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D E C I S I O N
of 23 March 2006

Case Number: T 0072/04 - 3.3.06

Application Number: 96908411.0

Publication Number: 0826086

IPC: D21C 9/10

Language of the proceedings: EN

Title of invention:
Method and apparatus for heating and pressuring a fibre pulp suspension during transportation to a bleaching reactor

Patentee:
Kvaerner Pulping AB

Opponents:
Sulzer Pumps Finland Oy
Andritz Oy
Metso Paper Sundsvall AB

Headword:
Pulp heating/KVAERNER

Relevant legal provisions:
EPC Art. 114, 83, 56
EPC R. 57a

Keyword:
"Admissibility of new requests (yes) - amendments not changing the scope of the claims as filed with the statement of grounds of appeal and made in good faith to overcome objections raised against the latter"
"Sufficiency (yes) - contradictory assertions of the parties; benefit of doubt is given to patent proprietor"
"Inventive step (yes) - hind-sight analysis"

Decisions cited:
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Catchword:
-

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Beschwerdekammern | Boards of Appeal | Chambres de recours

Case Number: T 0072/04 - 3.3.06

D E C I S I O N
of the Technical Board of Appeal 3.3.06
of 23 March 2006

Appellant: (Proprietor of the patent)
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-

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Decision under appeal:	**Decision of the Opposition Division of the European Patent Office posted 17 November 2003 revoking European patent No. 0826086 pursuant to Article 102(1) EPC.**

Composition of the Board:

Chairman: P. Krasa
Members: G. Dischinger-Höppler
J. Van Moer

Summary of Facts and Submissions

I. This appeal is from the decision of the Opposition Division to revoke the European patent No. 0 826 086 relating to a method and apparatus for heating and pressuring a fibre pulp suspension during transportation to a bleaching reactor.

II. Three notices of opposition had been filed against the granted patent, wherein the Opponents sought revocation of the patent on the grounds of Article 100(b) EPC for insufficiency of disclosure (Article 83 EPC) and Article 100(a) EPC for lack of novelty and inventive step (Article 54 and 56 EPC). The oppositions were based on a public prior use (hereinafter referred to as PU). Amongst others, the following documents have been filed as evidence:

P1 Process flow chart O_2-stage KF-R 30675 by Ahlstrom Karhula for Joutseno Pulp OY, dated 7 December 1993;

P2T Translation of purchase agreement No. 940018, signed on 15 March 1994;

P5 Print from the control room monitor at Joutseno pulp plant, dated 16 May 1995, 16:47:07;

P6 Print from the control room monitor at Joutseno pulp plant, dated 24 November 1994, 15:11:35;

P7 Print from the control room monitor at Joutseno pulp plant, dated 24 November 1994, 13:16:37;

P10 Affidavit by Mr Esko Turunen, dated 24 June 2003 and

P11 Translation of a sheet entitled "Acquisition Agreement No. 940018, Appendix 2" relating to design values for an oxygen delignification stage which formed part of purchase agreement No. 940018.

During the opposition proceedings, the Opponents further filed inter alia the following documents

D1 DE-A-2 441 579; and

E2 A table taken from the internet site of "The Engineering Tool Box" showing the saturation temperature values of steam in relation to absolute pressure values.

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. In its decision, the Opposition Division held that the subject-matter claimed in all requests was not based on an inventive step since it was obvious for the skilled person to use in the equipment of the PU heating steam having a lower pressure than that present in the bleaching reactor since this was already possible in the arrangement of the PU where medium pressure (MP) steam of 10 bar was used but obviously flashed down to a pressure in the area of 4 to 6 bar. In particular, it was held that no prejudice existed against use of low pressure (LP) steam for heating pulp to more than 100°C since steam at 3 bar overpressure had a temperature of

143°C and since the only reason for not using LP steam in the PU was that the LP steam available in the PU was unsuitable for that purpose due to its inadequate pressure of only 2.5 bar.

IV. This decision was appealed by the Patent Proprietor (hereinafter Appellant) who filed amended sets of claims in a new main and auxiliary request and, amongst others, the following further documents:

OP2 WO-A-99/19560;

D3 US-A-5 690 786 and

D4 EP-A-0 641 883.

