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**Datasheet for the decision
of 7 June 2022**

Case Number: T 0882/19 - 3.3.06

Application Number: 09397517.5

Publication Number: 2133402

IPC: C10J3/54, C10J3/56, C04B2/10,
F27B7/20

Language of the proceedings: EN

Title of invention:
METHOD OF TREATING LIME MUD

Patent Proprietor:
Valmet Technologies Oy

Opponent:
Omya International AG

Headword:
Valmet/lime mud

Relevant legal provisions:
EPC Art. 100(a), 56, 123(2)
RPBA Art. 12(4)

Keyword:

Oral proceedings - no withdrawal of request for oral proceedings

Inventive step - main request (no) - auxiliary request (yes)

Amendments - allowable (yes)

Late-filed request - No discretion not to admit auxiliary request.

Decisions cited:

Catchword:



Beschwerdekammern
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Case Number: T 0882/19 - 3.3.06

D E C I S I O N
of Technical Board of Appeal 3.3.06
of 7 June 2022

Appellant: Omya International AG
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Decision under appeal: **Decision of the Opposition Division of the
European Patent Office posted on 16 January 2019
rejecting the opposition filed against European
patent No. 2133402 pursuant to Article 101(2)
EPC.**

Composition of the Board:

Chairman J.-M. Schwaller
Members: S. Arrojo
R. Cramer

Summary of Facts and Submissions

I. The opponent filed an appeal contesting the decision of the opposition division to reject the opposition against European patent No. 2 133 402, claim 1 thereof (**main request**) reading:

"1. A method for treating lime mud, in which method lime mud is conveyed to a lime kiln, where fuel gas is used as fuel, which fuel gas is formed by a circulating fluidized bed gasifier, characterized in that a part of the lime mud is fed to the gasifier where it is used as bed material for the gasifier."

II. In its statement of grounds of appeal, the appellant requested to set aside said decision and to revoke the patent in its entirety for non-compliance with the requirements of Articles 123(2) EPC and 56 EPC in view of **D1** (US 3,617,583) or **D2** (US 4,548,796) as closest prior art, combined with common general knowledge or **D7** ("*Calcination of Lime Mud in a Circulating Fluidized Bed*" R. Legros et al., J. Pulp and Paper Science, 18, 2 (1992)). Further, it cited documents **D4** (J. Gaskin, "*Land Application of Pulp Mill Lime Mud*", University of Georgia Bulletin 1249, 2004), **D5** (F. Azgomi, "*Impact of Liming Ratio on Lime Mud Settling and Filterability in the Kraft Recovery Process*", University of Toronto, Doctorate Thesis, 2014) and **D6** ("*Lime Mud Crops*", Technical Evaluation Report Compiled for the USDA National Organic Program, 2004).

III. In its reply (dated 5 September 2019 and date-stamped 6 September 2019), the patent proprietor and respondent requested to dismiss the appeal and to maintain the patent as granted or, as an auxiliary measure, on the

basis of one of auxiliary requests 1, 2, 2B, 3, 4, 4B, 5, 6, 6B, 7, 8 and 8B filed therewith, wherein

Claim 1 of **auxiliary request 1** corresponds to that of the main request with the additional indication that the lime mud is *"taken from a chemical circulation of a pulp mill after causticization before the lime kiln"*.

Claim 1 of **auxiliary request 2** corresponds to that of auxiliary request 1 with the additional requirement that *"the lime mud is calcinated partly or entirely in a process chamber of the gasifier, and calcinated lime mud is conveyed with the fuel gas to the lime kiln"*.

- IV. With a letter dated 26 March 2020, the appellant requested not to admit into the proceedings auxiliary requests 2, 2B, 3, 4, 4B, 5, 6, 6B, 7, 8 and 8B.
- V. In its preliminary opinion, the board indicated that the ground for opposition under Article 100(a) EPC in combination with Article 56 EPC prejudiced the maintenance of the patent as granted, that the subject-matter of claim 1 of auxiliary request 1 did not meet the requirements of Article 56 EPC and that auxiliary request 2 was admissible and that its claimed subject-matter met the requirements of the EPC.
- VI. Both parties announced with letters dated 26 April and 20 May 2022 that they would not attend the oral proceedings but did not withdraw their request to hold oral proceedings.
- VII. At the end of the oral proceedings, which took place in their absence on 7 June 2022 by videoconference, the chairman established that the final requests of the parties as presented in writing were as follows:

- The opponent and appellant had requested that the appealed decision be set aside and that the patent be revoked in its entirety.

