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Datasheet for the decision of 30 January 2008

Case Number: T 0422/06 - 3.3.06

Application Number: 00956547.4

Publication Number: 1242678

IPC: D21C 9/14

Language of the proceedings: EN

Title of invention:
Method for bleaching pulp with chlorine dioxide

Patentee:
Andritz Oy

Opponent:
Metso Fiber Karlstad AB

Headword:
Pulp Bleaching/ANDRITZ

Relevant legal provisions:
EPC Art. 54(2), 56

Relevant legal provisions (EPC 1973):
-

Keyword:
"Main request: novelty (no) - qualifying attributes not suitable as distinguishing features"
"Auxiliary requests: inventive step (no)"

Decisions cited:
-

Catchword:
-

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Case Number: T 0422/06 - 3.3.06

D E C I S I O N
of the Technical Board of Appeal 3.3.06
of 30 January 2008

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Decision under appeal:
Interlocutory decision of the Opposition Division of the European Patent Office posted 28 February 2006 concerning maintenance of European patent No. 1242678 in amended form.

Composition of the Board:

Chairman: P.-P. Bracke
Members: G. Dischinger-Höppler
U. Tronser

Summary of Facts and Submissions

I. This appeal is from the interlocutory decision of the Opposition Division concerning maintenance of European patent No. 1 242 678 in amended form on the basis of the claims according to the then pending second auxiliary request.

II. A notice of opposition had been filed against the granted patent, wherein the Opponent sought revocation of the patent on the grounds of Article 100(a) EPC for lack of novelty and inventive step (Article 54 and 56 EPC). The opposition was based, amongst others, on the following document

D1 US-A-4 537 656.

During opposition proceedings, the Opponent filed further documents, inter alia, document

D7 "Pulp Bleaching - Principles and Practice" by C.W. Dence and D.W. Reeve (Eds.), TAPPI Press, 1996, pages 381 to 394, 586 to 587, 609, 628 to 629 and 638.

III. The decision under appeal was based on the claims as granted as the main request and on amended claims according to a first and second auxiliary request.

Claim 1 of the main request reads:

"1. A method of treating pulp with chlorine dioxide according to which chlorine dioxide is mixed in the pulp and the mixture thus produced is fed into a

treatment vessel (18, 34, 34', 42) in which the chlorine dioxide treatment is carried out at a temperature of 40 to 90°C and at a pH of **15** - 6.5, characterized in that the treatment time in each chlorine dioxide treatment vessel or each chlorine dioxide treatment step is less than 10 minutes, chlorine dioxide is mixed in the pulp by using intensive mixing (16, 30, 38) and the discharge of the pulp from the treatment vessel to a chlorine dioxide stage washer (20, 44) is arranged to take place in a closed space ensuring that no detrimental amounts of residual dioxide remain in the pulp flowing to the washer." (Emphasis added)

Claim 1 of the then pending second auxiliary request differed from that of the main request in that the term "15 - 6.5" had been replaced by "1.5 - 6.5", the terms "characterized in that" and "or each chlorine dioxide treatment step" had been deleted and the following term had been added at the end of the claim:

", wherein the chlorine dioxide residue is determined from the pulp at the end of the treatment vessel or after the treatment vessel, characterized in that said determined chlorine dioxide residue is used to adjust a parameter influencing the speed of the bleaching reaction, for example temperature, pressure, or the revolution speed of the mixer".

IV. In its decision, the Opposition Division held that the subject-matter claimed in the second auxiliary request fulfilled the requirements of the EPC. The higher ranking requests were rejected for the reason

that the subject-matter claimed therein was not novel under Article 54 EPC over the disclosure of document D1.

V. This decision was appealed by the Patent Proprietor (hereinafter Appellant-Proprietor) who maintained the claims as granted as its main request and filed, under cover of a letter dated 30 November 2007, amongst others document

HE-5 "Pulp Bleaching - Principles and Practice" by C.W. Dence and D.W. Reeve (Eds.), TAPPI Press, 1996, pages 515 to 521, 546 to 554 and 604 to 608,

as well as amended sets of claims in auxiliary requests 1 to 4 and - dependent on possible objections to expressions taken from Claim 1 as granted - four further auxiliary requests (5 to 8).

