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D E C I S I O N
of 25 January 2006

Case Number: T 0780/03 - 3.3.03

Application Number: 97200082.2

Publication Number: 0786475

IPC: C08B 31/00

Language of the proceedings: EN

Title of invention:
Modification of cationic starch

Applicant:
Eka Chemicals AB

Opponent:
-

Headword:
-

Relevant legal provisions:
EPC Art. 54(2)

Keyword:
"Novelty - common general knowledge (yes)"
"Novelty - implicit disclosure (yes)"

Decisions cited:
T 0012/81, T 0153/85

Catchword:
-

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Case Number: T 0780/03 - 3.3.03

D E C I S I O N
of the Technical Board of Appeal 3.3.03
of 25 January 2006

Appellant: Eka Chemicals AB
S-445 80 Bohus (SE)

Representative: Vikholm, Tommy
Eka Chemicals AB
P.O. Box 11556
S-100 61 Stockholm (SE)

Decision under appeal: **Decision of the Examining Division of the European Patent Office posted 31 January 2003 refusing European application No. 97200082.2 pursuant to Article 97(1) EPC.**

Composition of the Board:

Chairman: R. Young
Members: A. Däweritz
E. Dufrasne

Summary of Facts and Submissions

I. European patent application No. 97 200 082.2, filed on 13 January 1997 and claiming the priority of 26 January 1996 of an earlier application in Sweden (9600285) was refused by a decision of the Examining Division dated 31 January 2003. The decision was based on a set of five claims submitted with the Applicant's letter dated 5 July 2002, reading as follows:

"1. A method for improving retention and/or dewatering in papermaking, in which an aqueous solution of cationic starch is added to an aqueous suspension of lignocellulosic fibres, whereafter a sheet or web is formed of the fibres by dewatering the suspension, characterised in that an aluminium compound is added to a content of aluminium compound of at least 0.005% calculated on the basis of dry cationic starch to an aqueous solution of cationic starch containing anionic groups before the solution is added to the suspension, with the proviso that no epoxide is added to the solution if the aluminium compound is an alkali aluminate and the solution is alkaline and the temperature of the solution is between 5 and 40°C; and in that the process further comprises adding anionic silica based particles to the suspension.

2. A method according to claim 1, characterised in that the anionic groups are phosphate, sulphate, or carboxylate groups.

3. A method according to claim 1 or 2, characterised in that an aluminium compound is added directly to the suspension prior to, simultaneously with, or after addition of the starch solution to the suspension.

4. A method according to claim 3, characterised in that the proportion between the amount of aluminum added directly to the suspension and the amount of aluminum added to the starch solution before the solution is added to the suspension is 1000:1-1:50.

5. A method according to any of claims 1 to 4, characterised in that the anionic inorganic particles are silica based particles."

The suspension of "lignocellulosic" (present Claim 1, above) or "cellulose" (D4, see next paragraph, below) fibres will be referred herein to as "the stock" (D4: page 4, lines 39/40; application as filed: page 4, lines 17/18; *EP-A-0 786 475: page 3, lines 33 to 35*).

II. Whilst accepting in its decision that these claims met the requirements of Article 123(2) EPC and were novel over each of documents (as numbered in the Facts and Submissions of the decision)

D1: US-A-3 136 646,
D2: Derwent WPI Abstract of CA-A-739 365
D3: Derwent WPI Abstract of JP-A-06-092 629 and
D4: EP-A-0 490 425,

the Examining Division held, that the claimed subject-matter did not involve an inventive step. This finding

was based on the combination of D1 and a document identified in the Reasons for the Decision as "D3", with additional consideration of a further document, which had been referred to in both "D3" and the application in suit and will be referred to herein as

D7: EP-A-0 303 039.

In particular, the decision under appeal held that the disclosure of the closest prior art, D1, differed from the claimed subject-matter by the fact that no anionic silica based particles had been added to the suspension of the document. It was, however, held that the use of the composition of D1 for sizing in paper industry had implied that it conferred good retention and/or dewatering properties to the manufactured paper.

The technical problem to be solved was seen in the finding of an alternative method for improving the retention and/or dewatering in papermaking.

As "D3" taught that cationic starch containing aluminium in combination with anionic silica base inorganic based particles acted as a retention and dewatering system in paper manufacture, the Examining Division concluded that there was an incentive for the skilled person to combine the teachings of D1 and "D3" and, thus, to solve the above technical problem by adding anionic silica based inorganic particles to the lignocellulosic suspension. "Furthermore, the fact of adding anionic silica based inorganic particles is of common use in the field and is thus deemed to be obvious in the absence of a surprising effect linked to its use.".

