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D E C I S I O N
of 16 February 2005

Case Number: T 0189/02 - 3.3.6

Application Number: 96901357.2

Publication Number: 0830479

IPC: D21H 21/16

Language of the proceedings: EN

Title of invention:
A method for increasing the hydrophobicity of printing papers and a hydrophobe composition for the method

Applicant:
Ciba Specialty Chemicals Holding Inc.

Opponent:
-

Headword:
Precipitated calcium carbonate/CIBA

Relevant legal provisions:
EPC Art. 56, 109, 111(1)

Keyword:
"Inventive step: main request (no) - covers embodiments for which no effects have been shown; obvious combination of prior art for providing a further method"
"Inventive step: first auxiliary request (yes) - no reason to combine particular parts of the prior art in the expectation of improvement"

Decisions cited:
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Catchword:
-

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Case Number: T 0189/02 - 3.3.6

D E C I S I O N
of the Technical Board of Appeal 3.3.6
of 16 February 2005

Appellant: Ciba Specialty Chemicals Holding Inc.
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Representative: Grew, Eva Regina
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Decision under appeal: **Decision of the Examining Division of the European Patent Office posted 19 October 2001 refusing European application No. 96901357.2 pursuant to Article 97(1) EPC.**

Composition of the Board:

Chairman: P. Krasa
Members: G. Dischinger-Höppler
U. J. Tronser

Summary of Facts and Submissions

I. This appeal is from the decision of the Examining Division to refuse the European patent application No. 96 901 357.2 (international publication number WO-A-96/23105) relating to a method for increasing the hydrophobicity of printing papers and a hydrophobe composition for the method.

II. During the examining procedure, the following documents were cited:

D1 EP-A-0 220 941;

D2 US-A-5 145 522;

D3 EP-A-0 610 895 and

D4 DE-A-3 104 576.

The Examining Division refused the application in suit for lack of unity under Article 82 EPC of the then pending independent Claims 1 and 7 relating to "a method for improving the ink-jet printability of printing paper" and "a hydrophobic formulation for the method of claim 1" respectively.

The decision under appeal contained under the heading "additional comments not belonging to the present decision" inter alia remarks concerning lack of inventive step of the subject-matter of the then pending Claim 1 in view of D1 to D4.

III. The Applicant (hereinafter Appellant) filed an appeal against this decision. In an annex to the statement setting out the grounds of appeal, the Appellant submitted in one single request a new set of claims consisting of independent Claim 1 and dependent Claims 2 to 12 for a method, and inter alia the following further document:

D5 T. Blixt: "Chalk - a Calcium Carbonate for the High-Filled Sheet" in TAPPI Proceedings, 1992 Papermakers Conference, Book 2, Opryland Hotel, Nashville TN, April 5-8, TAPPI Press, pages 515 to 520

to illustrate the particular problems involved when using simultaneously precipitated calcium carbonate (PCC) fillers and alkyl ketene dimer (AKD) sizes in papermaking.

IV. In a communication and in an annex attached to the summons to oral proceedings, the Board raised objections under Article 56 EPC in view of the disclosure of D5.

In response to these communications, the Appellant filed amended sets of claims inter alia in a new main request under cover of the letter dated 7 January 2005, in five auxiliary requests under cover of a letter dated 10 February 2005 and in a sixth auxiliary request during oral proceedings held on 16 February 2005.

The only independent Claim 1 of the main requests reads:

"A method of improving the ink-jet printability of printing paper manufactured using precipitated calcium carbonate as filler, by adding prior to web formation to the pulp slurry a ketene dimer compound, characterized in that a sizing dispersion is used that contains at least the ketene dimer compound as hydrophobic sizing agent and further contains a water-soluble colloidal polymer, and wherein the amount of the water-soluble colloidal polymer is at least 100 % by weight of the hydrophobic sizing agent."

Claim 1 of the first auxiliary request, submitted under cover of the letter dated 10 February 2005, differs therefrom in that the feature "in an amount of 0.1 to 0.2 % of fiber dry weight" has been introduced between the terms "... as a hydrophobic sizing agent" and "and further contains water-soluble ...".

Dependent Claims 2 to 12 refer to preferred embodiments of the method of Claim 1 of the main and first auxiliary requests.

Further amendments have been made to the claims of the second to sixth auxiliary requests.