The Opponents (hereinafter Respondents) filed during the appeal proceedings amongst others the following documents:

E3T A translation of an order No. 005*201288/19933, dated 15 May 1992 by Modo Paper AB from Ahlstrom Machinery AB concerning technical equipment for birch bleachery including MC pumps and equipment for steam mixing and heating of 12% pulp and

E4 A data sheet dated 5 January 1995, entitled "AHLMIX Chemical Mixer" relating to some technical data of a steam mixing device No. 1607.

V. Upon requests made by all parties, oral proceedings before the Board of Appeal were held on 23 March 2006, in the course of which the Appellant replaced its

former requests by amended sets of claims according to a new main and auxiliary request.

VI. Claim 1 of the main request reads:

"1. Method for treating a fibre pulp suspension, which comprises transporting the fibre pulp suspension, having a concentration of 8-18% by weight, from a maintenance vessel (1), in which there is atmospheric pressure or at most 1 bar overpressure and in which the temperature of the pulp suspension does not exceed 95°C, to a bleaching reactor and introducing the suspension into the bottom part of the reactor (2), which is at least 10 m high, preferably 20 m high, and at the top of which there is an overpressure exceeding the steam saturation pressure, in which reactor (2) the pulp is subjected to a bleaching treatment under pressure, in addition to which the pulp suspension, during transport from the maintenance vessel (1) to the reactor (2), is heated to a temperature which is desirable and suitable for the reaction, wherein the pulp suspension is pumped from the maintenance vessel (1) into a first line section (4) to a mixer (9) with the aid of a first pump (3) which generates a pressure in the first line section, in that steam which is at an overpressure is mixed continuously into the pulp suspension in the mixer in a quantity which is so great that the temperature which is obtained is suitable and desirable for the reaction in the reactor, wherein the pressure on the pulp suspension, which has been heated in this manner, is increased still further, with the aid of a second pump (18) after the mixer, to a pressure which is greater than the pressure in the reactor at the feed-in point (20), and wherein the pulp

suspension, which has been heated and pressurized in this manner, is pumped into the bottom part of the reactor, characterized in that in the reactor (2) the pulp is subjected to a treatment at a reaction temperature that exceeds 100°C, said first pump (3) generates a pressure in the first line section (4) of 1,5-3 bar overpressure and that said steam is low pressure steam having a temperature of 135-145°C, and an overpressure of 3-5 bar which is substantially lower than the pressure in the bottom part of the reactor."

Claim 1 of the first auxiliary request differs therefrom in that the term ", and that a pressure converter (15) and an automatic speed-controlling mechanism (16) controls the speed of the first pump (7) and consequently the pressure in the first line section (4)" has been added at the very end of the claim.

VII. The Appellant, orally and in writing, submitted the following arguments:

- The alleged PU was insufficiently substantiated and not proven up to the hilt.

- In case the PU was taken into account as the closest prior art, the technical problem solved by the claimed subject-matter consisted in charging a bleaching reactor with medium consistency (MC) pulp of above 100°C at reduced heating costs.

- It was not obvious for that purpose to use LP steam since this was not hinted at, either in the PU or in any of the other cited prior art documents even though equipment suitable for

carrying out the claimed heating of pulp with LP steam was already disclosed in D1 which was published 20 years before the priority date of the patent in suit.

– On the contrary, the PU - as well the other prior art documents and even documents published after the priority date of the patent in suit - used for that purpose medium pressure (MP) steam in spite of the fact that an LP steam line into the maintenance vessel was provided in the PU but not used. Reference was made in this respect, inter alia, to documents P1, P5 to 7, D3 and D4.

– Moreover, the Opponents by filing patent application OP2 after the priority date of the patent in suit considered it non-obvious to use LP steam for heating MC pulp to temperatures above 100°C.

VIII. The Opponents (hereinafter Respondents), orally and in writing, submitted in essence the following arguments:

– The Appellant's new requests should not be admitted since they were filed late and not in accordance with Rule 57a EPC and Article 10a of the Rules of Procedure of the Boards of Appeal (RPBA) as published in the OJ EPO 2003.

