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**Datasheet for the decision
of 6 October 2016**

Case Number: T 1935/12 - 3.3.06
Application Number: 01965755.0
Publication Number: 1303670
IPC: D21H19/54, C09J199/00,
C08B30/00, C08L3/00, C08L3/02
Language of the proceedings: EN

Title of invention:

USE OF STARCH DISPERSIONS AS BINDER IN COATING COMPOSITIONS
AND PROCESS FOR PREPARING THE STARCH DISPERSIONS

Patent Proprietor:

EcoSynthetix Ltd.

Opponents:

- 1) Emsland-Stärke GmbH
- 2) Roquette Frères

Headword:

Starch dispersion/EcoSynthetix

Relevant legal provisions:

EPC Art. 52(1), 54, 56, 123(2), 123(3)
RPBA Art. 13(3)

Keyword:

Novelty (no) Main Request and Auxiliary Requests 2 and 15
Amendments - broadening of claim (yes) - Auxiliary Requests 1
and 7 - added subject-matter (yes) - Auxiliary Request 16
Inventive step (no) Auxiliary Requests 8 and 12 to 14
Late-filed Auxiliary Request 17 - admissible (no) - submitted
during the oral proceedings - change of subject-matter

Decisions cited:

Catchword:



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Case Number: T 1935/12 - 3.3.06

**D E C I S I O N
of Technical Board of Appeal 3.3.06
of 6 October 2016**

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Decision under appeal: **Decision of the Opposition Division of the
European Patent Office posted on 4 July 2012
revoking European patent No. 1303670 pursuant to
Article 11(3) (b) EPC.**

Composition of the Board:

Chairman B. Czech
Members: G. Santavicca
 C. Heath

Summary of Facts and Submissions

- I. The appeal lies from the decision of the Opposition Division revoking European patent No. 1 303 670.
- II. Independent Claims 1, 8, 9 and 15 of the patent as granted read as follows:

"1. A coating composition comprising
(i) a pigment and
(ii) a starch dispersion of discrete crosslinked native starch particles in an aqueous liquid, wherein the particle size of the starch particles in the starch dispersion ranges from 200 nm to 100 µm."

"8. Use of a starch dispersion as defined in any of claims 1 to 3 as a binder in pigmented coating compositions."

"9. A method of preparing a dispersion of starch particles in an aqueous liquid comprising
(a) obtaining a mixture of starch and an aqueous liquid;
(b) processing the mixture using shear forces in the presence of a crosslinker in an extruder; and
(c) adding a hydroxylic liquid to the extruder and dispersing the mixture inside the extruder or outside the extruder or both inside and outside the extruder to obtain the dispersion."

"15. A starch dispersion obtainable by the method according to any of claims 9 to 14."

- III. Two oppositions had been filed against the patent in suit on the grounds of lack of novelty and lack of inventive step (Article 100(a) EPC) as well as of

insufficiency of the disclosure (Article 100(b) EPC).

The items of evidence relied upon included the following documents:

C1: GB 1 420 392,

C12: WO 00/69916, and

C13: T.W.R. Dean, *The essential guide to aqueous coating of paper and Board*, PITA, March 1997, pages 7.2 to 7.4 and 1.11.

- IV. In the decision under appeal the Opposition Division found *inter alia* that
- the invention as defined in the claims of the patent as granted (Main Request) and of most of the then pending auxiliary requests was insufficiently disclosed, since it was not clear from the patent in suit by which measuring method it had to be ascertained whether the particle size of a starch dispersion fell within the range indicated in an independent claim comprised in each of said claim requests, and
 - that the subject-matter of method Claim 9 and product-by-process Claim 15 as granted, also comprised in the then pending Auxiliary Request 8a, were novel over *inter alia* documents C1 and C12, but
 - that none of the remaining, then pending auxiliary requests was allowable for lack of inventive step of the claimed subject-matter, document C1 being taken as the closest prior art.
- V. In its statement setting out the grounds of appeal dated 14 November 2012, the Patent Proprietor/Appellant defended the patent as granted (Main Request). It nevertheless also filed sixteen sets of amended claims as Auxiliary Requests 1 to 16.
- In support of its arguments regarding sufficiency and inventive step, it also filed several further items of

evidence labelled C18 to C28. As regards inventive step, it relied in particular on

C26: "Supplemental Experimental Report" by Dr. Deng.

Claims 1 and 15 according to **Auxiliary Request 1** read, respectively, as follows (amendments to the respective claims as granted made apparent by the Board):

"1. A coating composition comprising
... from 200 nm to 100 μ m,
wherein the starch dispersion is obtainable by a method comprising a step of processing starch using shear forces and simultaneously crosslinking."

"15. A coating composition comprising
(i) a pigment
(ii) A starch dispersion obtainable by the method according to any of claims 9 to 14."

Claim 1 according to **Auxiliary Request 2** is identical to Claim 1 according to Auxiliary Request 1.

Claim 14 of **Auxiliary Request 7** is identical to Claim 15 of Auxiliary Request 1.

Claim 1 according to **Auxiliary Request 8** reads as follows (amendments to Claim 1 as granted made apparent by the Board):

"1. A coating composition comprising
... from 200 nm to 100 μ m,
(iii) a synthetic latex."