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

– The claimed subject-matter differed from the closest prior art as represented by D5 in that starch and AKD were added to the pulp slurry as a

sizing dispersion instead of adding starch and AKD separately.

– As was evident from the examples given in the application in suit and from the experiments filed with the letter dated 10 February 2005, the problem actually solved by the claimed subject-matter in view of D5 was to improve the sizing efficiency in a method of manufacturing printing paper using PCC as filler and AKD as sizing agent.

– The claimed subject-matter was not obvious in the light of D5, either alone or in combination with any one of D1 to D4 due to the lack of relevant pointers to such an effect.

– Nor was the claimed subject-matter obvious if its effect in view of D5 consisted only in the provision of an alternative method since D5 taught to overcome the bad performance of PCC by substituting it with other calcium carbonate grades and the sizing dispersions disclosed in D1 to D4 have not been proposed for internal sizing of PCC-filled paper at the priority date. On the contrary, D1 and D4 disclosed only the use of chalk as filler and D2 and D3, the latter relating to surface sizing only, mention unspecifically calcium carbonate but not PCC.

VI. The Appellant requested that the decision under appeal be set aside and that a patent be granted on the basis of the following:

Claims 1 to 12 according to the main request filed under cover of the letter dated 7 January 2005 or Claims 1 to 12 according to the first auxiliary request or the auxiliary requests 2 to 6 submitted under cover of the letter dated 10 February 2005, respectively during oral proceedings, description pages 1, 3, 4 and 13 submitted during oral proceedings, description pages 3a, 9 and 12 submitted under cover of the letter dated 7 January 2005, pages 5 and 11 submitted under cover of the letter dated 17 September 2004 and pages 2, 6, 7, 8 and 10 as originally filed.

Reasons for the Decision

1. *Procedural matters*

By filing with its statement of grounds of appeal a single new request wherein all product claims have been deleted, the only ground on which the application in suit has been rejected under Article 82 EPC (see II above) has been obviously overcome. In such a situation, the Examining Division has to rectify the decision under appeal in accordance with Article 109 EPC (see Guidelines for Examination in the European Patent Office, Chapter XI, 7.1), irrespective of any additional comments on further defaults with regard to the requirements of the EPC which are not part of the decision. The need for a rectification is aggravated in the present case by the fact that the Appellant addressed the comments on the basis of newly filed evidence.

The Appellant did not, however, request remittal but wished to expedite the further prosecution of the application (Point 2.2 of the statement of grounds of appeal). The Board, therefore, refrains exceptionally from remitting the case to the Examining Division for further prosecution and acts within the competence of the Examining Division (Article 111(1) EPC).

2. The Board is satisfied that the claims as amended in accordance with the new main and first auxiliary requests comply with the requirements of Article 123(2) EPC since their wording is supported by the application as originally filed (see original claims, page 2, lines 9 to 11 and Examples of the application as filed).

Further, as will be apparent from the assessment of inventive step below, the subject-matter claimed in these requests is novel in view of the available prior art.

3. *Main request*

3.1 The application in suit relates to a method of improving the ink-jet properties of PCC-filled paper by internal sizing (page 1, lines 4 to 13 and 21 to 29). It is said that PCC, whilst being particularly suitable as filler due to its high brightness, has the disadvantage that higher amounts of size are needed which in the case of ketene dimer sizing agents causes undesired slipperiness of the sheet surface, expressed as reduced surface frictional resistance, and contamination of copying machines due to increased ketone residues formed from unbonded AKD so that the

paper is unsuitable in printing or copying machines (page 2, lines 5 to 37 and page 3, lines 1 to 20).

3.2 Amongst all the documents on file, only D5 also mentions technical problems related to ink-jet printability and slipperiness of PCC-filled and AKD-sized printing paper (page 518, right-hand column, last two paragraphs). The Board, therefore, agrees with the Appellant that D5 is the most suitable starting point for the assessment of inventive step.

D5 discloses in the experimental section on page 516 (right-hand column, third full paragraph) a method of making PCC-filled paper, wherein prior to web formation AKD is added to the machine chest in an amount of from 0.5 to 2.0 kg/ton and cationic starch is added to the thick stock in an amount of 5 kg/ton.