Particular reference was made in this passage of the decision to a number of passages in "D3", *viz.* to Claim 7, page 2 (line 41 to 43), page 4 (lines 30 to 35), page 4, line 57 to page 5, line 1, page 5 (lines 5 to 11), Example 1, and also to page 2 (lines 50 to 51), according to which the cationic starches used therein had been produced by the process of D7. Moreover, D7 itself stated that its composition was useful as a retention agent and as an additive for sizing paper.

An experimental report, submitted with the Applicant's letter of 3 October 2001, was found not to have proved any surprising effect over D1, because its results were in fact based on the use of potato starch. This type of starch had, however, already been mentioned in the prior art, eg in D1 (column 7, line 32), D2 (the abstract) and "D3" (page 2, line 42) and could not, therefore, support an inventive step either.

III. On 14 March 2003, a Notice of Appeal against the above decision, was lodged by the Appellant (Applicant). The prescribed fee was paid on the same date. In the Statement of Grounds of Appeal received on 10 June 2003, the Appellant filed a new Main Request and two auxiliary requests and contested the findings of the Examining Division concerning inventive step.

The set of claims according to the Main Request was identical to Claims 1 to 4 of the request, on which the decision under appeal had been based (ie the "previous claims" as quoted in section I, above).

The first Auxiliary Request contained three claims, ie a new Claim 1 on the basis of the combination of the features of previous Claims 1 and 2, followed by Claims 2 and 3 corresponding to previous Claims 3 and 4.

Thus, in Claim 1, the formulation ", and that the anionic groups are phosphate, sulphate, or carboxylate groups," had been inserted between "... solution of cationic starch containing anionic groups" and "before the solution is added ...".

The second Auxiliary Request differed from the new Main Request by the addition of the passage "and adding an aluminium compound directly to the suspension prior to, simultaneously with, or after addition of the starch solution to the suspension" at the end of Claim 1. This claim was followed by Claims 2 and 3 corresponding to previous Claims 2 and 4.

The Appellant assumed that the reference to document "D3" in the reasons for the decision under appeal was erroneous and that the Examining Division had rather meant D4 (as identified in the list in section II, above), which the Appellant considered as representing the closest state of the art.

Whilst deriving from D4 that good retention and dewatering effect would be obtained when an aluminium compound, cationic starch and silica based particles were added to the suspension, nevertheless, the skilled person would not arrive at the claimed subject-matter as defined in the characterising part of Claim 1 (cf. section I, above). By contrast, D4 would disclose in its Examples 1, 4, 5, 6 and 7, that the best effects

were obtained when adding the aluminium compound prior to adding the cationic starch and the silica-based particles to the fibre suspension. The Appellant concluded that D4 did not render the claimed subject-matter obvious.

The Appellant also discussed the other documents mentioned in the decision under appeal including D1, D3 and EP-A-0 303 039 and concluded, that the skilled person would neither combine the teachings of D4 and D1 nor those of D4 and D3 (as identified and listed in the first paragraph of section II, above) when trying to provide a solution for the existing technical problem "to provide a papermaking process with improved retention and/or dewatering" (Statement of Grounds of Appeal: page 2, lines 1 and 2). These arguments would be valid for the Main Request as well as for both Auxiliary Requests.

IV. In a communication dated 8 July 2005, the Appellant was informed about the preliminary, provisional view of the Board as to the findings in the decision under appeal and the situation of the case as regards the requests on file, *inter alia* with regard to the question of novelty. Those passages of the communication, which are most relevant for this decision and will be referred to herein below as the "preliminary view", read as follows:

"4. In the introduction of the description (page 1, line 15 *et seq.*), reference is made (i) to the process of D7, which related to the dry cationisation of starch with nitrogen containing alkylene epoxides in specific conditions, and (ii) to D4 (EP-A-0 490 425), in the

examples of which, cationic starch prepared according to the process of D7 had been used.

The drawbacks associated with this prior art, which drawbacks shall be avoided by the subject-matter according to the application in suit as originally filed, are addressed on page 2, line 4 of the application, ie (a) the 'highly reactive' epoxides being hazardous to health and environment and (b) difficulties encountered if the modification process of D7 is to be incorporated into any conventional paper process. Consequently, Claim 1 as originally filed concerned a process for the modification of cationic starch by treatment with an aluminium compound, which process required that, if alkali aluminate was used as the aluminium compound and the treatment was carried out in an alkaline medium at temperatures of between 5 and 40°C (as in D7), the absence of 'highly reactive' (page 1, line 26 of the present description) alkylene epoxide was mandatory.