- The proprietor and respondent had requested that the appeal be dismissed or, as an auxiliary measure, that the patent be maintained on the basis of the claims of one of auxiliary requests 1, 2, 2B, 3, 4, 4B, 5, 6, 6B, 7, 8 or 8B filed with its reply dated 5 September 2019 (date-stamped 6 September 2019).

Reasons for the Decision

1. Main request - Inventive step

The board has concluded that the ground for opposition under Article 100(a) EPC in relation to Article 56 EPC prejudices the maintenance of the patent as granted.

- 1.1 The **idea underlying the invention** is to provide a method for treating lime mud in a gasifier and a lime kiln, characterised in that part of the treated lime mud is used as bed material in the gasifier in order to prevent fouling and to increase the capacity of the kiln. It is well known that in these systems the fines can fly with the fuel gas and reach the lime kiln, thus causing fouling of the end product (see par. [0006] of the patent). This can be at least partially prevented by using the same lime mud being treated as bed material in the gasifier, because it will be this lime mud which is calcined and conveyed to the lime kiln (instead of fine particles of other materials in the bed) to produce further burnt lime, thereby reducing fouling of burnt calcium with contaminants and at the same time increasing the production of burnt lime (see par. [0014] of the patent).

1.2 Closest prior art

- 1.2.1 Document D1 (col. 1, lines 3-15) discloses a method for treating lime mud in a kiln using a fuel gas formed in a fluidised bed gasifier, wherein in a preferred embodiment (col. 2, lines 23-27) limestone of a particle size of 0.5 to 2.0 mm is used as fluidised bed. The limestone can be obtained (col. 2, lines 25-26) from quarry rejects of sizes ranging from 500 microns to 2 mm.

Document D2 discloses (column 1, lines 5-8 and 52-64) a method for producing burnt lime in a rotary kiln by means of gaseous fuels produced from industrial wastes in a fluidised bed reactor. The fluidised bed contains sand or coal sack with an adsorbent which provides the effect of separating noxious substances from the gases. This adsorbent contains finely divided limestone and/or burnt lime and/or carbonaceous materials with sizes ranging from 0.1 mm to 10 mm. The limestone can be obtained (col. 2, lines 19-26) from dust at the exit filter of the lime kiln.

- 1.2.2 The opposition division concluded that the limestone disclosed in D1 and D2 did not fall within the scope of the term "lime mud", because it was clear from the patent that this concept did not simply refer to any solid particles containing CaCO_3 (i.e. limestone), but to a specific effluent from a pulp manufacturing process. Both the composition and the range of particle sizes of the limestone used in these documents fell outside those typically associated with "lime mud". In particular D6 (page 2, lines 74-75) indicated that lime mud particles had sizes in the order of micrometers, and according to D4 or D5 the composition of lime mud

was not the same as that of limestone obtained from other sources such as agricultural lime.

- 1.2.3 In the board's view, the limestones in documents D1 and D2 could be considered to fall within the scope of the "lime mud" as defined in claim 1, because the latter does not define the properties of this material and the patent itself describes the term in very broad terms ("Lime mud is calcium carbonate (CaCO_3) in a solid form" (par. [0002])), with no further restriction in terms of composition or particle size. The board is also not convinced that the additional content of the patent or the typical composition and particle sizes of lime mud disclosed in D4, D5 and D6 can be used as a strict reference to interpret the scope of claim 1 narrowly because in practice, the characteristics of lime mud might vary depending on a number of factors which are not defined in the patent, such as how the process of causticising is conducted, the way in which the lime mud is recovered and/or whether this lime mud undergoes a post-treatment or conditioning step before being used in the fluidised bed.

However, for the sake of the argument, the board will assume (in the appellant's favour) that the limestone in D1 and D2 does not anticipate the feature "lime mud" in claim 1. Claim 1 is therefore considered to **differ** from these two prior art documents in that lime mud from the same source as that being treated in the lime kiln is used as bed material in the gasifier.

- 1.3 Problem solved by the invention
- 1.3.1 Both the opposition division and the respondent argued that the invention would provide the technical effect of converting at least part of the limestone in the

gasifier into lime (i.e. calcium oxide) particles, and that the lime particles escaping from the fluidised bed into the kiln would increase the lime production of the kiln rather than contaminating this product with other substances (see par. [0011] of the patent). The problem solved by the invention was therefore to reduce fouling of the calcium oxide while also increasing the capacity of the lime kiln (see par. [0014] of the patent).