Claim 1 according to **Auxiliary Request 12** reads as follows (amendment to use Claim 8 as granted made

apparent by the Board):

~~"8 1. Use of a starch dispersion as defined in any of claims 1 to 3 as a co-binder in pigmented coating compositions **in combination with a synthetic latex;** wherein the starch dispersion is a starch dispersion of discrete crosslinked native starch particles in an aqueous liquid, wherein the particle size of the starch particles in the starch dispersion ranges from 200 nm to 100 μ m."~~

Claim 1 according to **Auxiliary Request 13** reads as follows (amendment to use Claim 8 as granted made apparent by the Board):

~~"8 1. Use of a starch dispersion as defined in any of claims 1 to 3 as a binder in pigmented coating compositions; wherein the starch dispersion is a starch dispersion of discrete crosslinked native starch particles in an aqueous liquid, wherein the particle size of the starch particles in the starch dispersion ranges from 200 nm to 100 μ m."~~

Claim 1 according to **Auxiliary Request 14** reads as follows (amendment to product Claim 1 as granted made apparent by the Board):

~~"1. Use of a A coating composition as a coating color in paper coating, wherein the coating composition comprises
(i) a pigment and
(ii) a starch dispersion ... from 200 nm to 100 μ m."~~

Claim 1 according to **Auxiliary Request 15** is identical to Claim 9 as granted (wording under Point II, *supra*).

Claim 1 according to **Auxiliary Request 16** reads as follows (amendments to Claim 9 as granted made apparent by the Board):

"~~9~~ 1. A method of preparing a dispersion ... comprising
(a) ...
(b) ...
(c) ... to obtain the dispersion;
adding a pigment to the obtained dispersion."

- VI. In its reply, Respondent I (Opponent 1) maintained insufficiency objections as regards the particle size range and objected that the method of Claim 9 as granted was obvious over C1.
- VII. In a first reply to the Appellant's statement of grounds Respondent II (Opponent 2) preliminarily objected against the filing of a number of auxiliary claim requests that it considered to be "excessive" and amounting to an abuse of the procedure. With its full reply of 7 June 2013, Respondent II submitted two further items of evidence ("Annex 1" and "Annex 2" in support of its maintained insufficiency objection). It also maintained (*inter alia*) that the method of Claim 9 as granted lacked novelty over *inter alia* C12 and inventive step over C1, and that the product-by-process defined in Claim 15 as granted lacked novelty or at least inventive step over *inter alia* C1 and C12.
- VIII. With a further letter, the Appellant maintained its position regarding the presence of an inventive step and submitted two further items of evidence in support therefor, *inter alia*:

C30: Experimental Report by Dr. Bloembergen.

- IX. The parties were summoned to oral proceedings. In a communication issued in preparation therefor, the Board *inter alia* called into question whether the dispersion of product-by-process Claim 15, obtainable by the method of Claim 9, was novel over the prior art invoked. Regarding the pending auxiliary claim requests the Board particularly drew attention to amendments that appeared to contravene Article 123(2) EPC and/or Article 123(3) EPC.
- X. In further letters the parties submitted further arguments regarding sufficiency of the disclosure referring to case law (Appellant) and further items of evidence (Respondent I: document labelled "C29"; Respondent II: documents labelled "D31" to "D34").
- XI. In the course of the oral proceedings held on 6 October 2016, the Appellant withdrew its pending Auxiliary Requests 3 to 6 and 9 to 11, but filed a new set of claims as Auxiliary Request 17.

Claim 1 according to **Auxiliary Request 17** reads as follows (amendments to Claim 9 as granted made apparent by the Board):

*"9 1. A method of preparing **a coating composition comprising a pigment and a dispersion of discrete crosslinked** starch particles in an aqueous liquid comprising*

(a) ...

(b) ...

(c) ... to obtain the dispersion;

adding a pigment to the obtained dispersion."

The parties were in particular heard on the following issues:

- Novelty of the subject-matter of product-by-process Claim 15 according to the Main Request, over document C12 (Example 10).
- Compliance of Claim 15 according Auxiliary Request 1 and of Claim 14 according to Auxiliary Request 7 with Article 123(3) EPC.
- Novelty of the subject-matter of Claim 1 of Auxiliary Requests 1 and 2 over the disclosure of Document C1.
- Obviousness of the subject-matter of Claim 1 according to Auxiliary Request 8 in the light of C1 taken as the closest prior art in combination with the common general knowledge illustrated by C13 (use of synthetic latex as binder).
- Obviousness of the subject-matter of the respective use Claim 1 according to each of Auxiliary Requests 12 to 14 over C1/C13.
- Novelty of the subject-matter of Claim 1 of Auxiliary Request 15 over C12.
- Compliance of Claim 1 of Auxiliary Request 16 with Article 123(2) EPC.
- Admissibility of Auxiliary Request 17, filed at the oral proceedings, into the proceedings.

XII. Final requests

The **Appellant** (Patent Proprietor) requested that the decision under appeal be set aside and that the patent be maintained as granted (Main Request), in the alternative on the basis of the claims according to one of Auxiliary Requests 1, 2, 7, 8 and 12 to 16, all filed with the grounds of appeal, or of Auxiliary Request 17 filed during oral proceedings.

