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**Datasheet for the decision
of 7 March 2023**

Case Number: T 0981/20 - 3.3.06

Application Number: 13705801.2

Publication Number: 2820189

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D21H17/37, D21H17/00

Language of the proceedings: EN

Title of invention:

PROCESS FOR THE MANUFACTURE OF PAPER AND PAPERBOARD

Patent Proprietor:

BASF SE

Opponent:

Kemira OYJ

Headword:

Flocculation/BASF

Relevant legal provisions:

EPC Art. 56, 123(2)

RPBA 2020 Art. 12(3), 12(5)

Keyword:

Inventive step - main request (no) - auxiliary request (yes)
Reply to statement of grounds of appeal - Substantiation of
auxiliary request - Admitted (Yes)
Amendments - allowable (yes)

Decisions cited:

Catchword:



Beschwerdekammern

Boards of Appeal

Chambres de recours

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Case Number: T 0981/20 - 3.3.06

D E C I S I O N
of Technical Board of Appeal 3.3.06
of 7 March 2023

Appellant: Kemira OYJ
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Decision under appeal: **Decision of the Opposition Division of the
European Patent Office posted on 21 February
2020 rejecting the opposition filed against
European patent No. 2820189 pursuant to Article
101(2) EPC.**

Composition of the Board:

Chairman J.-M. Schwaller
Members: S. Arrojo
C. Heath

Summary of Facts and Submissions

- I. An appeal was filed by the opponent against **the decision of the opposition division to reject the opposition against European patent No. 2 820 189**, claim 1 thereof (**main request**) reading:

"1. A process of making paper, board or paperboard in which a cellulosic thin stock is provided and subjected to one or more shear stages and then drained on a moving screen to form a sheet which is dried, wherein the process employs a treatment system which is applied to the thin stock, said treatment system comprising as components,

a) a cationic organic polymer of charge density of at least 3.0 meq/g with a molar mass M_w of up to 3 million Daltons or poly aluminium chloride (PAC),

b) a cationic polymer having an average molar mass M_w of at least 500,000 Daltons and a charge density not exceeding 4.0 meq/g;

c) a microparticulate material;

in which components (b) and (c) are added to the cellulosic thin stock after the last shear stage before the head box and component (a) is added to the cellulosic thin stock before said last shear stage."

- II. In its grounds of appeal, the appellant requested to set aside the above decision arguing that the invention was insufficiently disclosed, the claimed subject-matter was not novel in view of either of documents K1 (WO 2008/033490 A1), K4a (A. Swerin, Dissertation "Flocculation and fibre network strength in papermaking suspensions flocculated by retention aid systems", 1995) or K12 (Wågberg et al, "On the mechanism of flocculation by microparticle retention-aid systems",

Tappi J., 1996), and not inventive in view of K4a alone, in the light of common general knowledge or combined with the teachings of K5 (EP 0 335 575 A2); or alternatively in view of K12 alone or in combination with K4a, or of K1 alone or combined with common general knowledge.

- III. In its reply filed on 5 November 2020, the patent proprietor and respondent requested that the appeal be dismissed and the patent be maintained as granted or, as an auxiliary measure, in amended form on the basis of the claims according to one of auxiliary requests 1 to 24 filed therewith (corresponding to auxiliary requests 1 to 24 filed before the opposition division).
- IV. The board issued a preliminary opinion indicating that the subject-matter of claim 1 of the main request did not appear to be inventive in view of document K1. The board also pointed out that since the parties had not presented any arguments regarding the allowability of auxiliary requests 1 to 24, it was not clear whether said requests were substantiated on the one hand, and objected to on the other hand.
- V. At the oral proceedings, which took place on 7 March 2023, the proprietor withdrew auxiliary requests 1 to 12.

Claim 1 of **auxiliary request 13** corresponds to that of the main request with the following amendment (highlighted by the board): *"a) a cationic organic polymer of charge density of at least 3.0 meq/g with a molar mass M_w of 750,000 Daltons to up to 3 million Daltons ~~or poly aluminium chloride (PAC)~~,"*

The final requests of the parties were as follows:

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

The respondent requested that the appeal be dismissed, or alternatively, that the patent be maintained on the basis of one of auxiliary requests 13 to 24 filed on 15 February 2019 and re-filed with the reply to the grounds of appeal on 5 November 2020.

