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D E C I S I O N
of 19 March 1997

Case Number: T 0466/93 - 3.3.1

Application Number: 87102389.1

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Title of invention:
Binder for use in a paper-making process

Patentee:
NALCO CHEMICAL COMPANY

Opponent:
Akzo Nobel N.V.

Headword:
Binder/NALCO

Relevant legal provisions:
EPC Art. 56, 113(1)

Keyword:
"Inventive step - no (main request: obvious alternative)"
"Inventive step - yes (auxiliary request; non-obvious
alternative)"

Decisions cited:
G 0010/91, G 0001/95, G 0004/92, T 0133/92

Catchword:
-



Case Number: T 0466/93 - 3.3.1

DECISION
of the Technical Board of Appeal 3.3.1
of 19 March 1997

Appellant:
(Opponent)

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Respondent:
(Proprietor of the patent)

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Decision under appeal:

Decision of the Opposition Division of the
European Patent Office posted 24 March 1993
rejecting the opposition filed against European
patent No. 0 234 513 pursuant to Article 102(2)
EPC.

Composition of the Board:

Chairman: R. K. Spangenberg
Members: P. Krasa
S. C. Perryman

Summary of Facts and Submissions

I. This appeal lies from the Opposition Division's decision rejecting an opposition against the European patent No. 0 234 513, Claims 1 and 12 of which read:

"1. A binder for use in a paper-making process comprising a cationic starch having a degree of substitution of at least 0.01 and silica particles characterized in that it comprises a ternary combination of

a cationic starch having a degree of cationic substitution ranging between 0.01 and 0.20,

an anionic high molecular weight polymer having a molecular weight of at least 500,000 and a degree of anionic substitution of at least 0.01, and

a dispersed silica having a particle size ranging from 1 to 50 nm,

wherein the weight ratio of anionic polymer to silica ranges between 20:1 and 1:10 and the cationic starch to silica weight ratio is between 100:1 and 1:1.

12. The use of the binder of any of claims 1 to 11 in a paper-making process in which a paper-making stock containing at least 50% of cellulosic pulp is formed into a sheet and then dried."

II. The grounds of opposition were that the subject-matter of the patent was neither novel nor inventive. The opposition was based, *inter alia*, on the documents

- (3) EP-A-0 050 316
- (4) EP-B-0 060 291
- (7) US-A-4 385 961 and
- (8) US-A-4 388 150.

III. The Opposition Division decided that the subject-matter of Claim 1 was novel and involved an inventive step as did the other Claims 2 to 15 of the patent in suit. They found in particular that documents (7) and (8) disclosed the most relevant prior art.

Further, the Opposition Division defined the technical problem underlying the patent in suit in respect to this state of the art as to provide a binder for use in a papermaking process leading to improvements in the

- binding between the cellulosic fibres,
- dewatering, and
- retention of fillers.

The Opposition Division found that this technical problem was solved by the subject-matter of Claim 1 and that this solution was not rendered obvious by any of the citations. They argued essentially as follows:

- documents (7) and (8) comprised no hint to the particular combination of technical features of the binder as claimed; and
- document (4), while disclosing a binder comprising cationic starch (CS) and an anionic polymer (AP), which was added together with polymer silicic acid (SA) to a pulp in a papermaking process, did neither disclose the specific characteristics of binder components of present Claim 1 nor the respective weight ratios.

IV. The Appellant (opponent) submitted in essence

- that it would have been obvious for a person skilled in the art to add an AP to the binder known from document (7), so much the more as document (8) taught the use of an anionic component in addition to the respective binder; and
- that document (4) disclosed a combination of CS, AP and SA, related to the same technical problem as the patent in suit and, thus, was the most relevant prior art;
- that the CS and the SA used according to document (4) had the same characteristics as the respective components according to Claim 1 of the patent in suit;
- that document (4) disclosed explicitly a medium molecular weight of 300 000 for the AP and taught that an AP with a higher molecular weight was also useful, thereby rendering obvious the use of an AP according to Claim 1 of the patent in suit having a molecular weight of at least 500 000, since document (4) informed the skilled person that the molecular weight of the AP was not critical;
- that the weight ratios given in Claim 1 of the patent in suit were also known from document (4), e.g. from example 1;
- that no data had been made available to evidence any improvements of the binder of the patent in suit as compared with the binder known from document (4);

- that, therefore, the teaching of document (4) in combination with the general common knowledge of the person skilled in the art rendered obvious the subject-matter of Claim 1 of the patent in suit.