Respondents I and II (Opponents 1 and 2) requested that the appeal be dismissed.

XIII. The arguments of the Appellant of relevance for the present decision can be summarised as follows:

Main Request - Novelty - Claim 15

The burden to prove that C12 was novelty-destroying rested with the Respondents, who had not substantiated an objection against Claim 15 before the oral proceedings, but had merely attacked Claim 9. It was not contested that Example 10 of C12 disclosed all the steps of the process according to Claim 9. The starch dispersion of Claim 15 was, however, different from the one of C12 and hence novel.

Auxiliary Requests 1 and 7 - Article 123(3) EPC

The subject-matter of Claim 15 according to Auxiliary Request 1 was narrower in scope than the subject-matter of Claim 15 as granted, because it required the presence of the pigment, in addition to the dispersion. There was no shift of the protection, nor of the debate. The now claimed subject-matter was based on the subject-matter of the claims as granted, of which only the method and use claims had been dealt with before the oral proceedings. As the combination of starch dispersion and pigment concerned the coating composition, Claim 15 did not come as a surprise for the other parties. The intention behind the drawing up of this Claim 15 was to overcome the insufficiency objections relating to the particle size range. Since there was no broadening of scope Claim 15 complied with Article 123(3) EPC.

At the oral proceedings, in response to the indication by the Board that its finding regarding Claim 15 of Auxiliary Request 1 applied likewise to Claim 14 of

Auxiliary Request 7, the Appellant provided no further arguments.

Auxiliary Request 2 - Novelty - Claim 1

C1 did not anticipate the claimed coating composition, because C1 did not disclose a coating composition. On page 2, lines 90 and 110, the mention of "pigment coating of paper" was within a long list of possible uses. Thus, a choice had to be made among these uses. Moreover, on page 4, lines 1-10, C1 mentioned three conditions (cold, hot or boiling water) applicable to preparing the starch dispersion, without disclosing temperature and time for the heating/boiling step. As starch became soluble at high temperature, the skilled person would end up with a solution of starch, rather than with a dispersion. As stated in paragraph [0004] of the patent in suit, the conventional way of using starch as a binder was to use a solution thereof. Hence, the intended use of C1 was different from that of the patent. Questioned by the Board on whether it was contested that C1 referred directly and unambiguously to dispersion "consisting of suspensions of granule fragments" (page 2, lines 4-5) to "pigment coating of paper" (page 2, lines 90-91 and 109-110), and on why the "stirring" mentioned in the examples of C1 would not imply the application of "shear forces", the Appellant only maintained the following: C1 was unclear, a number of choices had to be made within C1, and the resulting combination of features was not clearly disclosed in C1. The product-by-process features of Claim 1 at issue were not disclosed in C1, as C1 only disclosed the use of an extruder subsequently to the step of crosslinking.

Auxiliary Request 8 - Inventive step - Claim 1

The added feature "synthetic latex" was broad but the skilled person could select the vast majority thereof. C1 (page 2, line 115) merely disclosed the use of co-adhesives. The technical problem was to change the tackiness of the particle dispersion, and this was achieved by using a synthetic latex as co-binder. C1 did not address the problem of the viscosity of the coating composition. Adding another adhesive, as suggested by C1, was a different application. The skilled person wanting to manage the viscosity would not include a synthetic latex into the coating composition, because it would increase the viscosity. Thus, the claimed coating composition was not obvious.

Auxiliary Requests 12 to 14 - Inventive step

In response to the indication by the Board that the subject-matter of the respective use Claim 1 according to each of Auxiliary Requests 12 to 14 also did not appear to be inventive considering the Board's finding as regards the obviousness of the coating composition of Claim 1 according to Auxiliary Request 8, the Appellant stated that it was maintaining these claim requests, but did not wish to make further comments.

Auxiliary Request 15 - Novelty - Claim 1

On proper construction, Claim 1 clearly encompassed the possibility that what came out of the extruder was not yet the dispersion, and that step (c) of Claim 1 also encompassed the possibility of adding the hydroxylic liquid into the extruder for plasticising purposes only.

The subject-matter of Claim 1 was nevertheless novel over C12, as also acknowledged in the decision under appeal.

Auxiliary Request 16 - Article 123(2) EPC

Method Claim 1 concerned a method for preparing a starch dispersion which was quite different from a coating composition, so that an objection under Article 123(3) EPC as raised against Claim 15 of the Auxiliary Request 1 did not apply.

This method claim was based on Claim 9 as granted, hence on Claim 11 as initially filed in combination the disclosure of page 2 of the application as filed (lines 23 to 27). Thus, Article 123(2) EPC was complied with.

Auxiliary Request 17 - Admissibility

This claim request was clearly admissible, as it was filed to overcome the objection under Article 123(2) EPC raised against Claim 1 of Auxiliary Request 16 for the first time during oral proceedings. The amended claims complied also with Rule 80 EPC.

Moreover, Claim 1 complied with Article 123(3) EPC, as Claim 11 as filed and Claim 9 as granted did not contain any limitation on the starch particle sizes, and the feature of adding a pigment made it narrower than Claim 9 as granted. Thus, the subject-matter of Claim 1 did not go beyond the granted claimed subject-matter, as it was not directed to the preparation of a pigmented coating composition. The fact that Claim 11 as originally filed did not comprise the step of adding a pigment was because the starch dispersion used as a binder had to be prepared first.