Reasons for the Decision

1. Main request - Inventive Step

The board considers that the opposition ground under Article 100(a) EPC in relation to Article 56 EPC prejudices the maintenance of the patent as granted for the following reasons:

1.1 Closest prior art

1.1.1 The appellant formulated attacks starting from K1, K12 or K4a as closest prior art.

1.1.2 Document K1 discloses a method for manufacturing paper in a machine as disclosed in figure 1 including the addition of one or several flocculants, a micropolymer and a microparticle. This document discloses (see paras. [0046]-[0047], [0063], [0065] and [0073] to [0075]) that in some preferred embodiments, a flocculant is added before the last shearing stage and that the micropolymer and microparticle are added after the last shearing stage. More specifically, the exemplary embodiment in paras. [0073] to [0075] relates to a four flocculant component system comprising the addition of a first water-soluble cationic flocculant polymer, an organic micropolymer and a siliceous

material respectively corresponding to components a), b) and c) in claim 1 as granted, wherein the first component is added before the last shearing stage and the other two components are added simultaneously or sequentially after the last shearing stage. While this system also includes the addition of a further coagulant/flocculant, claim 1 at issue does not exclude this possibility, as it defines a "system comprising as components ...".

The appellant argued that it was clear in view of the exemplary substances in table 1 of K1 that the polymers in the preferred embodiments of this document fell within the scope of claim 1.

The board disagrees because paras. [0073] to [0075] fail to provide a direct and unambiguous indication of the charges and molecular masses of the flocculant and the micropolymer, and not all the preferred polymers in table 1 (or in paras. [0067] to [0072]) fall within the scope of claim 1 at issue.

- 1.1.3 Document K4a is a dissertation including several papers testing different flocculation and retention systems. Figure 4 on page 16 provides a schematic view of the experimental FEX machine used to perform the different tests. The schematic view of the machine includes three points of addition (Dk8, Dk2 and Dk15), wherein Dk8 is upstream of the last pump in the circuit and Dk2 and Dk15 are downstream of this pump. Paper IV discloses a retention system including (par. bridging pages 138 and 139) the addition of a DADMAC polymer, a cationic polyacrylamide (from now on "C-PAM") and a montmorillonite clay respectively falling within the scope of components (a), (b) and (c) in claim 1. The paper further refers to the residence time of the

different components (see page 140), from which it can be deduced that the DADMAC is added first, followed by the addition of the C-PAM and of the montmorillonite. There is however no direct indication in paper IV that the addition of the different components takes place before or after the last shearing stage.

The appellant argued that the experiments in paper IV had been carried out in the FEX machine disclosed in figure 4, with the pump between Dk8 and Dk2 representing the last shearing stage. The appellant further referred to the test in paper V, which was also carried out with the FEX machine in figure 4, to argue why it could be deduced that the residence times of the different components in paper IV necessarily corresponded to the points of addition DK8, DK2 and DK15 in figure 4.

The argumentation of the appellant however relies on a number of assumptions. First, there is no reference in paper IV or V to the points of addition Dk8, Dk2 and Dk15, so it must be assumed that the substances are indeed added at these points of the circuit. Second, there is no clear indication that the pump represents the last shearing point, as it cannot be discarded that the circuit includes other shearing points not shown in figure 4 or even integrated in the circuit of figure 4 (e.g. a mixing/shearing chamber in Dk2 or Dk15). Third, the deductions made from the residence times in papers IV and V do not appear to lead to clear conclusions. For example, the appellant's argument that both the cationic starch in paper IV and the DADMAC in paper V are added at point Dk8 is contradicted by the fact that the residence time of the former is 15 seconds while that of latter is 30 seconds. Document K4a is thus not

considered to directly and unambiguously anticipate the sequence of addition proposed in claim 1.