Further, the Appellant alleged for the first time that an inspection of the examples of the patent in suit showed that essential technical features, such as the sequence of the mixing steps, were missing from Claim 1 and concluded that, therefore, the claimed invention did not meet the requirements of Article 83 EPC.

V. At the oral proceedings, which took place on 19 March 1997 before the Board and at which the Appellant was not represented, the Respondent (patent proprietor) refused to give his consent to the introduction of the fresh ground of opposition raised by the Appellant for the first time on appeal. He conceded that document (4) was at least as relevant as the documents (7) and (8) and submitted in essence that the binder according to Claim 1 of the patent in suit differed from that of document (4) by not being a (hardened) reaction product of CS, AP and SA obtained by pre-mixing and heating these components prior to the addition of the binder to the pulp.

VI. In the course of the oral proceedings before the Board, the Respondent submitted, as an auxiliary request, a new set of 12 claims, Claim 1 of which reads:

"Use in a paper-making process in which a paper-making stock containing at least 50% of cellulosic pulp is formed into a sheet and then dried of a binder comprising a cationic starch having a degree of substitution of at least 0.01 and silica particles characterized in that it comprises a ternary combination of

a cationic starch having a degree of cationic substitution ranging between 0.01 and 0.20,

an anionic high molecular weight polymer having a molecular weight of at least 1 000 000 and a degree of anionic substitution of at least 0.01, and

a dispersed silica having a particle size ranging from 1 to 50 nm,

wherein the weight ratio of anionic polymer to silica ranges between 20:1 and 1:10 and the cationic starch to silica weight ratio is between 100:1 and 1:1, and

wherein the binder is formed in situ by a sequential addition to the paper-making stock of the cationic starch, then the anionic polymer and then the dispersed silica or

by a sequential addition to the paper-making stock of the cationic starch, then followed by an admixture of the silica sol and the anionic polymer,

each addition occurring after each prior addition has been thoroughly admixed."

In respect to this claim, the Respondent argued that the use of a binder obtained by the simple and quick process disclosed in the patent in suit was not indicated in document (4) which, in contrast, disclosed a complicated process requiring the pre-mixing of the binder components prior to its addition to the pulp.

VII. The Appellant had requested in writing that the decision under appeal be set aside and the patent be revoked.

The Respondent requested as main request that the appeal be dismissed and that the patent be maintained as granted, and as auxiliary request that the decision under appeal be set aside and the patent be maintained on the basis of the set of claims submitted at the oral proceedings on 19 March 1997, and a description to be adapted.

At the end of the oral proceedings the chairman announced the Board's decision to allow the Respondent's auxiliary request.

Reasons for the Decision

Procedural issues

1. The appeal is admissible.

2. The Appellant raised the objection under Article 83 EPC for the first time in his letter dated 19 February 1997 (pages 5 and 6). According to the Enlarged Board of Appeal, a fresh ground for opposition may not be introduced by an opponent, unless the patentee consents to this objection being dealt with (G 0010/91, No. 18 of the Reasons for the Decision, OJ EPO 1993, 420 and G 0001/95, No. 5 of the Reasons for the Decision, OJ EPO 1996, 615). In the absence of the Respondent's consent, the Board will not consider this new objection.

Main request

3. The only remaining objection against the subject-matter of the main request concerns inventive step.

The patent in suit relates to a binder to be used in a papermaking process for achieving improvements regarding

- the binding of the cellulosic fibres,
- dewatering, and
- retention of filler materials

(see page 2, lines 5 to 14).

4. Similar binders for achieving the same or similar effects are known from several documents, in particular from citation (4) corresponding to WO-A-82 01 020 which was already referred to in the patent in suit (page 2, lines 48 to 56).

- 4.1 Document (4) aims at a papermaking process characterised by a very high filler retention and a very high paper strength (column 1, lines 22 to 26). As a solution of this technical problem, which is practically the same as that underlying the patent in suit, a papermaking process is suggested making use of a binder (mucus) obtained by the reaction of

- a CS of low charge density of 0,01 to 0,10 (see Claim 1 and column 1, lines 6 to 9 and lines 36 to 40) with

- an AP, such as a carboxymethyl cellulose (CMC) having preferably a medium molecular weight (MW) of from 50 000 to 300 000 (column 1, line 61 to column 2, line 8; in column 3, lines 42 to 43, a MW of 150 000 is specified), and
- curing the resulting mucus by the addition of inorganic polymer colloids, such as polysilicic acids (column 1, lines 17 to 22, in combination with the sentence bridging columns 5 and 6).

At the oral proceedings the Respondent conceded that Example 1 of document (4), which is representative for these binders, discloses weight ratios for the components of the binder which are within the respective ranges of Claim 1 of the patent in suit.