3.3 Since starch is one of those colloidal polymers suitable in the claimed method (see Claim 4 and Examples), the subject-matter of Claim 1 covers embodiments which differ from the experiments in D5 only, but nevertheless distinguishably, in that AKD and cationic starch are added together as a sizing dispersion instead of being added separately.

3.4 The Appellant argued that it was apparent from Examples 1 to 3 given in the application in suit and the experiments filed with the letter dated 10 February 2005 that the claimed subject-matter resulted in an improvement of the sizing efficiency at decreased slipperiness of the sheet surface as compared with D5.

3.5 In the examples of the application in suit and in the experiments AKD is used in an amount of from 0.1 to 0.2 % based on the dry fiber weight. However, Claim 1 of the main request is not restricted in this respect and covers, therefore embodiments wherein the amount of AKD is beyond the above limits for which effects with regard to sizing efficiency and slipperiness have been presented.

3.6 Example 1 of the application in suit shows that the sizing effect depends inter alia on the amount of AKD used. Thus, it is apparent from the Table given on page 6 of the application in suit illustrating Example 1 that the degree of sizing decreases with decreasing amount of AKD such that no effect can be expected for AKD amounts of 0.5 kg/ton (i.e. 0.05 % by fiber dry weight) or below if the amount of starch in the dispersion is only 100 % by weight of the AKD.

Further, according to the application in suit, excessive amounts must be avoided since they result in an undesired slipperiness of the paper sheet (page 2, lines 23 to 30).

It is, therefore, not conclusive that the effects presented also extend to those embodiments of Claim 1 wherein the amount of AKD is lower than 0.1 % or higher than 0.2 % of the dry fiber weight or, in other words, no effects are apparent or on file which apply to the subject-matter of Claim 1 in its whole extent.

3.7 Thus, the technical problem actually solved in view of D5 by those embodiments of Claim 1 wherein the amount of AKD is below 0.1% or above 0.2 % based on dry fiber

weight is seen to consist in the provision of a further method of producing PCC filled ink-jet paper and the solution of this problem consists in that AKD and starch are added together as a sizing dispersion in lower or higher amounts, but also at a weight ratio of at least 1 : 1.

3.8 Dispersions for internal sizing of paper and containing AKD size and a water-soluble polymer, inter alia starch, in a weight ratio of 1 : 1 and above are well-known in the art, e.g. from D1 (page 2, first full paragraph to page 3, line 16 and page 4, third full paragraph and Claims 1, 4, 5 and 16) or from D4 (Claim 3, page 2, lines 3 to 16, page 5, lines 27 to 31 and Examples). In the presence of filler, the sizing agents are used in D1 in amounts of 0.1 and 0.5 % by weight of the dry fibers (Trial G and J). According to D4 the amount of size based on the dry paper stock may generally range between 0.05 and 2 % by weight (page 5, lines 23 to 25).

Since, in the present case, sufficient sizing or slipperiness are not an issue, one option which a person skilled in the art would adopt in the expectation of providing a further method of producing PCC filled ink-jet paper is to use in the method known from D5 AKD and starch in the form of a dispersion and in the amounts disclosed in D1 or D4, i.e. in amounts as low as 0.05 % or above 0.2 % of the dry fibers.

The Board, therefore, concludes that the subject-matter of Claim 1 of the main request is not based on an inventive step as required by Article 52(1) EPC in combination with Article 56 EPC.

4. *First auxiliary request*

4.1 Claim 1 differs from that of the main request in that its subject-matter has been restricted to embodiments with added AKD of from 0.1 to 0.2 % by weight on the dry fibers.

4.2 Example 1 of the application in suit (see e.g. Table on Page 6) and the experiments of February 2005 show that within this range of added AKD the claimed simultaneous addition of colloidal polymer and AKD in the form of a dispersion and in a weight ratio of at least 1 : 1 brings about an increase of the sizing degree such that sufficient sizing is obtained. By way of contrast, the experiments show further that under otherwise identical conditions separate addition of AKD and polymer or of dispersions containing lower amounts of polymer does not result in sufficient sizing. This latter finding is corroborated by D5 according to which the PCC-filled sheets obtained by separate addition of AKD and starch, just start to turn hydrophobic at an amount of AKD of at least 0.2 % of the dry fibers weight but are still far from being sufficiently sized (page 518, right-hand column, last two paragraphs and Figure 10).