Claim 1 of the first auxiliary request differs from that of the main request in that the term "15 - 6.5" had been replaced by "1.5 - 6.5", the term "or each chlorine dioxide treatment step" has been deleted, the term "the discharge of the pulp from the treatment vessel to a chlorine dioxide stage washer (20, 44) is arranged to take place in a closed space ensuring that" has been replaced by "the pulp travels from the chlorine dioxide mixing to the chlorine dioxide stage washer in a closed space such that chlorine containing compounds are prevented from escaping to the atmosphere, and wherein", the last term "washer" has been replaced by "chlorine dioxide stage washer" and the term ", and wherein the chlorine dioxide treatment in question is a bleaching D_0 stage removing lignin" has been added at the end of the claim.

Claim 1 of the second auxiliary request differs from that of the first auxiliary request in that the term "such that the mixing takes place in a fluidized state" has been inserted after the term "mixing (16, 30, 38)" and the term ", without the need of any gas emission collecting devices," has been inserted after the term "closed space".

Claim 1 of the third auxiliary request is identical with that of the second auxiliary request which had been maintained by the Opposition Division (points III and IV above).

Claim 1 of the fourth auxiliary request differs from that of the third auxiliary request by introducing after the terms "mixer (16, 30, 38)" and "closed space" the same terms as introduced in Claim 1 of the second auxiliary request.

The claims of the fifth to eighth auxiliary requests differ from the claims of the first to fourth auxiliary request only in that the term "each … vessel" has been replaced by "the … vessel".

VI. The decision was also appealed by the Opponent (hereinafter Appellant-Opponent).

VII. Upon requests made by both parties, oral proceedings before the Board of Appeal were held on 30 January 2008, in the course of which it was agreed by the parties that the pH range "15 - 6.5" mentioned in Claim 1 as granted was obviously incorrect and to be interpreted as "1.5 - 6.5".

VIII. The Appellant-Proprietor, orally and in writing, submitted in essence the following arguments:

The subject-matter claimed in all requests was novel over the cited prior art. In particular, it was held that document D1 did not anticipate the claimed subject-matter since it failed to disclose the features "intensive mixing" and "no detrimental amount".

With regard to inventive step, the Appellant-Proprietor essentially argued that the technical problem to be solved in view of the prior art disclosed in document D1 consisted in the provision of a method of treating pulp with chlorine dioxide in a D_0 stage in a fast and simple process which is environmentally friendly since it does not require the recycling of chlorine dioxide and which equally prevents that chlorine containing compounds escape to the atmosphere. In addition, the subject-matter claimed in the third and fourth auxiliary requests solved also the technical problem of improving the efficiency of the process. However, there was nothing in the prior art suggesting that these problems could be solved by the features distinguishing the claimed subject-matter from the prior art according to document D1. In particular, it was argued that the prior art did not propose for these purposes to avoid in the process of document D1 any venting from the treatment vessel as suggested in Claim 1 of the first and second auxiliary request or to use the value of residual chlorine dioxide present in the pulp after the treatment vessel to adjust a parameter influencing the speed of the bleaching as suggested in Claim 1 of the third and fourth auxiliary requests.

IX. The Appellant-Opponent, orally and in writing, submitted in essence the following arguments:

The subject-matter of Claim 1 of the main request was not novel over the prior art disclosed in document D1.

Further, the subject-matter claimed in accordance with the auxiliary requests was not based on an inventive step. In particular, it was not inventive to avoid a venting of gas from the treatment vessel since degassing may as well occur during mixing or pumping, depending on the circumstances of the process conditions. Concerning the third and fourth auxiliary request, reference was made to document D7 according to which it was known how mixing efficiency influenced the chlorine dioxide residual. It was, therefore obvious to those skilled in the art to adjust e.g. the mixing intensity in relation to the chlorine dioxide residual measured after the treatment vessel.

X. The Appellant-Proprietor requested that the decision under appeal be set aside and the patent be maintained as granted or be maintained on the basis of one of the auxiliary requests 1 to 4 submitted under cover of the letter dated 30 November 2007 or provisionally on the basis of one of the auxiliary requests 5 to 8 submitted with the same letter.