- 1.3.2 The board disagrees with this argumentation, because the subject-matter of claim 1 is not restricted in terms of the conditions of gasification nor in terms of the result to be achieved by this process. There is thus no basis to conclude that the effects of lime mud calcination in the gasifier and subsequent transportation of the resulting burnt lime to the kiln would necessarily be obtained throughout the entire scope of protection. The fact that bed particles of calcium carbonate could be calcined and ground, to subsequently fly to the kiln (see for example par. [0006] of the patent) does not necessarily imply that this would occur for any process falling within the scope of claim 1, because the loss of particles from a fluidised bed is normally an undesired process, so that means such as separation units can (and would) be used to prevent it (in fact, the patent itself contemplates using a cyclone for this purpose as shown in figures 1 and 2), and/or because even if this process was regarded as unavoidable, it could involve other particles different from the calcined lime.

In the board's opinion, it follows that the only problem which is solved by the differentiating feature is the provision of an alternative bed material for the gasifier.

1.4 Obviousness of the solution

- 1.4.1 The opposition division argued that document D1 taught away from using a portion of the treated lime mud in the kiln for the fluidised bed, because it explicitly disclosed using lower quality rejects from quarry limestone. A similar argument was brought forward for D2, since the proposed use of dust from the exit gas filter of the lime kiln for the fluidised bed implied that the bed material had to be different from that introduced into the lime kiln.
- 1.4.2 The board disagrees that the suggested bed materials in D1 and D2 (presented solely as examples) would teach away from the proposed solution. On the contrary, the use of limestone as bed material in these documents can be considered as a hint to contemplate other limestone-based materials which are readily available and inexpensive. In this respect, it is clear that availability and/or cost effectiveness is a relevant factor when selecting the bed materials in D1 (which proposes reject from quarries) and D2 (which proposes residual dust from the process itself). From this starting point, the selection of a portion of the lime mud to be treated in the lime kiln as bed material appears to represent a trivial alternative, because it is the most readily available limestone-based solid material in the processes of D1 or D2, which would reduce the costs associated with acquiring and/or transporting limestone products from other sources. In other words, a skilled person starting from D1 or D2 and looking for alternative sources of limestone-based product as bed material for the gasifier would not require any inventive skills to contemplate using a portion of the lime mud from the process for this purpose.

The board therefore agrees with the appellant in that the subject-matter of claim 1 at issue does not involve an inventive step because it is obvious in view of the cited prior art.

2. Auxiliary request 1 - Inventive step

The board has concluded that the requirements of Article 56 EPC are not met for the following reasons:

2.1 Claim 1 at issue corresponds to claim 1 of the main request wherein the lime mud is *"taken from a chemical circulation of a pulp mill after causticization before the lime kiln"*.

2.2 Closest prior art and problem solved

2.2.1 As for the main request, any one of documents D1 and D2 can be regarded as the closest prior art.

2.2.2 The proprietor argued that the amendments to claim 1 at issue implied that the lime mud was not sorted or fractionated in any way (i.e. it was taken directly from the circulation of the pulp mill), whereas both in document D1 and D2 the lime mud was implicitly fractionated or sorted, because it was respectively obtained from rejected particles and from an exit gas filter. The typical particle sizes in the recirculation of the pulp mill were small (less than 0.1 mm as indicated in D4, D5 and D6), so it was implicit that at least some particles would be conveyed with the fuel gas to the lime kiln as discussed in the main request. The use of lime mud from the chemical circulation as bed material implied that the impurities in the particles conveyed from the gasifier to the kiln were the same as those in the liquid of the lime

circulation, which would reduce the fouling of the product.

- 2.2.3 The board disagrees with this argumentation, because the subject-matter of claim 1 does not define the particle size of the lime mud nor does it exclude the use of additional steps of fractionation or sorting of the particles. Furthermore, as argued for the main request, there is no reason to conclude that a generally undesired process such as the conveyance of bed particles with the fuel gas to the lime kiln (i.e. of the lime mud particles in particular) would necessarily occur in the method of claim 1. While it is well known that fine particles of bed material can be conveyed to the kiln, the method claim does not exclude steps to prevent this process from happening (e.g. an intermediate cyclone) and even if it happened, there is no basis to conclude that the lime mud particles (rather than other particles in the bed) would be the ones calcined and conveyed with the fuel gas. It is also not apparent why including lime mud from the recirculation of the pump mill in the fluidised bed would solve the problem of improving the purity of the burnt lime with respect to D1 or D2, as this effect is related to the conveyance and burning of the lime mud particles of the fluidised bed, a process which, as indicated above, is not explicitly or implicitly defined in claim 1.