– Contrary to Article 83 EPC, the claimed subject-matter was insufficiently disclosed since any steam available at a pulp mill was superheated steam for which the temperature/pressure

conditions set out in Claim 1 did not apply as was apparent from E2.

– The existence of the PU has been established by the relevant evidence.

– The equipment of the PU as shown in P1 was the closest prior art. In this equipment two pumps and a steam injection line in-between were arranged between the maintenance vessel and the reactor so that the reactor bottom pressure was decoupled from the pressure of the pulp at the point of the steam injection. This arrangement rendered possible to use LP steam for heating MC pulp. Once this arrangement was known, it was obvious to use LP steam for heating at reduced costs, since LP steam was the cheapest steam available at a pulp mill.

– It was apparent from P10 and P11 that the only reason for not using the LP steam available at the pulp mill of the PU for heating the pulp was that its pressure was too low for this purpose. Further, any effort to mix this steam with steam of higher pressure was too expensive.

– There was no prejudice in the relevant technical field against the using of LP steam for heating the pulp to more than 100°C as long as its pressure was about 2 bar or 1.5 to 4 bar higher than that of the pulp as recommended in P10 and E4 and since it depended on the pressure of the pulp whether it could be heated to a temperature of above 100°C by LP steam having a pressure of 3 to

5 bar and the corresponding high temperature. This was corroborated by E3T showing that prior to the priority date of the patent in suit LP steam of 4 bar was used for increasing the temperature of pressurised MC pulp by 20°C. Moreover, the pressure of the pulp produced by the first pump was merely the result of design criteria since it depended on the conveying distance for the pulp.

IX. The Appellant requested that the decision under appeal be set aside and that the patent be maintained on the basis of the main request submitted during the oral proceedings or, in the alternative, on the basis of the auxiliary request submitted during the oral proceedings.

The Respondents requested that the appeal be dismissed.

Reasons for the Decision

Main request

1. *Procedural issues*

In the Respondents' view, the present request was filed in breach of Article 10a of the latest version of the RPBA (published in the OJ EPO 2003) and not occasioned by grounds of opposition as required by Rule 57a EPC. In particular, the wording of Claim 1 has been changed long after the filing of the statement of grounds of appeal without being occasioned by any grounds of opposition.

The Board observes that in the present case the amendments made to Claim 1 are in part the result of objections by the Respondents concerning incorrect application of Rule 29(1) EPC with respect to the PU, i.e. an incorrect distinction between those technical features which, in combination, are part of the PU and those features which are not and, in part the result of obvious mistakes made by the Appellant in an effort to remedy the criticised deficiencies.

It is true that according to Article 10a RPBA, second paragraph, a party's case shall be complete after the statement of grounds of appeal or, respectively the corresponding reply. However, in the Board's judgment, Article 10a RPBA must not be read out of the context given in Article 10b RPBA, first paragraph, which - in perfect alignment with Article 114 EPC - explicitly leaves it to the Board's discretion to admit and consider, under circumstances, any later amendments to a party's case.

It is also true that the amendments are not occasioned by grounds of opposition but by objections of the Respondents made during the appeal proceedings. However, the amendments are the result of the Appellant's effort to overcome in good faith deficiencies raised by the Respondents and it is immediately apparent that the amendments do not change the scope of Claim 1 as filed with the statement of grounds of appeal even if the wording is different. This was not contested by the Respondents.

Hence, the Board exercises its discretion under Article 114 EPC and Article 10b RPBA and admits the

claims according to the main request into the proceedings.

2. *Amendments (Articles 123 and 84 EPC)*

2.1 The Board is satisfied that the claims meet the requirements of Article 123(2) EPC in that

- the subject-matter of Claim 1 is based on original Claims 1, 4 and 8 in combination with page 2, lines 26 to 32,

- Claims 2 to 8 correspond to original Claims 2, 3 and 6 to 8 and

- the subject-matter of Claim 7 is based on a preferred embodiment contained in original Claim 1. This was not challenged by the Respondents.

2.2 Since the amendments do not extend the protection conferred by the claims as granted, the requirements of Article 123(3) are also met.