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

Reasons for the Decision

1. Main request (claims as granted)

It is obvious that the pH range of 15 to 6.5 mentioned in Claim 1 of the main request is incorrect. The Board agrees with both parties (point VII above) that the range has to be read as 1.5 to 6.5 instead, since the lower pH value of 1.5 is explicitly mentioned in the patent in suit (e.g. paragraph [0042] of the B9-specification) and also originally disclosed (Claim 1). This interpretation is, therefore, taken as a basis for the following assessment of novelty.

1.1 In the decision under appeal, the Opposition Division rejected the Appellant-Proprietor's main request on the basis of the claims as granted for lack of novelty in view of the disclosure of document D1.

1.2 Document D1 discloses a method for delignifying and/or bleaching pulp by mixing in a static or dynamic mixer chlorine dioxide with the pulp at low to high consistencies, feeding the mixture to a treatment vessel 4 in which the chlorine dioxide treatment is carried out at a temperature of preferably 40 to 60°C for preferably 0.3 to 10 minutes at a pH ranging from 4 to 6 (column 2, lines 17 to 18, column 2, line 53 to column 3, line 14 and column 5, lines 3 to 7). Thereafter, the treated pulp is fed to a press 5 where liquid containing residual bleaching chemicals is removed from the pulp either by a pressing operation or by displacing the liquid with fresh liquid or by a combination of both methods (column 3, lines 15 to 27). Document D1 discloses specifically that the removal of

the liquid may be obtained by a typical washing operation carried out in press 5 by supplying washing liquid through line 13 (Figure 1 in combination with column 9, lines 55 to 58).

Consequently, the only features of Claim 1 (point III above) not explicitly referred to in document D1 are

- that the mixing of the chlorine dioxide to the pulp is an intensive mixing and

- that the discharge of the pulp from the treatment vessel to the washer (press) takes place in a closed space such that no detrimental amounts of residual dioxide remain in the pulp flowing to the washer.

1.3 The Appellant-Proprietor agreed that according to document D1 the discharge of the pulp from vessel 4 to press (washer) 5 also takes place in a closed space.

The Appellant-Proprietor argued, however, that the residual chlorine dioxide in the pulp which was discharged in document D1 to the washer (= press 5) was a detrimental one since as shown in Table I the added amount of 2.5% was reduced during the treatment to 1.9% only. The term 'no detrimental amount' in Claim 1 was appropriate in the present case since it depended on the washer material whether a particular amount of residual chlorine dioxide was detrimental so as to destroy the washer by corrosion.

Further, document D1 did not disclose an intensive mixing in the sense of the patent in suit, namely a

mixing suitable to fluidise the pulp at medium (MC) and low consistency (LC). It was apparent from document HE-5 that the static and dynamic mixers mentioned in document D1 were not suitable for fluidising MC pulp.

1.4 The Board notes that both features, the 'intensive mixing' and the 'non-detrimental amount' were already present in the claims as granted.

Therefore, the presence of those features in Claim 1 is not objectionable under Article 84 EPC.

On the other hand, those features are not prima facie restricted to particular embodiments suitable to distinguish the claimed method from the prior art disclosed in document D1. On the contrary and as shown by the Appellant-Proprietors own argumentation (point 1.3 above), they are open to interpretation in the light of the prior art and the explanations given in the patent in suit.

1.5 However, the Board is not convinced by the Appellant-Proprietor's interpretations.

1.5.1 Concerning the non-detrimental amounts of chlorine dioxide in the pulp flowing to the washer, the Board firstly notes that Claim 1 includes but is not limited to washer corrosion. Thus, the term 'no detrimental amounts' could as well refer to other undesired consequences due to the presence of too large amounts of chlorine dioxide, for example in the wastewater of the process.

However, even if the term was correlated to washer corrosion only, it is questionable how long a washer must resist so that a particular residual amount of chlorine dioxide can be estimated to be not detrimental to the washer. It must also be born in mind that the washer material is not identified in the patent in suit. Since Claim 1 is unlimited in these respects and the Appellant-Proprietor has not provided evidence for a particular meaning in the art, the term 'no detrimental amounts' as such is not suitable to distinguish the claimed subject-matter from the prior art disclosed in document D1. It covers instead any amounts accepted in the prior art and, hence, also the amount of 1.9% (based on the absolutely dry pulp) mentioned in Example 1 of document D1.