XIV. The arguments of the Respondents of relevance for the present decision can be summarised as follows:

Main Request - Lack of novelty - Claim 1

As the Appellant did not contest that Example 10 of C12 disclosed a process with all of the features of Claim 9 as granted, also the product so-obtained had to be the same. The product of Claim 15 thus lacked novelty.

Auxiliary Requests 1 and 7 - Article 123(3) EPC

The coating composition defined in Claim 15 according to Auxiliary Request 1 was different from the starch dispersion defined in Claim 15 as granted. Indeed, the coating composition of Claim 15 was now broader than the coating composition of Claim 1 as granted, given that the particle size of the starch particles was not defined. Hence, Claim 15 did not comply with Article 123(3) EPC.

The objection raised against Claim 15 of Auxiliary Request 1 applied *mutatis mutandis* against Claim 14 of Auxiliary Request 7.

Auxiliary Request 2 - Lack of novelty - Claim 1

C1 disclosed a coating composition for pigment coating of paper comprising a pigment and a starch dispersion with a particle size ranging from 1 to 10 μm (page 1, column 2, lines 85-90). C1 disclosed (page 1, lines 90-94) that a "suspension of granule fragments" was being used (see also page 4, line 4: "consisting of suspensions"). Stirring implied the use of shear forces. Hence, the claimed composition was not novel over that disclosed in C1.

Auxiliary Request 8 - Lack of inventive step - Claim 1

The sole difference between the coating composition of Claim 1 and the coating composition of C1 was the additional presence of the synthetic latex in the composition. C1 (page 2, line 115) taught that the starch dispersion was "advantageously" used with other adhesives. It was common general knowledge (C13, page 7.3, Point 7.5; page 1.11, Point 1.30) that compositions could contain more than one binder and that latex was widely used as binder, because it led to very low viscosity compositions. Therefore, the coating composition of Claim 1 was obvious over C1 and C13.

Auxiliary Requests 12-14

The claimed subject-matter of these claim requests was also not inventive over C1 / C13, for the same reasons given for Auxiliary Request 8.

Auxiliary Request 15 - Lack of novelty - Claim 1

Claim 1 was identical to Claim 9 as granted. As argued in connection with product-by process Claim 15 as granted, a method according to claim 9 as granted was disclosed in C12, *inter alia* Example 10.

Auxiliary Request 16 - Article 123(2) EPC

Claim 1 did not comply with Article 123(2) EPC, as the application as filed did not disclose a process for preparing a starch dispersion comprising a step of adding a pigment to a starch dispersion. It only disclosed that a coating composition may comprise a pigment. A starch dispersion with a pigment was not necessarily a "coating composition" as generally

disclosed on pages 2 and 3 of the application as filed. The examples of the patent in suit all concerned either starch dispersions without pigments or specific coating compositions including starch dispersions and mixtures of pigments, among other components. Hence, the subject-matter of Claim 1 was an undisclosed, thus non-allowable generalization of the originally disclosed method for preparing specific coating compositions, contravening the requirements of Article 123(2) EPC.

Auxiliary Request 17 - Non-admissibility

Auxiliary Request 17 should not be admitted, as the Appellant had already filed an excessive number of claim requests during the appeal proceedings, and Auxiliary Request 17 was not formally allowable under Rule 80 and Articles 123(2) and (3) EPC.

As to Article 123(3) EPC, the same objection raised against Claim 15 of Auxiliary Request 1 applied against Claim 1 of the present auxiliary request, as the subject-matter of Claim 1 shifted the protection as granted, to the extent that Claim 1 no longer concerned the granted coating composition, and had a different and broader scope.

Reasons for the Decision

Main Request - lack of novelty - Claim 15

1. The starch dispersion according to Claim 15 as granted is defined in product-by-process form, i.e. as being "*obtainable by the method according to ... Claim[] 9*". Since a new process does not necessarily result in a new product, it must be assessed whether said

preparation method results in a starch dispersion which differs from the starch dispersions of the prior art in terms of at least one property.

2. Document C12

2.1 C12 is prior art pursuant to Article 54(3) EPC. This is not in dispute.

2.2 C12 (Claim 14) discloses a dispersion of crosslinked starch nanoparticles in water.

2.2.1 In particular, C12 discloses (Claims 1, 2) the preparation of such a dispersion, in which a "biopolymer is plasticised by processing using shear forces, a crosslinking agent being present during the processing" (Claim 1) and, thereafter, "the biopolymer is dissolved or dispersed in an aqueous medium to a concentration between 4 and 40 wt.%" (Claim 11). Starch is a preferred biopolymer (Claim 2). Glyoxal is an especially preferred crosslinking agent (Claim 3).

2.2.2 More particularly, Example 10 of C12 discloses the following process:

A premix of waxy corn **starch**, glycerol and **water** is provided, which is then processed in an **extruder** (shear forces being applied), to which is also fed a **glyoxal** (crosslinker) solution of 10% in **water** (a "*hydroxylic liquid*").

Example 10 thus discloses a method comprising step (a) and step (b) of the method of Claim 9 as granted, referred to in Claim 15 at issue.