However, Claim 1 under consideration relates neither to the preparation of a cationic starch nor to the modification of cationic starch, but to a particular embodiment of a paper making process for the purpose of improving the retention and/or the dewatering of an aqueous suspension of lignocellulosic fibres when forming a sheet or web.

This embodiment involves the addition of an aluminium compound to an aqueous solution of a cationic starch before this solution is fed to the aqueous suspension of the fibres. Thus, the aqueous solution of the

cationic starch is one of the starting materials of the claimed method.

The proviso further contained in Claim 1 excludes the addition of an epoxide to 'the solution' in specific pH and thermal conditions as defined in the characterising part of the claim. In other words, this term 'the solution' has its antecedent in the 'aqueous solution of cationic starch containing anionic groups before the solution is added to the suspension' of lignocellulosic fibres and, thus, refers to a feature different from that discussed in the introduction of the description and contained in original Claim 1 (cf. the first paragraph of this section, above).

In other words, the disclaimer in Claim 1 under consideration does not exclude any method for the preparation of the aqueous solution of a cationic starch mentioned in the previous paragraph as used in the claimed method as a starting compound, let alone a solution as obtained by the process of D7 (see page 2, lines 24 to 26 of the present description). It only excludes the addition of further epoxide in the papermaking process.

5. Consequently, the problem underlying the application must be defined in a way different from the wording as suggested on page 2, lines 3 to 5 of the application, if it exists at all.

Furthermore, no evidence is available that, in fact, the retention and/or dewatering is improved and any drawbacks in the prior art as addressed on page 1 of the description are avoided, respectively. Neither

Example VIII nor any one of Examples 1 to 7 as contained in the application provides any information to this end. Again reference must be made to page 2, lines 24 to 26 of the present description, since it must be expected that when cationic starch prepared according to D7 is used in a process as known from D4 or in the claimed method, the results would be the same (cf. T 12/81, OJ EPO 1982, 296).

6. The Board concurs with the opinion of the Appellant (Statement of Grounds of Appeal, page 4, first complete paragraph) that D4 is the closest state of the art, because it also aims at the improvement of the retention and dewatering in a process of making, in its broadest sense, paper (D4: page 2, lines 1 to 5).

To this end, the process of D4 includes the addition of a cationic starch or a cationic galactomannan containing at least 0.01 % by weight of aluminium and anionic inorganic particles (Claim 1), in particular Bentonites or silica based particles (D4: page 3, line 28 to page 4, line 29). It is further stated in D4 (page 2, lines 36 to 38), with reference eg to D7, that cationic carbohydrates of the above types containing aluminium have previously been known. Furthermore, on page 2, lines 41 to 43, a number of possible sources for the starch are listed in D4 which are the same as those listed on page 2, lines 20 and 21 of the application in suit. However, D4 does not refer to the presence of specific anionic groups, such as those listed in present Claim 2 (or on page 2, lines 22 to 24), in the starch, in particular in the preferred potato starch.

However, the presence of such anionic groups is apparently inherent to native potato starches as indicated in the description of Example 6 of the application. Cationic starches prepared from such conventional native potato starches were used not only in Example 1 of the application, but also in Examples 2 to 5, in the experimental report, filed with the letter dated 3 October 2001, and in the examples of D7 (page 5, lines 1 and 2) and of D4 (see page 5, lines 30 to 33). Moreover, as discussed in section 4, above, neither the modification of the native starch according to D7, nor the use of such products in D4 is excluded from the present claims.

In view of the above facts and findings, it would appear that the subject-matter of the present claims lack novelty vis-à-vis D4."

V. In reply to a request dated 15 September 2005 for an extension of time of additional two months "to file its observations on this communication", the Board issued summons, dated 29 September 2005, to oral proceedings to be held on 25 January 2006.

Then, by letter of 23 January 2006, received on the same date, the Appellant withdrew its request for oral proceedings and requested that the proceedings be continued in writing. If this request was rejected, it informed the Board that it would neither attend the hearing, nor be represented thereat.

VI. The oral proceedings were held on 25 January 2006 in the absence of the Appellant and on the basis of the

substantive requests of the Appellant as identified in section III, above.

Reasons for the Decision

1. The appeal is admissible.

2. The Appellant has been summoned in due time (section V, above). Moreover, although the time limit set in the communication of 8 July 2005 had thus been replaced by the date of the oral proceedings (26 January 2006), thus giving the Appellant altogether more than 6 months from the receipt of the communication (Rule 78(2) EPC) to comment on the arguments contained therein, the Appellant has neither filed any observations to any one of the issues addressed therein, nor has it given any reasons for not providing such observations even in its letter dated 23 January 2006, ie only two days before the oral proceedings.