- 1.1.4 Document K12 discloses an experimental process for testing a retention system (figure 1 on page 158), wherein a DADMAC polymer falling within the scope of component a) in claim 1 is added to a thin stock in a storage tank, the stock then flows through a pump, and C-PAM and montmorillonite respectively falling within the scope of components b) and c) in claim 1, are added to the stock through dosage stations 1 and 2 (page 159, middle col.). The resulting stock is then tested to estimate the flocculation index.

The appellant argued that it was clear that the experimental set-up anticipated the sequence of addition of the invention and was intended to be implemented in a paper-making process, so K12 anticipated the subject-matter of claim 1.

The board agrees that K12 describes an experimental set-up with a sequence of addition of the substances which is analogous to that proposed in claim 1. While it is apparent that the idea in this document is to use the results from the experimental set-up to design a papermaking system, this would require significant modifications, not only in terms of scale and operating conditions, but also by adding certain steps and elements which are absent in the experimental set-up. There is no implicit or explicit indication to support the conclusion that the papermaking process designed on the basis of the experimental set-up in K12 would anticipate the sequence of addition proposed in claim 1 at issue, as it cannot be discarded that the system would include additional shearing stages such as mixing chambers or pumps.

1.1.5 In view of the above considerations, the board has concluded that K1 represents the closest prior art, as it is the only document which anticipates the sequence of substance addition proposed in claim 1 at issue. Documents K4a and K12 do not represent promising springboards, because they do not disclose the sequence of addition of the substances with respect to the last shearing stage. In fact, since the shearing stages do not play any significant role in these documents, there would be no incentive to consider using the sequence of addition of the invention.

1.1.6 The board thus considers that the embodiment in paras. [0073] to [0075] represents the closest prior art.

As concluded in point 1.1.2 above, claim 1 at issue differs from this embodiment in the specific identity (i.e. molecular weight and charge ranges) of the polymers forming the retention system.

1.2 Problem solved according to the patent

According to par. [0015] of the patent, the proposed sequence of addition provides an improved retention system without negatively impacting the final paper properties, so the problem solved by the invention would be to provide a papermaking process with an improved retention system without negatively impacting the paper properties.

At the oral proceedings, the patent proprietor argued that the problem solved was to provide a process with an improved retention of fines.

1.3 Non-success of the solution and reformulation of the problem

The board notes that the example in paras. [0062] to [0067] and in particular the measurements in table 1 of the patent show that the proposed sequence of addition gives rise to an improved first ash retention. This sequence of addition is however anticipated in document K1, so there is no basis to conclude that the invention provides the effect of an improved retention. There is also no evidence on file that the broad ranges for the charge and molecular weight of the polymers defined in claim 1 would provide any specific technical effect, or that the properties of the final paper are improved or maintained in any way.

The invention can therefore not be considered to successfully solve the problem as presented in the patent or as proposed by the proprietor, but should be reformulated less ambitiously in the provision of an alternative paper manufacturing process.

1.4 Obviousness of the solution

1.4.1 The proprietor argued that document K1 included a large number of alternatives, many of which were presented as "preferred" or "advantageous" options. For example, while the cited embodiment in par. [0073] proposed the sequence of addition of the invention, par. [0076] indicated that it was advantageous to add all the substances after the last shearing stage, in particular when the flocculant and the organic micropolymer had the same charge. Consequently, when two cationic polymers were added, as it was the case in the underlying invention, the skilled person would have an incentive to add both of them concurrently after the last shearing stage.

1.4.2 The board disagrees therewith because the relevant embodiment in paras. [0073] to [0075] of K1 includes the steps of adding: i) a water soluble cationic flocculant, ii) an additional coagulant/flocculant, iii) a micropolymer and iv) a siliceous material, wherein the micropolymer and the siliceous material are added after the last shearing stage. The proprietor's argument concerning par. [0076] is not considered to be relevant, because as indicated at the beginning of this paragraph, the information therein relates to "another embodiment". The subsequent information concerning the sequence of addition for a linear synthetic polymer and the organic micropolymer of like charge is also not relevant, as this is not a general teaching of document K1 but a specific one relating to these substances within the narrow context of the embodiment in par. [0076].

