introducing gaseous ozone bleaching agent into the shell and means for dispersing the pulp particles into the gaseous bleaching agent while advancing the pulp through the

shell in a plug flow-like manner wherein the dispersing and advancing means preferably is a paddle conveyor (original application, page 5, lines 2 to 17 and 28 to 33, page 6, lines 21 to 27; patent in suit, page 3, lines 23 to 31, 36 to 38 and 49 to 52).

1.4 Article 84 EPC

1.4.1 The upper limit of less than 8 for the DI was mentioned in apparatus Claims 1, 31 and 45 of the original application. It is not explicitly mentioned in the description of either the application or the patent in suit. However, it follows from the description in the original and granted version that the DI, which is an indicator of bleaching uniformity and characterises the pulp flow within the bleaching apparatus, should be as low as possible in order to approximate perfect plug flow with a DI of zero (original application, page 26, lines 9 to 15; patent in suit, page 10, lines 14 to 16). This information is the basis for support of the upper limit of the DI value originally disclosed in the above claims.

1.4.2 For these reasons, the Board holds that the Respondent's objection under Article 84 EPC must fail.

1.5 Article 123(2) EPC

1.5.1 Original dependent Claim 48 includes the features of independent Claim 45 and of dependent Claim 47. Because of its dependency, Claim 48 discloses that the radially extending means of the conveying and dispersing means of the apparatus of Claim 45 include paddles comprising "smaller-than-CEMA standard size mounted in non-

overlapping configuration" as a preferred embodiment of the particular high consistency pulp/ozone bleaching apparatus of Claim 47 which in addition to the features of Claim 45 comprises means for controlling the fill level in the shell and providing a particular conveying rate in a first section of the shell. Since according to Claim 45 the dispersing and conveying means are means for providing a DI of less than 8 by increasing the radial dispersion and reducing the axial dispersion of the pulp, Claim 48 discloses the above particular paddle design in combination with a DI of less than 8.

1.5.2 The question to be answered here is, whether or not this combination is originally disclosed only in relation to that particular apparatus of original Claim 47 or applies also to the other embodiments falling under the original general disclosure mentioned under paragraph 1.3 above, including those presently claimed.

1.5.3 In the application as filed it is stated that CEMA standard relates to certain paddle blade sizes for given diameters and that these sizes are referred to in the application as "standard" size as compared to large size (twice standard) or small size (half standard) (page 19, lines 9 to 11, in combination with page 23, lines 3 to 11). The term "CEMA" stands for "Conveyor Equipment Manufacturer's Association" whose bulletin ANSI/CEMA 300-1981 entitled "Screw Conveyor Dimensional Standards" concerns specific dimensional details and configurations of the conveyor paddles (page 16, lines 13 to 21). Further, it is stated on page 18, lines 2 to 14 of the application as filed that conventional art taught away from using paddle

conveyors having "smaller-than-CEMA standard size paddles mounted in non-overlapping paddle configuration". A non-overlapping paddle configuration is, for example, defined as one wherein the paddles are positioned at 240° spacings in a helical quarter pitch pattern along the shaft as compared to an overlapping design with 60° spacings in a full pitch pattern (page 26, lines 16 to 21 in combination with page 13, line 34 to page 15, line 11). According to the application as filed, the preferred paddle design of the invention would unexpectedly result in a narrow axial dispersion of the fiber and in uniform delignification and bleaching (page 18, lines 14 to 27). In the examples of the application as filed it is shown that small size paddles with 240° quarter pitch configuration perform better in terms of brightness and ozone conversion to be achieved than standard size paddles in the same configuration (Examples 3 and 9 and Tables III and VIII) and that for a given paddle size a 240° quarter pitch pattern performs better than a 60° full pitch pattern or a 120° half pitch pattern (Example 10 and Table IX).

- 1.5.4 On the other hand, it follows from paragraph 1.4.1 above that according to the application as filed the DI should generally be limited since large values indicate poor bleaching uniformity (page 26, lines 14 to 15) and that the upper limit for the DI value should be less than 8. It is illustrated in Figure 4 that a DI of 2.6 is achieved if small size paddles with a non-overlapping configuration are used as compared with a DI of 8.3 when using standard size paddles with an overlapping configuration (page 26, lines 16 to 33).