   Therefore, the Board saw no reasons for a further continuation of these proceedings in writing, but it decided to hold the oral proceedings as scheduled in the absence of the Appellant in accordance with Rule 71(2) EPC.

   Main Request

3. As set out in section IV, above, serious doubts had been raised in the communication of 8 July 2005 *inter alia* as to lack of novelty.

3.1 Before turning to the assessment of novelty, it is, in the Board's opinion, necessary to assess the meaning and the scope of the claims, in particular in regard of the negative feature or disclaimer contained in Claim 1 ("with the proviso … and 40°C", cf. section I, above).

The Board sees no reason, namely in the absence of any comments thereon by the Appellant (section 2, above), which would show that, in this respect, the preliminary view as presented in item 4 (section IV, above) was wrong and, therefore, could or should not be maintained.

Consequently, the Board takes the view that this negative feature cannot serve, for the reasons given in the preliminary view, to delimit the claimed subject-matter properly from the prior art.

3.2 Like the Appellant, the Board considers D4 as the most relevant piece of the state of the art, which had erroneously been addressed in the reasons for the decision under appeal as "D3", as is evident from the references listed in section II, above, third last paragraph.

3.2.1 Document D4 relates to "A process for the production of cellulose fibre containing products in sheet or web form from a suspension of cellulose containing fibres, and optional fillers, which comprises addition of anionic inorganic particles and a cationic carbohydrate polymer to the suspension, forming of the suspension on a wire and drying, characterized in that to the suspension are added anionic inorganic particles and a cationic carbohydrate polymer which is a cationic starch or a cationic galactomannan having a degree of

substitution of at least 0.02 and containing at least 0.01 per cent by weight of aluminium." (Claim 1).

Moreover, in the first paragraph of the description, particular reference is made to the production of paper, "whereby inorganic particles and a cationic polymer are used for improving retention and dewatering".

3.2.2 Apart from the minimum amount of aluminium as defined in Claim 1 of D4, "The aluminium content is suitably at least 0.02 per cent by weight and the preferred range is from 0.05 to 5 per cent by weight and especially from 0.1 to 1.5." (D4: page 2, lines 35/36). These amounts clearly comply with the corresponding requirement ("at least 0.005%") in present Claim 1.

Furthermore, according to page 2, lines 50/51, of D4, "Advantageously cationic starch prepared using alkali aluminate as disclosed in the European patent application 303039 is used in the present process." and, in addition to this reference, the same document D7 is also referred to on page 2, lines 38 and in Example 1 (page 5, lines 30 to 33) of D4.

3.2.3 With regard to the other essential component of the process according to present Claim 1 (as defined in the characterising part thereof), reference can be made to (i) page 3, lines 28 to 32 of D4: "The anionic inorganic particles which are used are previously known for use in papermaking. ... Bentonites and silica based particles are preferred. The anionic inorganic particles are added to the cellulose fibre containing suspension in the form of aqueous dispersions.", and to (ii) Claim 7 of the document: "A process according to

claim 1, characterized in that the anionic particles are silica based particles.".

3.3 In view of these facts and findings, the Board takes the view that there is only one feature in Claim 1 of the application in suit, which has no explicit counterpart in D4 and might, thus, possibly amount to a distinguishing feature over D4, ie the requirement that the cationic starch contains anionic groups.

3.3.1 As pointed out above (section 3.2.2, above), D4 contains, however, more than one clear reference to the use of a cationic starch prepared by the process of D7.

3.3.2 In T 153/85 (OJ EPO 1988, 001; in particular, in No. 4.2 of the reasons), the Board had stated that "in a case ..., where there is a specific reference in one prior document (the 'primary document') to a second prior document, when construing the primary document (i.e. determining its meaning to the skilled man) the presence of such specific reference may necessitate that part or all of the disclosure of the second document be considered as part of the disclosure of the primary document." This has been established jurisprudence ever since (cf. "the Case Law of the Boards of Appeal of the European Patent Office", 4th Edition 2001, chapter I.C.3.1), and is applicable here as well, namely in view of the reference in the description of Example 1 of D4 to D7 (see section 3.2.2, above).

3.3.3 As acknowledged in the Statement of Grounds of Appeal (page 3, line 1), D7 relates to cationisation of starch. The product of this known process can then be used for

example as auxiliary retention aids, as additives to the mass in the manufacture of paper for improving the paper strength and in the glue press in the manufacture of paper (D7: page 4, lines 8 to 10), ie in the same field of the art and at least in part for the same purpose.