In the board's view, the embodiment of paras. [0073] to [0075] in K1 represents a specific form of the four components system described in paras. [0067] to [0072]. In particular, paras. [0067] to [0072] disclose a flocculation system comprising four flocculant components and provides some examples for these flocculant components. The "exemplary embodiment" in paras. [0073] to [0075] refers to the order of addition of the four flocculant components, so it is apparent that it is an exemplary embodiment of the system described in the preceding paragraphs.

According to par. [0069], the water soluble cationic flocculant in this system is advantageously one with a "low molecular weight of relatively high ionicity" which is regarded as a direct hint to work within the molecular weight and charge ranges of component (a) in claim 1, because a molar mass of up to 3 million

Daltons is a broad way of defining a low molecular weight, and a charge density of at least 3.0 meq/g corresponds to a relatively high ionicity.

Furthermore, according to the end of par. [0044] in K1, the micropolymers in this document correspond to those described in document K2 (US 5,480,934), which have a molecular weight of at least 5×10^5 Daltons, therefore falling within the corresponding range of component (b) (see abstract of K2). Consequently, the only aspects which are not derivable from this embodiment is that the micropolymer is cationic and that it has a ionicity not exceeding 4.0 meq/g.

- 1.4.3 In the board's view, a skilled person looking for an alternative process would turn to table 1 of K1 to select appropriate micropolymers and in doing so it would have several options, some falling within the scope of claim 1, such as CatMP or CatMP-SS and some not (e.g. ANMP or ANMPP).

Since the only problem solved by the invention is that of providing an alternative process, the board has concluded that the selection of the polymers in table 1 of K1 falling within the scope of claim 1 at issue is obvious from the known state of the art and thus cannot be considered to be inventive. In other words, a skilled person looking for alternative paper manufacturing methods would arrive at the subject-matter of claim 1 in view of the teachings in K1 and without exercising inventive skills.

The subject-matter of claim 1 as granted is therefore not considered to be inventive in view of document K1.

2. Admittance of auxiliary request 13

2.1 This request was filed in response to the notice of opposition on 15 February 2019 during first instance proceedings and re-filed with the reply to appeal on 5 November 2020. As noted by the board in the preliminary opinion, the reply does not appear to include any argument indicating why this request would overcome the outstanding objections.

2.2 The appellant argued that the reply to appeal did not include the entire case pursuant to Article 12(3) RPBA 2020, because no argument had been submitted to substantiate why the request would meet the requirements of the EPC. Moreover, no basis had been provided for the amendments. The request should therefore not be admitted under Article 12(5) RPBA 2020.

2.3 The board notes that the proprietor filed auxiliary request 13 in its response to the notice of opposition on 15 February 2019 and indicated that the amendments were intended to further differentiate the subject-matter of the claims from the documents cited by the opponent. The submission also included the basis for the amendments.

The opponent did not respond to these arguments in its subsequent letter and the opposition division decided to maintain the patent as granted, so the auxiliary requests were not further discussed. Moreover, the opponent did also not present any objection against auxiliary request 13 in its written submissions during the appeal proceedings.

2.4 The board however observes that the amendments to claim 1 at issue are simple, as they only involve the

deletion of one alternative and the addition of a lower limit for the molecular mass of component a).

Further, the basis for the amendments in this claim is readily apparent and can also be found in the letter accompanying the auxiliary requests during first instance proceedings.

Finally, at the oral proceedings, the discussion of patentability (carried out before the discussion on admittance) was conducted on the basis of the same evidence and using analogous arguments to those presented for the main request.

2.5 In view of the above facts, the board sees no reason to exercise its discretion under Article 12(5) RPBA 2020 not to admit auxiliary request 13.

3. Auxiliary request 13 - Article 123(2) EPC

3.1 Claim 1 of this request has been amended *inter alia* by adding a bottom end value of 750,000 Daltons for the molar mass of the cationic organic polymer defined in point a). A basis for this value can be found on page 5, line 24 of the description as filed.