2.3 Further, the amendments do not create problems under Article 84 EPC. This was also not contested by the Respondents.

3. *Sufficiency of disclosure (Article 83 EPC)*

However, the Respondents contested that the claimed subject-matter was insufficiently disclosed. It was argued that the requirement for the LP steam to have a temperature of 135 to 145°C and at the same time an overpressure of 3 to 5 bar was insufficient information

for a skilled person to be able to carry out the claimed subject-matter since only superheated steam existed at a pulp mill and since unsaturated steam would provoke undesired condensation; its use was therefore not possible. According to fundamental thermodynamics as exemplified in E2, superheated steam at 5 bar overpressure necessarily had a temperature above 145°C and superheated steam of 135°C necessarily had an overpressure of below 3 bar. According to the Respondents, also in the claimed method only superheated steam was used. Reference was made in this respect to the overall content of the patent in suit and the wording of Claim 1.

In contrast, the Appellant argued that the claimed subject-matter covered the possibility of using unsaturated steam and that such steam was also present at a pulp mill. Moreover, unsaturated steam could be easily generated by changing pressure and temperature conditions and undesired condensation could be avoided by means like condensation traps which was not contested by the Respondents.

Concerning their allegation that only superheated steam was used in the patent in suit, the Respondents did neither further specify their reference to the description and to Claim 1 nor give detailed reasons. The Board notes, however, that the description contains the same temperature/pressure conditions as Claim 1 (column 3, lines 25 to 30). Moreover, the fact that a second pump is foreseen to increase the pressure of the pulp/steam mixture may lead to an overpressure above the steam saturation pressure at the top of the reactor as required in the preamble of Claim 1. Therefore, it

is not prima facie evident that only superheated steam is considered in the patent in suit.

The Respondents did not substantiate by evidence their allegation concerning the existence of only superheated steam at a pulp mill. Nor did they deny that the temperature/pressure conditions set out in Claim 1 may apply in the case of unsaturated steam.

According to the established jurisprudence of the Boards of Appeal (Case Law of the Boards of Appeal of the European Patent Office, 4th edition 2001, Chapter VI.J.6), each party normally carries the burden to prove the facts it alleges, however, in a case where the parties make contradictory but unsubstantiated assertions concerning facts relevant for establishing patentability and the EPO is not in a position to establish the facts of its own motion, the benefit of the doubt is given to the patent proprietor.

Since this latter situation exactly applies to the present case, the Board decides in the Appellant's favour, namely that the invention is sufficiently disclosed in accordance with the provisions of Article 83 EPC and that the patent in suit, therefore, meets the requirements of Article 100(b) EPC.

4. *Inventive Step*

Since the issue of novelty has not been in dispute between the parties, the only matter remaining to be decided here is whether or not the claimed subject-matter is based on an inventive step.

4.1.1 The patent in suit and in particular the claimed subject-matter relate to a method for treating a fibre pulp suspension which comprises

- transporting the pulp from a maintenance vessel in which the pulp is under a pressure of at most 1 bar above atmospheric and at a temperature of at most 95°C to a bleaching reactor which is at least 10 m high and at the top of which there is an overpressure exceeding the steam saturation pressure,

- introducing the pulp into the bottom part of the reactor,

- subjecting the pulp in the reactor to a bleaching treatment at a reaction temperature above 100°C and

- heating the pulp during transport from the maintenance vessel to the reactor to at least reaction temperature (column 1, lines 1 to 19).

4.1.2 As is explained in the description of the patent in suit, the heating of the pulp is usually performed in the art by mixing steam into the pulp and the transport is performed by means of a pump which generates a pressure which is sufficiently high to enable the transport and to overcome any pressure losses along the transportation distance and in particular to overcome the counter-pressure in the bottom of the reactor. Due to the height of the reactor and the pressure required to perform the process in the reactor, this counter-pressure can be considerable. Therefore, MP steam, i.e.

steam at a pressure of 9 to 12 bar is used for heating in those instances (column 1, lines 32 to 57).

4.1.3 According to the patent in suit, a disadvantage is seen in the fact that MP steam is expensive. It was, therefore, an object of the patent in suit to provide a method which enables LP steam to be used for heating the pulp during the transport from the maintenance vessel to the reactor since LP steam was cheaper (column 1, line 57 to column 2, line 17).

4.1.4 In conformity with the decision under appeal, all Respondents based their line of argument for evaluating inventive step only on the PU as the closest prior art.