Whilst, according to the description (D7: page 2, lines 52 to 54), "Zur Herstellung kationischer Stärkeäther nach dem erfindungsgemäßen Verfahren können native oder modifizierte Stärke oder Stärke enthaltende Substanzen beliebiger Herkunft eingesetzt werden. Mit besonderem Vorteil wird native Weizen-, Mais-, Tapioca- oder Kartoffelstärke verwendet." (Native or modified starch or starch containing substances of any conventional origin can be used for preparing cationic starch ethers according to the method of the invention. Native wheat, corn, tapioca or potato starch is used with particular advantage.), particular emphasis was made to native potato starch in the generally applicable data ("Allgemein gültige Angaben") describing the details of the process carried out in the examples of D7 (page 5, lines 1 to 13).

3.3.4 As mentioned in sections 3.2.2 and 3.3.2, above, reference was made to D7 in Example 1 of D4. The relevant passage reads as follows: "The cationic starch used was one ... containing aluminium in an amount of 0.3% by weight (Starch A) and one ... not containing aluminium (Starch B). The two starches had been prepared according to the process disclosed in the European patent application 303039 whereby the cationisation had been carried out in the presence of

aluminate for starch A but without aluminate for starch B."

3.3.5 In view of the clear reference in the generally applicable data on page 5 of D7 and of the above established jurisprudence (sections 3.3.3 and 3.3.2, above, respectively), the Board therefore takes the view that the passage in D4, quoted in section 3.3.4, above, clearly establishes that the cationic starch used in the examples of D4 had been prepared from native potato starch modified by the process of D7.

Moreover, the Board has no reason to doubt that the presence of small amounts of phosphate groups in native potato starch has generally been known. This view is even confirmed by the wording of the description of Example 6 of the application in suit ("... about twice the P-content of native potato starch ...").

In this context, reference can again be made to the preliminary view (section IV, above), wherein, within the considerations about the question of novelty, reference had been made to decision T 12/81 (OJ EPO 1982, 296). According to this decision, "the disclosure by description in a cited document of the starting substance as well as the reaction process is always prejudicial to novelty because those data unalterably establish the end product" (No. 13 of the reasons). This is, in the Board's opinion, also the case here in respect of the identity of the cationic starch containing anionic groups and at least 0.005 % by weight of aluminium. The preliminary remarks of the Board to this end in the preliminary view have not been disputed by the Appellant.

Consequently, the Board has come to the conclusion that the not explicitly disclosed and, thus, possibly distinguishing feature as referred to in section 3.3, above, had, in fact, been an implicit property of the cationic starch as used in D4, in particular in its examples. Consequently, this feature (i) had already been implicitly disclosed in the Examples of D4, (ii) cannot serve to distinguish the cationic starch as used in the method of Claim 1 of the Main Request from D4 and, therefore, (iii) cannot impart novelty to the claimed subject-matter.

4. Consequently, in view of the findings in sections 3.2.2, 3.2.3, 3.3 and 3.3.5, above, Claim 1 of the Main Request does not meet the requirements of the Article 54 EPC.

Since a decision can only be made on a request as a whole, but not on individual claims, the Main Request as a whole must, therefore, fail and it is, consequently, refused.

Auxiliary Requests

5. The above findings apply not only to the Main Request, but also for the two auxiliary requests.

5.1 Claim 1 of the first Auxiliary Request additionally contains a definition of the anionic groups contained in the cationic starch, including phosphate groups. As pointed out in section 3.3.5, above, this has, undisputed by the Appellant, been common general

knowledge that native potato starch contains such groups.

Consequently, Claim 1 of the first Auxiliary Request does not meet the requirements of Article 54 EPC either. As indicated above (section 4, above, second paragraph) the further claims must share the fate of Claim 1, and, therefore, the first Auxiliary Request is also refused.

5.2 Claim 1 of the second Auxiliary Request additionally refers to "adding an aluminium compound directly to the suspension prior to, simultaneously with, or after addition of the starch solution to the suspension."

Document D4, page 4, lines 39/40, reads as follows: "At the production of paper a number of different chemical additives to the fibre suspension, the stock, are usually used.", and it continues on page 5, lines 7 and 8: "It is particularly suitable to use aluminium compounds as additives to the stock to further increase the retention and dewatering effects.".

Hence, this additional feature in Claim 1 does not change the situation with regard to novelty either.

The above findings are, therefore, also valid for Claim 1 of this request and, consequently, also for the request as a whole. It is, therefore, refused for the same reason as the two higher-ranking requests, above.

6. In summary, since none of the requests of the Appellant on file complies with the EPC, the application must be refused, as was already done in the decision under appeal.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar: The Chairman:

E. Görgmaier R. Young