3.2 The appellant argued that the paragraph on page 5, lines 21 to 27 included multiple alternatives for the top and bottom end values of the molar mass of the cationic organic polymer. The range of 750,000 to 3 million Daltons therefore required two selections from a list of alternatives. Since there was no teaching that this combination was preferred, the amendment extended beyond the content of the application as originally filed.

3.3 The board disagrees with this argumentation, because the top end value of 3 million Daltons for the molar mass of component a) in claim 1 at issue was already defined in claim 1 as filed. The only amendment being thus the addition of the bottom end value of 750,000 Daltons, it is allowable because it is based on a single selection from a list and not on two selections as argued by the appellant.

3.4 The subject-matter of claim 1 thus meets the requirements of Article 123(2) EPC.

4. Auxiliary request 13 - Inventive step

4.1 Closest prior art and problem solved

Both parties agreed that the embodiment in paras. [0073] to [0075] of K1 represented the closest prior art.

The subject-matter of claim 1 differs therefrom in the specific identity (i.e. molecular weight and charge ranges) of the polymers forming the retention system.

The problem solved by the invention is, as in the main request, to provide an alternative papermaking process.

4.2 Non-obviousness of the solution

4.2.1 The appellant argued that since the main request had been considered to be obvious in view of K1, claim 1 at issue should also be regarded as non-inventive because the restriction to the molecular mass did not provide any inventive contribution and could also not be regarded as a selection invention. Moreover, the defined molar mass range was still very broad and did

not clearly exclude the "relatively low molecular weight" proposed in par. [0069] of K1. Additionally, par. [0069] also indicated that the intrinsic viscosity of the flocculant was up to 3 dl/g, which according to K3 (Extract from the Handbook of Size Exclusion Chromatography (2009)) corresponded to a molecular weight of up to 1.2 million g/mole (see page 251, table 5).

4.2.2 The board disagrees with this argumentation because according to par. [0069] of K1 the skilled person has to select a flocculant with a relatively low molecular weight and an intrinsic viscosity up to 3 dl/g. While it is true that for some polymers an intrinsic viscosity of around 3 dl/g can be associated with a molecular weight falling within the claimed range, there is no explicit instruction to work within the upper portion of the open-ended range of "up to 3 dl/g". In other words, while the broad range given for the intrinsic viscosity might indicate that the molecular weight range in claim 1 is not directly discarded in this embodiment of K1, the additional instruction to select polymers with a relatively low molecular weight is considered to teach away from the selection of flocculants falling within the claimed range (i.e. at the higher end of the range "up to 3 dl/g").

It follows that to arrive at the subject-matter of claim 1 the skilled person would need to make several selections: first, the selection of a flocculant with a relatively high molecular weight (higher than 750,000 g/mole) despite the instruction to select polymers with a relatively low molecular weight in par. [0069]; and second, the selection of a cationic micropolymer with the required charge among the different alternatives in table 1 of K1 as discussed in point 1.4.3 above.

Despite the fact that the only problem solved by the invention is that of providing an alternative papermaking process, the board considers that a skilled person would not arrive at the claimed subject-matter in an obvious manner, as this would require several selections as discussed in the previous paragraph, with one of them going against the explicit teachings in K1.

4.2.3 Claim 1 is also not considered to be obvious in view of K4a or K12, as there is no incentive to consider the sequence of addition proposed in claim 1 at issue when starting from these documents (see point 1.1.5 above).

4.2.4 The subject-matter of claim 1 is thus considered to be inventive in view of the cited prior art.

5. Since the opponent did not raise any additional objection against auxiliary request 13, the board concludes that this request meets the requirements of the EPC.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.
2. The case is remitted to the department of first instance with the order to maintain the patent in amended form on the basis of auxiliary request 13 filed on 15 February 2019 and re-filed with the reply to the grounds of appeal, and a description to be adapted where appropriate.

The Registrar:

The Chairman:



A. Pinna

J.-M. Schwaller

Decision electronically authenticated