2.2.3 The extrudate is then dried and granulated and,

thereafter, dispersed in water to form a latex (after being cryogenically ground to particles smaller than 150 μm , see paragraph [0015] of C12).

The Board holds that these last steps correspond to one of the alternatives covered by step (c) according to Claim 9 as granted, referred to in Claim 15 at issue, namely the "*dispersing the mixture ... outside the extruder to obtain the dispersion*".

This understanding of Claim 15 at issue is in line with the examples of the patent in suit (e.g. reference Examples 1 to 3) which expressly describe that the extrudate is dried, cryogenically ground and then dispersed in water.

- 2.2.4 At the oral proceedings, the Appellant did not contest that Example 10 of C12 disclosed all of the process steps of Claim 9 as granted. It nevertheless essentially argued that the dispersion of Claim 15 as granted was novel due to the crosslinking being carried out within the extruder.

However, considering that according to C12/Example 10 the crosslinking agent (glyoxal) is added to the fifth of nine zones of a Berstorff ZE40 extruder (as in reference examples 1 to 3 of the patent in suit), the Board holds that the starch (fragments) will also be crosslinked during the processing of the mixture within the extruder.

Under these circumstances, the Board holds that the burden of proof rests with the Patent Proprietor, who chose to define the claimed product in terms of features of the process for its preparation, to convincingly demonstrate that a product (starch

dispersion) obtained by the method of Claim 9 as granted necessarily differs from the product obtained according to C12/Example 10.

In the absence of any indication suggesting that this could be the case, the Board can only conclude that the definition of the starch dispersion of Claim 15 by means of a reference to the method of Claim 9 does not imply that the claimed dispersion may be distinguished, in terms of at least one chemical or physical property, from that of Example 10 of C12.

2.3 For the sake of completeness, the Board observes that although novelty of the subject-matter according to Claim 15 as granted is not dealt with in the decision under appeal, it is not a "new" issue since a novelty objection to claim 15 based on C12 had already been raised by Opponent 2 in its notice of opposition (see page 13; C12 referred to as "D3"), and was maintained in its response (see Point III.2.13) to the statement setting out the grounds of appeal.

2.4 Hence, in the Board's judgement, the subject-matter of Claim 15 lacks novelty (Articles 52(1) and 54(3) EPC).

2.5 Consequently, the Main request is not allowable.

Admissibility of Auxiliary Requests 1 to 16

3. In writing, Opponent 2/Respondent II had objected against the allegedly "excessive" number of Auxiliary Requests filed by the Patent Proprietor upon appeal.

3.1 However, during the oral proceedings, the opponents did not specifically call into question admissibility of one or more of the upheld auxiliary claim requests into

the proceedings, but merely objected to their allowability.

- 3.2 Therefore, the Board saw no reason for not admitting these requests filed under cover of the statement of grounds.

Auxiliary Requests 1 and 7 - extension of the protection conferred - product Claim 15

4. Comparison of Claim 15 at issue to Claims 1 and 15 as granted

- 4.1 Product-by-process type Claim 15 as granted is directed to "a **starch dispersion**, obtainable by the method of any of Claims 9 to 14".

Product Claim 1 as granted is directed to "a **coating composition** comprising (i) a pigment and (ii) a starch dispersion", the latter being further defined in terms of a particle size range.

- 4.2 Amended Claim 15 according to Auxiliary Request 1 concerns "a **coating composition** comprising (i) a pigment and "(ii) a starch dispersion" as defined in Claim 15 as granted, i.e. obtainable by a method according to granted Claim 9.

- 4.3 Compared to Claim 1 as granted directed to a "**coating composition**", present Claim 15, also directed to a coating composition, is broader in scope since it does not impose any limitation size on the starch particles.

- 4.4 As explained in the description of patent in suit (e.g. in paragraphs [0011], [0012] and [0014]), the starch

dispersion can be used as (co-)binder in a "*coating composition*" comprising a pigment.

Compared to Claim 15 as granted directed to a "**starch dispersion**", present Claim 15 is directed to a different physical entity, i.e. a **coating composition** comprising not only a starch dispersion but also a suitable pigment.

4.5 Amended Claim 15 according to Auxiliary Request 1 does not further restrict the protection conferred by Claim 15 as granted (as regards **starch dispersions**) but shifts it to a **different** subject-matter (**coating composition**), whilst also extending it beyond the protection conferred by Claim 1 as granted (as regards coating compositions).

4.6 In the Board's judgement, Claim 15 according to Auxiliary Request 1 does not, therefore, meet the requirements of Article 123(3) EPC.

5. Claim 14 according to Auxiliary Request 7 is identical to Claim 15 according to Auxiliary Request 1. Thus, it does not meet the requirements of Article 123(3) EPC for the reasons given *supra* as regards Claim 15 of Auxiliary Request 1.

6. Consequently, Auxiliary Requests 1 and 7 are not allowable either.

Auxiliary Request 2 - Lack of novelty - Product Claim 1

7. Document C1

7.1 C1 (e.g. Page 2, left column, line 9, to right column, line 74) discloses an aqueous, film-forming and non-

migrating adhesive consisting of an aqueous suspension (i.e. dispersion) of starch (native or converted) obtained by crosslinking starch granules and thereafter subjecting them to heat pressure and fragmenting action in an extruder, milling the extrudate and suspending the product in water. The weight average particle size of the (swollen) crosslinked starch particles ("separate fragments") is in the range of from 1 to 10 μm , preferably 2 to 4 μm , with less than 15% of the particles being larger than 10 μm .