4.1.5 At the oral proceedings, the Appellant in contrast to its written opinion (letter of 10 March 2004, page 3, point 3) disputed that the PU was sufficiently substantiated. However, in the present case it is not necessary to decide this question since the appeal succeeds even if the PU is considered to be prior art.

4.2 The parties agreed that the technical features mentioned in the first part of Claim 1 are present in combination in the PU. In particular, the PU deals with an arrangement for transporting MC pulp from a maintenance vessel to a bleaching reactor including a steam mixing device between two pumps (see in particular P1, P10, points 1 to 3, and E3T). The Board, therefore, is also of the opinion that the PU, if prior art, may be used as a starting point for the assessment of inventive step.

However, in the PU MP steam having a pressure of 10 bar is used for heating. Therefore, the above mentioned object of providing a method wherein LP steam can be used for heating has not been achieved by the PU.

4.3 The parties further agreed that the technical problem to be solved by the claimed subject-matter in view of the PU can be defined to consist in a reduction of the production costs while heating the MC pulp to above 100°C.

It is evident that this problem has been solved by the claimed subject-matter since only LP steam of 3 to 5 bar overpressure is actually used for heating (see e.g. Claim 1).

4.4 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

- generating an overpressure of 1,5 to 3 bar by means of the first pump, and

- heating the pulp to a reaction temperature of above 100°C,

- by using LP steam having a temperature of 135 to 145°C and an overpressure of 3 to 5 bar which is substantially lower than the pressure in the bottom part of the reactor

as is specified in the characterizing portion of Claim 1.

It is to be noted that the term "substantially" when read in the context of the description of the patent in suit according to which the pressure at the bottom of the reactor may be as low as 4 bar, includes a pressure difference of only 1 bar.

4.5 The above technical features of the characterizing portion of Claim 1 are not derivable from the PU.

However, the Respondents contended that a temperature of above 100°C was also reached in the PU since a temperature of 101°C was measured according to P6.

P6 as well as P5 and P7 are screen prints from a control room presenting "snapshots" of the actual process parameters (pressure, temperature and feed) measured at that very instant. Neither the screen prints nor any other part of the evidence provided for the PU indicate the conditions for the respective measurements, or which margin of error is applicable to the measured values. The temperature of 101°C is marked on P6 at the end of the pulp line below the first bleaching reactor. Inside the reactor temperatures of 96°C and 94°C are shown. On print screens P5 and P7, the respective temperatures are several centigrade lower. Hence the temperature of 101°C indicated on screen print P6 is in the Board's judgment no evidence establishing that in the PU a reaction temperature of above 100°C is reached within the reactor.

4.6 The Respondents further argued that in the light of the PU the features of the characterizing portion of Claim 1 would not require an inventive step. In particular, the following arguments were presented:

4.6.1 The only purpose of the first pump was to transport the pulp from the maintenance vessel to the steam injection device. Therefore, the pressure (1.5 to 3 bar overpressure) generated by the first pump was merely a design option dictated by the conveying distance. It was not relevant for the above technical problem and its solution.

4.6.2 Whether or not the aqueous pulp could be heated to above 100°C was dependent on the pressure applied, but had no special meaning or technical effect with regard to the technical problem to be solved. It was evident that pressurized pulp can be heated to above 100°C by steam of sufficiently high pressure and temperature. This was shown in E3T according to which LP steam of 4 bar overpressure and a temperature of 145°C was able to heat pressurized MC pulp by 20°C.

4.6.3 Anyone skilled in the art was interested to use LP steam for heating since it was the least expensive steam. The only requirement for that purpose was that its pressure was about 2 bar or 1.5 to 4 bar higher than that of the pulp, as was apparent from P10 and E4, and that its temperature was sufficiently high for heating the pulp to the desired temperature. It was evident from P10 and P11 that only MP steam of 10 bar pressure and LP steam of 2.5 bar pressure was available at the pulp mill where the arrangement according to flow sheet P1 of the PU was to be used. It was further

evident that the pressure of this LP steam was too low to be introduced into the pulp after the first pump. Since any mixing of the steams would be too expensive, the PU was adapted so as to use the MP steam for heating in spite of the fact that according to P10 LP steam was first considered and planned to be used. Moreover, it was apparent from P1 that the pressure of the MP steam was flashed down and controlled via measurements of the steam flow rate and the temperature of the pulp after heating.