4.2 The dispersed silica, as characterised by its particle size in Claim 1 of the patent in suit, may be colloidal silicic acid (see the patent in suit, page 4, lines 31 to 32). At the oral proceedings, the Respondent was asked by the Board to explain any technically relevant difference between this dispersed silica of Claim 1 of the patent in suit and the "... colloidal solution of polysilicic acid ..." used according to Claim 1 of document (4), but was unable to point to any such difference. The Board thus finds that the requirements regarding dispersed silica of Claim 1 of the patent in suit are fulfilled by what is suggested in document (4).

- 4.3 Apart from the MW, the CMC of Example 1 of citation (4) is an AP as defined in Claim 1 of the patent in suit. Therefore the Board concludes that **the only difference** of the subject-matter of this claim and the (mucous) binder disclosed in document (4) **is the MW of the AP** which has to be "at least 500 000", according to the patent in suit.
- 4.4 The Respondent argued that the binder of citation (4) must, apart from the differences in the MW of the AP, also differ from the binder of the patent in suit, since the latter was obtained by simply mixing the components with the paper pulp, whereas document (4) referred to a first "reaction" of the CS and AP, which were cooked yielding a "compound", which in turn was admixed with the filler slurry and to a second "reaction" of the resulting mixture with SA, prior or after its admixture with the cellulosic fibres (document (4) column 1, lines 6 to 9, together with column 4, lines 17 to 36, column 5, line 56 to column 6, line 2, in combination with column 6, lines 21 to 27 and the examples).
- 4.4.1 In the Board's judgement this argument is not relevant, since it relies on differences in process features. However, Claim 1 of the patent in suit relates to a product which is solely characterised by the chemical nature and the concentration of its components, but not by the process for its manufacture. Claim 1 comprises no process features at all. Under these circumstances, differences in such features - should they exist indeed - cannot be used to distinguish the claimed subject-matter from the state of the art.
- 4.4.2 Moreover, it follows from the paragraph bridging columns 6 and 7 of document (4) reading

"It is obvious that the invention can be practised also in other ways than described as optimal above. For instance, the cationic starch may be swollen in pure water to a certain degree and without prolonged cooking, whereupon the anionic polyacid is added ...",

that the "cooking" of CS and AP is not a mandatory feature of the process disclosed in document (4). Therefore, and in the absence of any experimental proof to the contrary, the Board concludes, that - apart from the different MW of the AP - no further differences exist between the binder disclosed in document (4) and the binder according to Claim 1 of the patent in suit which covers also binders obtainable according to the sequence of mixing steps as disclosed in document (4).

4.5 It follows from the above that document (4) discloses the most relevant state of the art, which was also conceded by the Respondent at the oral proceedings (see above no. V). Therefore, the Board takes this citation as the starting point for defining the technical problem underlying the invention claimed in the patent in suit.

5. No data are available comparing the performance of the binders according to citation (4) and that of the binders in accordance with the patent in suit.

Under these circumstances the technical problem underlying the invention as claimed in Claim 1 of the patent in suit can be defined in view of document (4) as to provide **further binders** for a papermaking process leading to a good retention of fillers and to a high paper strength. Table II of the patent in suit provides sufficient evidence that this technical problem was solved by the subject-matter of Claim 1 of the patent in suit.

6. Regarding inventive step, it is decisive, whether or not a person skilled in the art would have used an AP with a MW \geq 500 000 when following the technical teaching of document (4).
- 6.1 It is true that any **specific** information on MW in document (4) relates only to CMC (see above no. 4.1). It may be questionable, whether a skilled person would have deduced from the statement that CMC with a MW "outside" of the range of 50 000 to 300 000 "also can be used" that this statement would apply also to a CMC with a MW \geq 500 000.
- 6.2 However, the APs to be used according to document (4) are not limited to CMC, but include e.g. polyacrylic acid (see e.g. column 1, line 9 and Example 2). Likewise, according to the patent in suit "... preferably water-soluble vinylic polymers containing monomers from the group consisting of acrylamide, acrylic acid, ..." are to be used (patent in suit, page 4, lines 4 to 5).
- 6.3 It was not contested by the Respondent at the oral proceedings that a MW \geq 500 000 is common for such an AP (see e.g. document (3), page 6, lines 17 to 23, disclosing MWs in the range of $5 \cdot 10^6$ to 10^7 for APs to be used as retention agents). Therefore, in the Board's judgement, it was obvious for a skilled person looking for an alternative to a binder as disclosed in document (4), to use an AP, in particular a polyacrylic acid, having a MW in the range as defined in Claim 1 of the patent in suit.