- 7.1.1 It is not in dispute that the starch suspension (i.e. dispersion) of C1 meets the particle size requirement of Claim 1 at issue.
- 7.1.2 Considering *inter alia* that according to all the examples of C1, crosslinking is carried out under **stirring** (page 5, lines 29; page 6, lines 25 and 87; page 7, line 61), the Board accepts that the person skilled in the art would understand that the method of C1 "*compris[es] a step of processing starch **using shear forces** and simultaneously crosslinking*" (emphasis added) required by Claim 1 at issue.
- 7.1.3 More particularly, the Board accepts, as argued by e.g. Opponent 1, that "*stirring*" inevitably implies the application of "*shear forces*" within the broadest meaning of Claim 1, the latter not being limited to carrying out the crosslinking reaction within an extruder.
- 7.1.4 The Board thus concludes that C1 discloses a starch dispersion meeting the definition as defined in step (ii) of Claim 1 at issue.
- 7.2 The general description part of C1 also comprises the

following statements (Page 2, lines 85-110; emphasis added by the Board)

"... the adhesion given by the small granule fragments is much better than that that can be obtained by the bulky unbroken swollen granules, especially when small particles must be held together, as in **pigment coating of paper**"; and

"The novel product according to the invention, therefore, can advantageously be used as adhesives in high speed applications ... such as .. the **pigment coating of paper**".

7.2.1 C1 thus directly and unambiguously discloses the use of the starch dispersion described (points 7.1 to 7.1.4, *supra*) in the pigment coating of paper. The Board accepts that, in other words, C1 thereby also discloses a coating composition as such, comprising a pigment as well as said (adhesive) starch dispersion, and being suitable for being used for paper coating.

7.2.2 The Appellant also argued that "pigment coating of paper" is only mentioned in C1 as one out of a long list of possible uses, and that a further choice has to be made among the different conditions for the dispersion of the starch fragments in water given in C1 (page 4, lines 1 to 10).

This argument is not convincing, as the invoked passages of C1 (page 4, lines 1 to 10) clearly disclose that the dispersion of the starch particles in cold, hot or boiling water always results in a suspension of granule fragments with the average particle size mentioned under Point 7.1, *supra*, and never in a solution as argued by the Appellant.

Hence, no two-fold selection or choice needs to be made

within C1 in order to arrive at a composition falling within the ambit of Claim 1 at issue.

7.3 In the Board's judgement, document C1 thus directly and unambiguously discloses to the person skilled in the art a coating composition with all the features of Claim 1 at issue.

7.4 The subject-matter of Claim 1 thus lacks novelty (Articles 52(1) and 54(1)(2) EPC).

7.5 Consequently, Auxiliary Request 2 is not allowable.

Auxiliary Request 8 - Lack of inventive step - Claim 1

8. The invention

The invention (see Claim 1 at issue) concerns a pigmented coating composition comprising a starch dispersion.

9. The closest prior art

9.1 At the oral proceedings, it was common ground between the parties that C1 discloses the closest prior art for the assessment of inventive step.

9.2 Considering the similarities between the patent in suit and C1 in terms of technical issues addressed and the products and uses concerned (composition for coating paper comprising a pigment and a starch dispersion as binder), the Board sees no reason for taking another stance in this respect.

10. C1 does not disclose the additional incorporation of a synthetic latex into the disclosed pigment coating

composition containing a dispersion of crosslinked fragments of starch granules. This is not in dispute.

11. The technical problem according to the Appellant

Referring to paragraph [0012] of the patent in suit, and in particular to the data presented in the supplemental experimental reports C26 and C30, the Appellant maintained that, in the light of the closest prior art C1, the claimed invention solved the problem of providing storage stable coating compositions with improved properties.

12. The solution

As a solution to the technical problem the patent in suit proposes a "*coating composition*" which is characterised in that it comprises, in addition to a pigment and a starch composition as defined in Claim 1, "***(iii) a synthetic latex***".

13. Alleged success of the claimed solution

13.1 C1 is neither acknowledged in the application as filed nor in the patent as granted. Hence, C1 was not considered when the problem mentioned in the patent in suit (paragraph [0012]) was formulated.

13.2 Invoking in particular C26 and C30, the Appellant argued that the starch dispersion obtained upon crosslinking whilst extruding, rather than before extrusion, resulted in starch dispersions advantageous in terms of their lower viscosity even at relatively high solids content and lower crystallinity of the starch particles. The former were thus particularly suitable for being used in stable pigment containing

coating compositions that could be used e.g. in paper coating.