4.6.4 Therefore, so the Respondents argued, once the arrangement of the PU was known where the pressure of the reactor was decoupled by a second pump from the pressure of the pulp at the point of steam injection, a person skilled in the art would have used in the PU LP steam of suitable pressure for heating the pulp if it had been available.

4.7 The Respondents' arguments are not convincing for the following reasons:

4.7.1 As correctly stated by the Respondents, it depends on the pressure applied to the pulp, whether or not it can be heated to above 100°C (point 3.5.2 above). Therefore, the Respondents contradict themselves when stating at the same time that the pressure generated by the first pump was irrelevant for the existing technical problem. On the contrary, it is apparent that the purpose of the first pump in the claimed method is not only to transport the pulp but also to provide a pressure on the pulp which allows a heating to above 100°C.

4.7.2 The Respondents did not deny that a reaction temperature above 100°C would be preferable for bleaching. Nevertheless they relied on E3T as evidence to show that it was obvious to use LP steam of 3 to 5 bar for heating the pulp. E3T represents an order of equipment for a birch bleaching plant including pumps and a steam mixing device and contains technical information concerning the required performance of the equipment. It is indicated that MC pulp of 12% consistency is to be heated by means of steam of 145°C temperature and 4.0 bar overpressure, however only from a temperature of 70°C to a temperature of 90°C. It is further indicated in E3T that the equipment shall contain a steam header between an MC pump and an Ahlmixer. The information given in E3T, therefore, applies to pressurized pulp as correctly stated by the Respondents, but fails to teach any conditions necessary to heat the pulp to a temperature above 100°C.

4.7.3 Concerning the steam pressure conditions in the PU, the Board notes that P11 only indicates that any (the values have been blackened) LP steam of 2.5 bar pressure and MP steam of 10 bar pressure may be consumed in the process but acknowledges that it may be possible to derive from the affidavit of Mr Turenen, an employee at the pulp mill of the PU, P10, that only LP steam of 2.5 bar pressure was available for the PU.

However, Mr Turenen makes clear in his affidavit that the LP steam was only planned for heating pulp in the drop leg in atmospheric conditions upstream of the first MC pump (point 4a) but found unsuitable due to its low pressure (2.5 bar) since a difference between the pressure of the steam and the pressure of the pulp

line of about 2 bar was required for that purpose (points 4b and 4c). This is corroborated by flow sheet P1 where a pipeline for feeding LP steam to the drop leg is foreseen and by P5 to P7 showing that no (0%) LP steam was actually used.

It goes without saying that LP steam of too low pressure to be introduced into the pulp in the drop leg, is still less suitable to be introduced into the pulp line between the pumps where the pressure of the pulp is higher than in the drop leg.

The Respondents admitted, however, that the LP steam of only 2.5 bar pressure could have been used in admixture with the MP steam but alleged that this option was too expensive to be considered by those skilled in the art.

The Board does not accept this argument since mixing gases of different pressure is usual in the art and is exemplified even in flow sheet P1 and screen prints P5 and P7 of the PU where oxygen of 14 bar pressure is mixed with MP steam of 10 bar pressure before it is mixed into the pulp line in injection device 501.06. Steam mixing may be required also when performing the method disclosed in D4 where 40 kg/ton of LP steam and 40 to 180 kg/ton of HP steam are introduced into the pulp by means of one single mixer (Figure 1, reference number 16, in combination with page 3, lines 50 to 52 and page 4, lines 48 to 51). Further, it is shown in the background part of D3, a document published after the priority date of the patent in suit, that pressurization of LP steam with HP steam in a thermocompressor was prior art since 1978 (column 2, lines 11 to 18). The Board is, therefore, of the

opinion that steam mixing would have been considered by those skilled in the art if use should be made of the LP steam present at the mill but at too low pressure to be used alone.