The board therefore considers that claim 1 at issue differs from D1 or D2 in that i) part of the lime mud under treatment is fed to the gasifier to be used as bed material and in that ii) the lime mud is taken from a chemical circulation of a pulp mill after causticisation before the lime kiln. As explained in the previous paragraph and also in view of the

arguments brought forward for the main request, the board sees no reason to conclude that obtaining the lime mud from this source would give rise to any specific technical effect beyond that of providing an alternative bed material.

The board therefore concludes that the only problem solved by the invention is the provision of an alternative bed material for the gasifier.

2.3 Obviousness of the solution

2.3.1 The proprietor essentially argued that the exemplary sources of lime mud in D1 and D2 led to particles which would significantly differ from those according to claim 1, so it would not be obvious to consider using lime mud from the chemical circulation of the pump mill.

2.3.2 The board however considers that the argumentation presented for the main request is also applicable to this request. In particular, having established that the selection of a portion of the lime mud introduced in the lime kiln as bed material for the gasifier is considered to be an obvious alternative, and that the lime mud introduced in a lime kiln is normally the product of a chemical circulation of a pulp mill after causticisation, it follows that the selection of a lime mud taken from a chemical circulation of a pulp mill after causticisation as fluidised bed also represents an obvious alternative (in fact, it would be counter-intuitive to use a source of lime mud other than that from the process itself).

- 2.3.3 The subject-matter of claim 1 of this request is therefore obvious in view of the cited prior art and not considered to involve an inventive step.
3. Auxiliary request 2 - Admittance
- 3.1 This request was filed with the reply of the proprietor on 6 September 2019, so its admittance is governed by Article 12(4) RPBA 2007.
- 3.2 The request at issue corresponds in substance to auxiliary request 1C (it just omits the expression "in such way that" in claim 1) filed during opposition proceedings after the final date pursuant to Rule 116 EPC for making written submissions, but the opposition division did not decide on its admittance.
- 3.3 The appellant argued that since no justification had been presented for this late-filing and as this request was not *prima facie* suitable for overcoming the outstanding objections, it should not be admitted into the proceedings.
- 3.4 The board does not follow this argumentation because first, it is noted that according to Article 12(4) RPBA 2007 the board has the discretion not to admit requests which "... could have been presented or were not admitted in the first instance". Since auxiliary request 1C was presented during the first instance and there was no decision not to admit it, it does not fall into any of the two cases set out in Article 12(4) RPBA 2007. Furthermore the reply to the statement of grounds of appeal meets the requirements of Article 12(2) RPBA 2007 with respect to auxiliary request 2. There is therefore no basis for the board to exercise its

discretion not to admit this request under this legal provision.

The board further notes that on 20 September 2018 the opponent submitted new documents D6 and D7, and that these were used to formulate new objections. It is thus apparent that the filing of the auxiliary requests 1B-1C on 30 October 2018 (still several weeks before the oral proceedings) constituted a timely response of the proprietor to the new submissions of the opponent.

Finally, the board also notes that the request at issue appears to *prima facie* overcome the outstanding issues.

3.5 Auxiliary request 2 is therefore part of the proceedings.

4. Auxiliary request 2 - Article 123(2) EPC

The board has concluded that the requirements of Article 123(2) EPC are complied with for the following reasons:

4.1 Claim 1 at issue reads (amendments with respect to claim 1 as filed highlighted by the board):

"A method for treating lime mud, in which method lime mud is conveyed to a lime kiln, where fuel gas is used as fuel, which fuel gas is formed by a circulating fluidized bed gasifier, characterized in that a calcium compound a part of the lime mud is fed to the gasifier where it is used as bed material for the gasifier, the lime mud is calcinated partly or entirely in a process chamber of the gasifier, and calcinated lime mud is conveyed with the fuel gas to the lime kiln, wherein

the lime mud is taken from a chemical circulation of a pulp mill after causticization before the lime kiln."

4.2 For the board there is a basis in the application as filed (see for example page 3, line 15) for specifying that the "calcium compound" defined in claim 1 as filed corresponds to a part of the lime mud being treated (as defined in claim 1 at issue). The appellant has not contested this conclusion.

4.3 It however argued that the definition of a step of calcining the lime mud in the gasifier and conveying the product to the lime kiln could only be based on page 5, lines 10-20 as originally filed. This passage concerned the specific embodiment of figure 2, which included a number of features which were omitted in claim 1 at issue, such as the presence of a separating unit or that the entire bed material was formed from calcium-containing materials. The subject-matter of claim 1 was therefore based on an unallowable intermediate generalisation of the information in the application as filed.

Furthermore, the indication in claim 1 at issue that burnt lime was conveyed to the lime kiln implied that non-burnt lime mud was retained by a separating unit, so it was apparent that this unit was an essential part of the invention and should be defined in claim 1.