Further, Examples 2 and 3 of the application in suit show that within the claimed range of added AKD slipperiness of the sheet or implications with residual ketone are not an issue.

4.3 Therefore it is credible that, in view of D5 as the most suitable starting point for the assessment of inventive step (3.2 above), the claimed subject-matter actually solves the problem of providing a method of

improving the AKD sizing of PCC-filled paper to a sufficient level without reducing its suitability in printing and copying machines due to sheet slipping or contamination with residual ketone.

4.4 It remains to be assessed whether, in view of the available prior art documents, it was obvious for someone skilled in the art to solve this problem by the means claimed, i.e. by adding in the process disclosed in D5 at least 1 kg/ton of AKD simultaneously with the starch as a dispersion.

4.5 D5 indicates away from the claimed solution since it is concluded from the investigations reported that blends of chalk and PCC could be used for optimizing the performance of the paper sheet (page 520, last paragraph in combination with page 518, Figure 10).

As correctly stated by the Appellant, D1 to D4 do not mention PCC fillers at all, let alone the problems involved in the manufacture of PCC-filled and AKD sized paper sheets (see V. above). Instead, they are all concerned with the stability problems of aqueous ketene dimer sizing compositions.

Thus, D1 proposes to solve the stability problems by solid particulate compositions comprising ketene dimers and an encapsulating agent like starch in a weight ratio of from 1 : 0.2 to 1 : 1, preferably at most 1 : 0.5, which are readily dispersible in water and exhibit improved stability on storage as against dispersions of ketene dimer and surfactant or emulsifier (page 1, lines 3 to 25, page 2, line 28 to page 3, line 3 and page 4, third paragraph).

D2 proposes to solve the stability problem by adding a polymeric aluminium compound to an aqueous dispersion of ketene dimer sizing agent and a dispersing agent such as cationic starch in a weight ratio of from 1 : 0.005 to 1 : 1, preferably 1 : 0.05 to 1 : 0.3 (column 1, lines 40 to 50, column 3, lines 7 to 27 and Claim 1).

D3, whilst recommending for the same purpose compositions comprising 50 to 99.9 % polyvinyl alcohol and 0.1 to 50 % ketene dimer, relates to surface sizing instead of internal sizing page 2, lines 19 to 31 and 49 to 52).

D4 mentions stable emulsions of AKD and cationic starch as prior art but recommends galactomannane as being superior to starch with respect to the amount needed for a proper sizing effect and for reasons of solubility. Suitable ratios of AKD : galactomannane range from 1 : 0.1 to 1 : 1.5 (page 3, lines 1 to 24, page 4, lines 6 to 14 and page 5, line 27 to page 6, line 5).

However, whilst disclosing dispersions of AKD and colloidal polymer which come under those used in the claimed method, none of D1 to D4 gives any hint that sufficient internal sizing could be obtained in PCC-filled paper sheets at a size level of 0.1 to 0.2 % by weight of the dry fibers by using those dispersions wherein AKD and polymer are present in a weight ratio of at least 1 : 1 as against any other ratios proposed in D1 to D4.

4.6 The Board, therefore, concludes that it was not obvious from the prior art documents to use in the process disclosed in D5 a dispersion of AKD and water-soluble colloidal polymer in a ratio of at least 1 : 1 in the expectation of improving the AKD sizing without any need of adding the AKD in amounts which render the sheet surface slippery or increase the residual ketone content of the paper.

4.7 Therefore, the Board is satisfied that the subject-matter of Claim 1 involves an inventive step, thus meeting the requirements of Articles 52(1) and 56 EPC.

Dependent Claims 2 to 12 refer to specific embodiments of Claim 1 and derive their patentability therefrom.

5. Since the claims of the first auxiliary request comply with the requirements of the EPC, there is no need to consider the second to sixth auxiliary requests.

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 grant a patent on the basis of:

Claims:
Nos. 1 to 12 according to the first auxiliary request submitted under cover of the letter dated 10 February 2005,

Description:
pages 1, 3, 4 and 13 submitted during oral proceedings,
pages 3a, 9 and 12 submitted under cover of the letter dated 7 January 2005,
pages 5 and 11 submitted under cover of the letter dated 17 September 2004 and
pages 2, 6, 7, 8 and 10 as originally filed.

The Registrar: The Chairman:

G. Rauh P. Krasa