The Respondents' argument which was also considered in the decision under appeal that according to the PU the MP steam was flashed down, possibly to a pressure of 4 to 6 bar, is based on no evidence at all and is rather counter-intuitive, considering that the steam injection device 501.02 in P1 is designed for a pressure of 14 bar (P2T, page 18(19), Appendix 2) and that the pressure of the pulp has to be increased thereafter by booster pump 501.01. Hence, in the Board's opinion, the controlling devices shown in P1 in the steam line and in the pulp line downstream steam injection to adjust a corresponding valve in the steam line do not provide evidence for a particular regulation of the pressure of the steam, let alone a flashing down to LP level.

The Board concludes, therefore, that the available evidence does not support the conclusion that those responsible for designing and using the arrangement of the PU have contemplated introducing LP steam in the pulp line between the two pumps.

4.7.4 Yet, the arrangement with two pumps which, as a matter of principle, enables the use of LP steam has already been disclosed in 1975 by D1, i.e. 20 years before the priority date of the patent in suit and more than 19 years before the transfer of the propriety right to the alleged PU took place (point 2.4 of the decision under appeal and P2T).

D1 does not mention MC pulp to be treated in this arrangement or the pressure of the steam introduced between the two pumps for heating the pulp. Nevertheless, for the reasons given above (point 4.7.3) it is remarkable that the introduction of LP steam after the first pump has not even been considered in the PU, if - as alleged by the Respondents - this would have been obvious once the arrangement with two pumps was known. The Board concludes, therefore, that the allegation of the Respondents is based on hind-sight analysis, rather than on evidence.

This conclusion is corroborated by the fact that the authors of D3, a document published after the priority date of the patent in suit but filed in 1991, hence a document representing the opinion of a skilled person at the priority date of the patent in suit, still considered MP steam for heating MC pulp in an arrangement with only one pump in spite of the fact that they were interested in using LP steam of about 3 to 5 bar which was readily and sometimes available in excess at pulp mills. According to D3, LP steam of about 5 bar was conveniently introduced before the pump but suitable only to increase the temperature to about 82°C. Thus, MP steam of 12 bar was introduced after the pump to further elevate the temperature of the pulp (column 7, lines 40 to 53 and column 8, lines 57 to 66). Hence, it was not recognised in 1991 that the LP steam of 3 to 5 bar which was available at the pulp mills could be used for heating even though the equipment suitable therefor was known from D1 since 1975.

Finally, the Board observes that the Respondents' line of argument concerning obviousness of the claimed subject-matter is also weakened by the fact that one of the Respondents, by filing patent application OP2 in October 1997, i.e. two and a half years after the priority date of the patent in suit, still considered it worthwhile to apply for a patent of similar content to the patent in suit, namely for a method and apparatus for heating pulps by supplying LP steam into pulp pressurized by a first pump and supplied to the following process step by a pressure-raising steam mixer (Claim 1 and Figure) with the intention to save costs by using LP steam available at pulp mills which otherwise is classified as waste (page 3, lines 6 to 13).

4.8 In summary, the Board notes that there was a general desire in the art to use cheap LP steam for heating pulp to the preferred bleaching temperature of above 100°C which was, however, not satisfied before the priority date of the patent in suit. It may be true that the skilled person could have made the invention by combining different elements in the prior art. However, he had no incentive from the prior art for such a combination. Instead, it is the merit of the Appellant to realise for the first time that the arrangement of D1 when applied to MC pulp as in the PU is suitable for that purpose of using only LP steam for heating if the proper adjustment as set out in the characterizing portion of Claim 1 of temperature and pressure conditions in the pulp line and the steam line is observed.

4.9 As a consequence of the above reasons, the Board is satisfied that the subject-matter of Claim 1 involves an inventive step, thus meeting the requirements of Articles 52(1) and 56 EPC.

Dependent Claims 2 to 7 refer to specific embodiments of Claim 1 and derive their patentability therefrom.

5. Since the claims of the main request comply with the requirements of the EPC, there is no need to consider the auxiliary request.

Order

For these reasons it is decided that:

6. The decision under appeal is set aside.

7. The case is remitted to the first instance with the order to maintain the patent with the following documents:

   – Claims 1 to 7 submitted as main request during the oral proceedings;

   – a description to be adapted;

   – Figure 1 of the patent as granted.

The Registrar: The Chairman:

G. Rauh P. Krasa