1.5.2 The fluidising mixing of the chlorine dioxide into the pulp is mentioned in the patent in suit, in particular in paragraph [0032] (of the B9 specification) where it is stated that the reaction of the chlorine dioxide is facilitated if the mixing is done "as efficiently as possible, i.e. by using a fluidizing, in other words high-intensity mixer".

However, the attributes 'fluidising' or 'high-intensity' qualifying the mixing are not mentioned in Claim 1. Instead, Claim 1 states that the mixing is done by using 'intensive' mixing which is not necessarily limited to the above most efficient mixing but includes lower qualities of mixing not defined in the patent in suit in greater detail. The Board is, therefore of the opinion that the claimed method includes mixing by using static mixers as in document D1, the more so as it is confirmed by document HE-5

that static mixers can be used even for MC pulp if turbulent motion is not required.

Hence, the term 'intensive mixing' is also not suitable to distinguish the claimed method from that disclosed in document D1.

1.6 For these reasons, the Board concludes that the subject-matter of Claim 1 is not novel in view of the disclosure of document D1 (Article 54 EPC).

2. Auxiliary requests

The question of whether the amendments made to the claims of the auxiliary requests are admissible under Articles 123 and 84 EPC or whether the claimed subject-matter is novel in view of the cited prior art (Article 54 EPC) need not be gone into since, eventually, none of these requests succeeds for lack of inventive step.

2.1 First auxiliary request

2.1.1 The subject-matter of Claim 1 differs from that of the main request in essence in that it has been limited to a D_0 stage, i.e. a delignifying stage and, further, insofar as the closed space extends now from the mixer to the washer and includes, therefore, the treatment vessel. Hence, Claim 1 excludes bleaching stages D_1, D_2 etc. and the presence of a vent from the treatment vessel (point V above) by which chlorine containing gases could escape to the atmosphere or be drawn off and collected.

2.1.2 The Board agrees with the parties that document D1 is a suitable starting point for the assessment of inventive step since it is concerned with the same object as the patent in suit, namely of providing a method for treating pulp by using chlorine dioxide in a treatment phase in which the use of chlorine dioxide has been optimised (see paragraph [0001] of the patent in suit and column 1, lines 57 to 60 of document D1).

In particular, document D1 relates to a process for delignifying or bleaching pulp (see Claim 1 and column 2, lines 17 to 18). It covers, therefore, also the embodiment now claimed, namely that the treatment is a D_0 stage (see also paragraph [0008] of the patent in suit).

2.1.3 Document D1 does not exclude a venting of chlorine containing gases from the treatment vessel. Insofar, the subject-matter of Claim 1 differs from the process disclosed in document D1.

2.1.4 The Appellant-Proprietor argued that the technical problem solved by this difference consisted in the provision of a fast and simple D_0 stage which is environmentally friendly.

The Board observes that Claim 1 does not exclude vents before or after the treatment vessel. Therefore, the claimed D_0 stage is not necessarily faster, simpler or friendlier to the environment than that disclosed in document D1. Since the Appellant-Proprietor has not provided any evidence in this respect, it is not plausible that the above stated technical problem has

actually been solved by the claimed subject-matter when compared with the process disclosed in document D1.

2.1.5 Thus, the technical problem credibly solved by the claimed subject-matter in view of document D1 boils down to the provision of an alternative process for treating pulp with chlorine dioxide.

2.1.6 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 the above stated technical problem by the means claimed, namely by excluding vents between the mixer and the washer, thereby preventing chlorine containing compounds to escape here to the atmosphere.

2.1.7 The Appellant-Proprietor has not contested the Appellant-Opponent's argument that the necessity of venting gases and where to vent them depended on the process conditions which were responsible for the production of gases during the process. Thus, degassing of the pulp could already occur during mixing and pumping.

2.1.8 The Board, therefore, shares the Appellant-Opponent's opinion that the venting of gases is also possible before or after the treatment vessel, namely in the mixer or washer. This is corroborated by document D7 showing a venting from the washer (D7, page 384, Figure 5) and by document HE-5 indicating a degassing ability in MC pumps (page 551, right-hand column).

Considering that both, document D7 and HE-5 are part from a well-known textbook concerning pulp bleaching, those skilled in the art know about the possibilities of venting during a D_0 stage. Therefore, the Board is of the opinion that one option which a skilled person would adopt in the expectation of providing an alternative process to that disclosed in document D1 is to run the process such that venting can be avoided during the treatment.