4.4 The board does not agree therewith because the passage on page 3, lines 15-19 of the description (reciting "*In an embodiment at least a part of the lime mud is fed to the gasifier. Thus, lime mud is calcinated partly or entirely and is conveyed with product gas to the lime kiln*"), and the indication on page 2, lines 33-34 that "*Lime mud is taken from the chemical circulation of a*

pulp mill after causticization before lime kiln",
provide a clear support for the amendments to claim 1
as filed.

It is also noted that the step of conveying the burnt
lime to the kiln does not imply that the non-burnt lime
mud is not conveyed or that it must be separated (the
claim is simply not restricted in this respect), so the
omission of the separating unit cannot be considered to
extend the scope of the claim beyond the content of the
application as filed.

4.5 The subject-matter of claim 1 is therefore supported by
the content of the application as filed.

5. Auxiliary request 2 - Inventive step

The board has concluded that the requirements of
Article 56 EPC are met for the following reasons:

5.1 Closest prior art

5.1.1 As in the previous requests, any one of documents D1
and D2 can be used as starting point.

5.1.2 The appellant argued that D1 and D2 implicitly included
the steps of calcining at least part of the limestone
in the gasifier and conveying the burnt lime to the
kiln, because this process was unavoidable. Thus, the
amendments to claim 1 at issue did not lead to any
further differentiating feature.

5.1.3 The board disagrees with this view because as indicated
above, the loss of particles from a fluidised bed is
normally undesired, so that means such as separation
units (e.g. the cyclone proposed in D2) are normally

used. Furthermore, even if it were considered unavoidable that at least some particles escape and reach the kiln, there is no reason to conclude that this would involve calcined lime particles rather than calcium carbonate or other particles from the gasifier.

- 5.1.4 The subject-matter of claim 1 therefore differs from documents D1 and D2 at least in that:
- i) the lime mud is taken from a chemical circulation of a pulp mill after causticisation before the lime kiln,
 - ii) the lime mud is calcinated partly or entirely in a process chamber of the gasifier, and
 - iii) calcinated lime mud is conveyed with the fuel gas to the lime kiln.

5.2 Problem solved by the invention

Unlike in the main request and auxiliary request 1, claim 1 at issue is restricted by a step of calcining at least part of the lime mud in the gasifier and conveying it to the kiln. Consequently, the arguments brought forward in point 1.3.2 above are no longer applicable.

The board considers that the partial calcination of the lime mud in the bed material and its conveyance to the lime kiln can plausibly be associated with a reduction of the fouling of the calcium oxide and with an increase of the capacity of the lime kiln for the reasons brought forward by the proprietor in point 1.3.1 above (see also par. [0014] of the patent). The problem solved by the invention is therefore to provide a method with a reduced fouling and an improved efficiency.

5.3 Obviousness of the solution

In the board's view, there is no hint or incentive in D1 or D2 to promote a generally undesirable process such as the calcination and conveyance of particles in the fluidised bed to the lime kiln. In fact, D1 and D2 teach away from this solution, because in both cases the limestone in the fluidised bed is configured to adsorb and eliminate noxious substance from the burnt fuel, so if the resulting particles (i.e. limestone with adsorbed contaminants) were allowed to reach the kiln, the fouling of the lime would not only not improve but would likely worsen.

The board therefore concludes that the subject-matter of claim 1 is not obvious and involves an inventive step over the cited prior art.

6. It is noted that the proprietor filed an adapted version of the description together with auxiliary claim request 2 (see submissions on 6 September 2019).

6.1.1 The appellant briefly indicated in its letter dated 26 March 2020 (see passage bridging pages 5 and 6 in point E) that the descriptions attached to each claim request were not adapted to the corresponding claims, and that the requirements of Article 84 EPC were therefore not complied with.

6.1.2 The board notes that no specific objection was raised by the appellant in this respect (i.e. a specific contradiction between the claims and the description), and that, consequently, this issue has not been addressed or discussed during the appeal stage.

7. The board thus concludes that the case should be remitted to the opposition division with the order to maintain the patent on the basis of auxiliary claim request 2 with a description to be adapted if necessary.

8. In view of the above conclusions, there is no need to decide on the admittance and/or allowability of the other auxiliary requests on file.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.

2. The case is remitted to the opposition division with the order to maintain the patent in amended form on the basis of the claims of auxiliary request 2 filed with the reply to the statement of grounds of appeal, and a description to be adapted where appropriate.

The Registrar:

The Chairman:



A. Pinna

J.-M. Schwaller

Decision electronically authenticated