- 13.3 However, the examples supposed to demonstrate the alleged improvements over the compositions of C1 all involve the use of starch dispersions obtained by **simultaneous extrusion and crosslinking**, whereas Claim 1 at issue does **not** require the starch dispersion component to be prepared by such a process, but merely defines a particle size criterion for the crosslinked starch particles to be respected.
- 13.4 Moreover, the Board notes that C1 not only discloses that the particle size of the cross-linked starch fragments produced (according to C1) is in the range defined in Claim 1 at issue (Point 7.1.1, *supra*), but also that the produced dispersions have "extremely low" viscosity (page 1, lines 90 to 94; page 2, lines 2, 45 to 46 and 55 to 63), thus implying that they may have a relatively high starch solids content. In any case, Claim 1 at issue does not require any particular solids content, whilst dispersions of 10 wt.-% solids content and having low viscosity are mentioned and illustrated in the examples of C1. Moreover, also the preferred starch particle dispersions of C1 are stable towards sedimentation (page 4, lines 12 to 18).
- 13.5 Thus, the comparative test results in C26 and C30 (the admissibility of which was not called into question by the Opponents), are not suitable to show that improvements can be attributed to those features (presence of synthetic latex component) which actually distinguish the claimed coating compositions from those of the closest prior art C1.

14. Reformulation of the technical problem

14.1 In view of the above finding, the technical problem actually solved must be reformulated in less ambitious terms. It can be seen in providing a further pigmented coating composition, suitable for coating e.g. paper.

14.2 The examples in the patent in suit show that this less ambitious problem is effectively solved by the composition of Claim 1 at issue. This is not in dispute.

15. Obviousness of the solution

15.1 It remains to be decided whether in the light of the closest prior art (paper coating composition of C1), the claimed solution was obvious, i.e. whether the additional incorporation a synthetic latex into the coating composition of C1 was an obvious measure for the person skilled in the art seeking to solve the technical problem posed (Point 15.1, *supra*).

15.2 On the one hand, document C1 does not require the starch dispersion to be used as the sole binder ("adhesive") component of the compositions disclosed. Quite to the contrary, it is expressly mentioned in D1 (see e.g. page 2, lines 113 to 116) that "the novel products [i.e. the starch dispersion] can **advantageously be used in admixture with other adhesives**, such as polyvinyl acetate or polyvinyl alcohol" (emphasis added).

15.3 On the other hand, it belongs to common general knowledge in the technical field of paper coating compositions as illustrated by e.g. document C13, that an aqueous coating composition comprising pigment may

comprise more than one binder component (page 1.11, point C 1.30), and that starch, latex and polyvinyl alcohol are commonly used binders each having its advantages (pages 7.3 and 7.4, Point 7.5), starch being cost effective, synthetic latex may be tailor made at low viscosities and high binding power, and polyvinyl alcohol being a very good binder too, but has high cost.

15.4 Synthetic latices are thus well known and widely used binder components for paper coating compositions. They are also available in formulations of very low viscosity and, thus, compatible with the low-viscosity starch dispersion of C1.

15.5 In the light of common general knowledge the skilled person merely seeking to provide a further pigmented composition for the coating of e.g. paper would thus certainly consider using a synthetic latex binder component in admixture with the starch dispersion of C1. Providing a composition suitable for coating e.g. paper and comprising a pigment, a starch dispersion as described in C1 and, additionally, some synthetic latex, is thus one out of several equally obvious ways (mixtures of binder components) of solving the technical problem posed. By doing so, the person skilled in the art would arrive at a composition as defined in Claim 1 at issue without ingeniousness.

15.6 Hence, in the Board's judgement, the subject-matter of Claim 1 at issue does not involve an inventive step (Articles 52(1) and 56 EPC).

16. Consequently, Auxiliary Request 8 is also not allowable.

Auxiliary Requests 12 to 14 - Lack of inventive step

17. At the oral proceedings, made aware of the Board's view that the coating composition of Claim 1 according to Auxiliary Request 8 was not inventive in the light of C1 and common general knowledge (C13), and of the provisional view that the use Claims 1 of Auxiliary Requests 12 to 14 did not, therefore, appear to involve an inventive step either, the Appellant did not wish to make any further comments in this respect.

18. Taking into account the above findings regarding the obviousness of the coating composition according to Claim 1 of Auxiliary Request 8, the subject-matter of (independent use) Claim 1 according to each of Auxiliary Requests 12 to 14 do not, for the following reasons, involve an inventive step either (Article 52(1) and 56 EPC):

18.1 Claim 1 of Auxiliary Request 12 is directed to the use of of a starch dispersion as defined in Claim 1 as granted "*as a co-binder in pigmented coating compositions*".

The considerations of the Board regarding the obviousness of a composition for coating paper comprising a pigment as well as starch and synthetic latex latex **as (co-)binders** apply analogously to the use Claim 1 at issue.

18.2 Claim 1 according to Auxiliary Request 13 is directed to the use of a starch dispersion defined as in Claim as granted "*as a binder in pigmented coating composition*" and does not even require the presence of a synthetic latex component. The very purpose of using the starch dispersions according to C1 in a paper

coating composition comprising pigment (page 2, lines 100 to 103 and 109 to 110) being their adhesiveness, i.e. binding power. Hence, such use is, to the least, obvious over C1 taken alone.

- 18.3 Claim 1 of Auxiliary Request 14 is directed to the "use of a coating composition" as defined in Claim 1 as granted "as a coating color in paper coating".

One of the purposes of coating paper with a composition comprising a pigment is to impart a certain colour to the coated paper (e.g. white). Hence, the wording "as a coating color in" does not distinguish the claimed subject-matter, let alone in a non-obvious way, from the use of the starch dispersion according to C1 "in the pigment coating of paper" (page 2, lines 90 and 109 to 110).