- 6.4 For these reasons, the Board concludes that at least Claim 1 of the patent in suit covers subject-matter which does not involve an inventive step as required by Articles 52(1) and 56 EPC. The main request must therefore fail.

Auxiliary request

Admissibility

7. Claim 1 results from a combination of Claim 12 as granted with Claims 1, 2, 10, and 11 as granted in combination with page 4, lines 1 and 2 of the patent specification as granted (corresponding to Claims 1, 2, 5, and 6 as filed in combination with page 6, lines 7 to 10 of the description as filed). Dependent Claims 2 to 12 correspond to Claims 2 to 9 and 13 to 15 as granted, respectively (finding their support in Claims 2, 4, and 9 to 16 as filed, respectively). It follows that no objections are to be raised against the claims of the auxiliary request either under Article 123(2) or under Article 123(3) EPC.

Novelty

8. The Board is satisfied that the subject matter of the present claims is novel. Since novelty of the claims according to the main request was not contested by the Appellant, it is not necessary to give detailed reasons in respect of the more restricted present claims.

Inventive step

9. A similar use of a binder is disclosed, as already stated, in document (4) (see, no. 4.1, above) which again qualifies as starting point for the evaluation of inventive step.

9.1 According to document (4),

- a mixture of a filler and of a binder consisting of CS and AP has to be prepared separately
- and has then to be admixed to the cellulosic fibres, whereby SA is added prior or after the mixture's addition to the cellulosic fibres (see no. 4.4, above).

In contrast, the binder to be used in accordance with Claim 1 of the patent in suit as amended is obtained by a simple sequential admixture of its components to the paper pulp, as specified.

9.2 The technical problem to be solved can thus be seen in providing a papermaking process leading to high filler retention and high paper strength which process is simpler than that disclosed in document (4). Having regard to examples 1 to 3 of the patent in suit, the Board is satisfied that this technical problem is solved by the subject-matter of Claim 1.

9.3 The process features of the papermaking process according to document (4) as outlined in no. 9.1, above, are **mandatory features** of this process (see, e.g. the claims and all the examples). The possibility to obtain the binder **in situ by sequential addition of the components to the papermaking stock** is not foreshadowed in document (4). Therefore, a skilled person looking for the solution of the existing technical problem would not have found any indication in document (4) that the separate preparation of the binder was not essential and that the papermaking process could be simplified by adding the binder components in the claimed sequence to the paper pulp without pre-mixing.

9.4 Documents (7) and (8) both relate to a papermaking process in which a two-component binder comprising CS and SA, but **no** AP, is used (see, e.g. the respective Claims 1). Document (3) discloses a papermaking process which also makes use of a two-component binder system comprising an anionic polymer and a cationic flocculant (document (3), page 3, second paragraph, in combination with page 5, first paragraph and last paragraph). None of these documents contain information, how to improve a papermaking process utilising a three-component binder as disclosed in document (4). For this reason, they comprise no hint for a person skilled in the art to the claimed solution of the existing technical problem.

9.5 Thus, in the Board's judgement, the use suggested according to Claim 1 as the solution of the said technical problem was not obvious for a person skilled in the art. Accordingly, the subject-matter of Claim 1 involves an inventive step in the sense of Article 56 EPC.

9.6 Dependent Claims 2 to 12 relate to particular embodiments of Claim 1 and derive their patentability from that of Claim 1.

10. Finally the Board finds that considering and deciding in substance on the maintenance of the patent in amended form on the basis of the claims of the auxiliary request as submitted at the oral proceedings in the absence of the Appellant is not in contradiction with the decision of the Enlarged Board of Appeal G 0004/92 (OJ EPO 1994, 149). According to this decision, a party who fails to appear at oral proceedings must have the opportunity, in accordance with Article 113(1) EPC to comment on new (and therefore surprising) facts and evidence submitted in

these proceedings. In the present case, the Respondent's amended claims resulted from a combination of claims as granted (see above no. 7) which were all known to the Appellant and removed objections already raised by the Appellant with respect to inventive step. In such a situation the Appellant could not have been taken by surprise, because he had reasonably to expect that the Respondent would try to overcome such objections by appropriate limitation of the claims (see also T 0133/92, no. 7 of the Reasons for the Decision; published in EPOR 1996, 558).

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.
2. The case is remitted to the first instance with the order to maintain the patent on the basis of the set of claims submitted at the oral proceedings on 19 March 1997 and a description to be adapted.

The Registrar


E. Gorgmaler

The Chairman


R. Spangenberg