2.1.9 The Board concludes, therefore, that the exclusion of the venting of gases from the treatment vessel is not based on an inventive step.

2.2 Second auxiliary request

2.2.1 Claim 1 of the second auxiliary request differs from that of the first auxiliary request in that the intensive mixing has been specified to take place in a fluidised state and in that it has been added that no gas emission collecting devices are needed within the closed space (point V above).

2.2.2 The reasons put forward above with respect to the omission of vents in accordance with the first auxiliary request (point 2.1.8) apply likewise for the omission of gas collecting devices within the closed space since the provision of gas collecting devices is only meaningful if vents are present. In this respect, the Appellant-Proprietor has not provided additional arguments.

2.2.3 Concerning the fluidising mixing, the Appellant-Proprietor argued in writing that it was essential in the process of document D1 to recycle the chlorine dioxide. Therefore, a skilled person had no motivation to intensify the mixing in that process.

2.2.4 It is, however, generally known in the art, that the intensity of mixing has an influence on the efficiency of chlorine dioxide bleaching and that improper distribution of chlorine dioxide throughout the pulp suspension leads to high chemical consumption and low brightness (document D7, page 392, left-hand column, last paragraph and Figures 19 and 20).

The Board concludes, therefore, that it was obvious for a skilled person to optimise the mixing in the process of document D1 as is suggested in document D7.

2.3 Third auxiliary request

2.3.1 Claim 1 of the third auxiliary request differs from that of the main request in essence in that it has been added that the chlorine dioxide residue in the pulp is determined at the end of or after the treatment vessel and used to adjust a parameter influencing the speed of the bleaching, such as temperature, pressure or revolution speed of the mixer (see points III and V above).

Whilst document D1 discloses a determination of the residual chlorine content at the end of the treatment step, it is completely silent about any feedback control of the process on the basis of that measurement.

2.3.2 In agreement with the Appellant-Proprietor, the technical problem credibly solved by these features vis-à-vis the prior art disclosed in document D1 may, thus, be seen in an improvement of the efficiency of the process.

2.3.3 However, according to document D7 those skilled in the art are aware of the fact that the measured residues of the chemicals used indicate the reaction progress of the bleaching process (page 629, left-hand column, lines 2 to 5). Further, they know that parameters like temperature and mixing intensity may be adjusted to control the reaction rate (document D7, page 629, Table 1 and left-hand column lines 12 to 14 and page 392, Figure 19 and left-hand column, last paragraph to right-hand column, line 4). Hence, it belongs to the common general knowledge of someone skilled in the art that a measured chemical residue can be used to adjust a parameter influencing the reaction rate or, in other words the speed of the reaction.

2.3.4 The Appellant-Proprietor argued that the disclosure of documents D1 and D7 could not be combined because, unlike document D1, document D7 did not relate to a recycling of the residual chlorine content of the liquid separated from the pulp (D1, e.g. column 3, lines 15 to 29). This argument is not convincing since the recycling of the chemical residue is technically not in conflict with a controlling of the reaction rate on the basis of the measured amount of the residue.

2.3.5 The Board is, therefore, of the opinion that given the above common technical knowledge, a person skilled in the art would use in the process of document D1 the

values of the residual chlorine content as measured at the end of the treatment step to adjust a parameter influencing the speed of the bleaching reaction in the expectation to improve the efficiency of the process.

2.4 Fourth auxiliary request

The reasons given above under points 2.2.4 and 2.3.5 apply mutatis mutandis to Claim 1 of fourth auxiliary request which is a combination of the features of Claim 1 of the second and third auxiliary requests.

2.5 Fifth to eighth auxiliary requests

The fifth to eighth auxiliary requests differ from the first to fourth auxiliary requests only in that the subject-matter claimed therein has been restricted to the embodiment comprising only one single chlorine dioxide treatment. Since the above reasoning with respect to the first to fourth auxiliary requests is based exactly on that embodiment, it applies also to the fifth to eighth auxiliary requests.

2.6 Consequently, the subject-matter of Claim 1 of none of the auxiliary requests complies with the requirements of Articles 52(1) and 56 EPC.

3. Since all of the Appellant-Proprietor'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:

G. Rauh P.-P. Bracke