1.5.5 The Board concludes from this that using paddles smaller than CEMA standard size and mounted in a non-overlapping configuration are generally preferred in the application as filed in order to obtain a DI value of less than 8 and good bleaching performance.

1.5.6 Consequently, the particular combination of both preferred features, namely "smaller-than-CEMA standard size paddles mounted in a non-overlapping paddle configuration" and "at a dispersion index of less than 8" in Claims 1, 8 and 9 is supported by the application as filed.

1.5.7 The other amendments made to the claims also find support in the application as filed (see in particular Claims 1, 2, 4 to 15, 38, 39, 48, 49, 52, 54, 56, 68 to 71 and pages 5 to 7, 11, 18 and 33) and limit the scope of protection.

1.6 The Board is, therefore, satisfied that the amendments made to the claims meet the requirements of Article 123(2) and (3) EPC.

2. *Novelty*

The Respondent contested novelty only in respect of the bleaching apparatus of Claim 9 in view of document (6).

2.1 The objection was based on the argument that the amended apparatus claim differed from that considered by the Opposition Division essentially by the feature defining the paddles as "smaller-than-CEMA size paddles" and "mounted in a non-overlapping

configuration" and that this feature was also known from document (6), in particular from Figure 2c.

2.2 Document (6) discloses a reactor apparatus comprising a shell having a pulp inlet and a pulp outlet, means for introducing pulp into the shell (Figure 1, column 4, lines 14 to 17), means for introducing a flow of a gaseous bleaching agent into the shell (Figure 1, column 2, lines 44 to 47), a shaft extending through the shell along a longitudinal axis thereof and having a first end adjacent to the pulp inlet and a second end adjacent to the pulp outlet, advancing and dispersing means associated with the shaft (Figure 1, column 5, lines 28 to 31 and lines 51 to 56), and means for recovering residual gaseous bleaching agent and means for recovering the bleached pulp (Figure 1, column 5, lines 10 to 14, column 6, lines 27 to 31) wherein the advancing means includes a plurality of paddles positioned and oriented in a predetermined pattern defining a pitch of the advancing means (Figure 2c and 2d, column 5, lines 35 to 50). The size of the paddles or their configuration on the shaft is not explicitly disclosed.

2.3 The Respondent argued that conveyors were normally designed for an efficient transport in forward, i.e. axial direction. Therefore, paddles used in such a conveyor would normally extend radially from the shaft up to the internal wall of the shell of the reactor. This size had to be understood as standard size or "CEMA size". According to the Respondent, it was apparent from Figure 2c of document (6) that the apparatus disclosed therein comprises non-overlapping

paddles which did not radially extend to the wall of the shell but were shorter.

2.4 The Appellant did not object to the above definition of the term "CEMA size". Further, Figure 2c indeed illustrates an embodiment where, in addition to a screw having cut and folded flights, paddles are mounted on the shaft. However, Figure 2c being a perspective drawing, it does not clearly and unambiguously disclose paddles which are shorter in height than the screw flight since the paddles are drawn as being tilted forward and/or backwards at an unknown angle with respect to the plane of the paper sheet. Therefore, the drawing leaves room for variations, in particular with respect to the size of the paddles in relation to the size of the screw flights as well as with respect to the question whether the paddles are overlapping or not (see also decision T 204/83, OJ EPO, 1985, 310, reasons Nos. 4 to 7 and T 896/92, not published in the OJ EPO, reasons No. 2).

2.5 In the absence of anything further in document (6) providing, directly and unambiguously, technical information concerning the size and configuration of the paddles mounted on the shaft, the disclosure in Figure 2c is insufficient to anticipate the features in question, namely that the paddles are smaller-than-CEMA size paddles and mounted in a non-overlapping configuration.

2.6 The Board, therefore concludes that the subject-matter of Claim 9 is novel over document (6) under Article 54(1)(2) EPC.

3. *Auxiliary requests*

It follows from the above that the claims according to the main request are not open to the objections on which the Respondent relies. Therefore, there is no need to deal with the claims of the auxiliary requests.

4. In the present case, the Opposition Division has not yet considered the issue of inventive step which is an essential question regarding patentability of the claimed subject-matter. Therefore, the Board exercises its discretion under Article 111(1) EPC and remits the case to the first instance for further prosecution on the basis of the claims of the main request, thereby granting the respective request of the Appellant.

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.

The Registrar:

The Chairman:

G. Rauh

P. Krasa