19. It follows from the foregoing that none of Auxiliary Requests 12 to 14 is allowable.

Auxiliary Request 15 - Lack of novelty - Method Claim 1

20. Claim 1 according to Auxiliary Request 15 is identical to Claim 9 as granted (wording under II, *supra*).

- 20.1 As set out in Point 2.2.4, *supra*, it is not in dispute that document C12/Example 10 discloses a method with all the features of Claim 9 as granted.

The subject-matter of this Claim 1 at issue thus lacks novelty (Articles 52(1) and 54(3) EPC).

- 20.2 Therefore, Auxiliary Request 15 is not allowable.

Auxiliary Request 16 - Non-compliance with Article 123(2) EPC

21. Claim 1 according to Auxiliary Request 16, like Claim 9 as granted, is directed to "*a method of preparing a dispersion of starch particles*", but additionally comprises the further step of "*adding a pigment to the obtained dispersion*".

21.1 The Appellant argued that this amended claim found basis in the application as filed, namely in Claim 11, taken in combination with the disclosure of page 2, last full paragraph.

21.1.1 Claim 11 of the application as filed is identical to Claim 9 as granted, directed to the preparation of a starch dispersion.

21.1.2 The last full paragraph of page 2 of the application as filed reads as follows:

"It was found by the present inventors that starch dispersions can be used as the binder in a pigmented coating composition. The coating composition of the present invention comprises a pigment and a starch dispersion of discrete crosslinked starch particles in an aqueous liquid."

21.2 This description passage however merely discloses that **starch dispersion**, the preparation of which is defined in Claim 9 as granted, can be used as a binder in a "**pigmented coating composition**". It does **not** disclose a **method for the preparation** of a coating composition within the meaning of the patent in suit, comprising pigment and an aqueous dispersion of discrete cross-linked starch particles, the particles size ranging from 200 nm to 100 µm.

- 21.3 Moreover, none of the other claims of the application as filed is directed to a method for preparing a starch dispersion comprising the addition of a pigment.
- 21.4 The example (bridging pages 11 and 12) of the application as filed relating to paper coating indeed shows that a "*coating composition*" within the meaning of the patent in suit comprises the starch dispersion and pigments as necessary to obtain a coating formulation, i.e. a formulation to be coated on paper to impart sought-for properties to the paper, as described in the application as filed (pages 14 to 16). The preparation of the paper coating formulations described involves mixing the pigment(s) in form of an aqueous dispersion with a relatively small amount of the starch dispersion.
- 21.5 The Board thus concludes that the application as filed contains no direct and unambiguous description of a generic method for the preparation of a "*starch dispersion*" to which a pigment (of whatever type and amount) is added, i.e. which need not be suitable for use in a "*coating composition*" within the meaning of the patent in suit, e.g. for paper coating.
- 21.6 Hence, to the extent that the claimed method for the preparation of a pigmented starch dispersion is not limited to the production of pigmented coating compositions as disclosed in the application as filed, it represents subject-matter extending beyond the content of the application as filed.
- 21.7 In the Board's judgement, Claim 1 according to Auxiliary Request 16 does not meet the requirements of Article 123(2) EPC.

21.8 Auxiliary Request 16 is thus not allowable.

Auxiliary Request 17 - not admitted into the proceedings

22. Auxiliary Request 17 was filed at a late stage of the oral proceedings. Its admission into the proceedings is a matter for the Board's discretion (Article 13(3) RPBA).

22.1 The Respondents requested that this claim request be not admitted into the proceedings in view of its late filing and considering that it gave rise to further objections under Articles 123 (2) and (3) and Rule 80 EPC.

22.2 The Appellant justified the late filing of this claim request by arguing that it was intended to overcome the objection under Article 123(2) EPC against Auxiliary Request 16, raised for the first time during oral proceedings. It argued that this new claim request was clearly allowable, as it was based on Claim 11 as originally filed and on a specific passage of the description, which had been literally identically inserted in Claim 1 at issue.

22.3 Claim 1 of Auxiliary Request 16 had, however, already been objected to under Article 123(2) EPC in the reply of Opponent 2 (page 24/24, Point 16, referring back to page 21/24, point 11) to the Appellant's statement of grounds.

22.4 None of the claims as granted (see wordings of independent claims under Point II, *supra*) is directed to a "*method of **preparing a coating composition comprising a pigment***" as is (emphasis added).

22.5 Moreover, Claim 1 according to Auxiliary Request 17 comprises no limitation as to the starch particle size. The protection conferred by this Claim 1, extending to coating compositions directly obtained by the method claimed (Article 64(2) EPC), is thus broader than the protection conferred by product Claim 1 as granted (limited to coating compositions meeting the starch particles size criterion).

Hence, this claim request appears to be *prima facie* objectionable under Article 123(3) EPC). It thus is not clearly allowable but gives rise to at least this further objection.

22.6 In the exercise of its discretion under Article 13(3) RPBA the Board thus decided not to admit Auxiliary Request 17 into the proceedings.

Conclusion

23. None of the Appellant's pending claim requests is both admissible into the proceedings and allowable.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar:

The Chairman:



+D. Magliano

B. Czech

Decision electronically authenticated