

Internal distribution code:

- (A) [] Publication in OJ
(B) [] To Chairmen and Members
(C) [X] To Chairmen
(D) [] No distribution

**Datasheet for the decision
of 16 December 2009**

Case Number: T 1042/06 - 3.3.03

Application Number: 93301665.1

Publication Number: 0559476

IPC: C08F 220/04

Language of the proceedings: EN

Title of invention:

Method for the production of absorbent resin

Patentee:

NIPPON SHOKUBAI CO., LTD.

Opponent:

Stockhausen GmbH

Headword:

-

Relevant legal provisions:

EPC Art. 123, 107, 54, 56

Relevant legal provisions (EPC 1973):

-

Keyword:

"Scope of the appeal"

"Amendments (main request) - added subject-matter (no)"

"Novelty (main request) - yes"

"Inventive step (all requests) (no)"

Decisions cited:

G 0009/92, T 0453/87, T 0169/93, T 0653/93, T 0542/96

Catchword:

The criterion which has to be applied for the assessment of novelty is in principle the same which has to be applied when deciding on the allowability of amendments within the meaning of Article 123(2) EPC, namely as to whether or not the claimed subject-matter is clearly and unambiguously derivable from the prior art and the application as filed, respectively. In the present case, however, the application of this criterion leads to different results regarding the assessment of the amendments of the claims and novelty (Resons point 3.2.3).



Case Number: T 1042/06 - 3.3.03

DECISION
of the Technical Board of Appeal 3.3.03
of 16 December 2009

Appellant:
(Patent Proprietor) NIPPON SHOKUBAI CO., LTD.
1-1, Koraihashi 4-chome
Chuo-ku
Osaka-shi
Osaka-fu 541 (JP)

Representative: Rees, David Christopher
Kilburn & Strode LLP
20 Red Lion Street
London WC1R 4PJ (GB)

Respondent:
(Opponent) Stockhausen GmbH
Bäckerpfad 25
D-47805 Krefeld (DE)

Representative: Neumann, Ditmar
KNP Patentanwälte
Kahlhöfer Neumann Herzog Fiesser
Postfach 10 33 63
D-40024 Düsseldorf (DE)

Decision under appeal: Decision of the Opposition Division of the
European Patent Office dated 5 April 2006 and
posted 8 May 2006 revoking European patent
No. 0559476 pursuant to Article 102(1) EPC
1973.

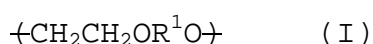
Composition of the Board:

Chairman: R. Young
Members: W. Sieber
H. Preglau

Summary of Facts and Submissions

I. The mention of the grant of European patent No. 0 559 476, in respect of European patent application No. 93301665.1, in the name of Nippon Shokubai Co., Ltd., filed on 4 March 1993 and claiming priority from JP 48321/92 (5 March 1992), was published on 16 July 1997 (Bulletin 1997/29). The granted patent contained 11 claims, whereby Claim 1 read as follows:

"A method for producing an absorbent resin by polymerizing a water-soluble monoethylenically unsaturated monomer in the presence of a cross-linking agent and heat-treating the resultant polymer, which method of production is characterized by the fact that said cross-linking agent is a cross-linking agent possessing at least two polymerizable unsaturated groups and further possessing between said two polymerizable unsaturated groups at least one unit represented by the formula I:



wherein R¹ is an alkylene group of 2 to 4 carbon atoms, said cross-linking agent is used in a proportion in the range of from 0.01 to 0.3 mol% based on the amount of said water-soluble monoethylenically unsaturated monomer, and the heat treatment is carried out at a temperature in the range of from 160° to 230°C."

Dependent Claims 2-11 were directed to elaborations of the method of Claim 1.

II. Notice of opposition was filed on 11 April 1998 by Stockhausen GmbH & Co. KG (now Stockhausen GmbH; opponent), invoking the grounds pursuant to Article 100(a) EPC, in particular that the claimed subject-matter lacked novelty and was not founded on an inventive step.

III. In a decision announced orally on 18 January 2001 and issued in writing on 8 May 2001, the opposition division revoked the patent because the claimed subject-matter lacked novelty over document G2 and did not involve an inventive step over G2.

G2: EP 0 372 981 A2.

IV. On 26 March 2001, the proprietor lodged an appeal against the above decision of the opposition division.

In its decision T 360/01 of 21 October 2003, the board of appeal held that the claims of the main request then on file met the requirements of Articles 123(2) and (3) and 84 EPC. Furthermore, the subject-matter of the claims of the main request was considered to be novel over G2. However, in view of the relevance of an experimental report submitted by the appellant, the board did not consider the issue of inventive step, and referred the case back to the first instance for further prosecution.

V. During the continuation of the opposition procedure, the opponent filed *inter alia* the new document G19, which was introduced by the opposition division into the proceedings because it was *prima facie* highly relevant.

G19: EP 0 349 240 A2.

By a decision which was announced orally on 5 April 2006 and issued in writing of 8 May 2006, the opposition division revoked the patent because none of the numerous requests filed by the proprietor (main request, first to ninth auxiliary requests) met the requirements of the EPC.

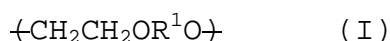
VI. On 3 July 2006 the proprietor (appellant) lodged an appeal against the decision of the opposition division, the prescribed fee being paid on 6 July 2006.

A statement setting out the grounds of appeal including new claim sets was filed on 7 September 2006. The appellant maintained the eighth auxiliary request refused by the opposition division for lack of inventive step as its main request and added new first to third auxiliary requests.

(a) Claim 1 of the main request read as follows:

"A method for producing an absorbent resin by polymerizing a water-soluble monoethylenically unsaturated monomer selected from the group consisting of an acid group-containing monomer, a metal salt, an ammonium salt and an amine salt of said acid group-containing monomer, a nonionic hydrophilic group-containing monomer, an amino group-containing monomer and a quaternary compound of said amino group-containing monomer in an aqueous solution in the presence of [*sic*] cross-linking agent and heat-treating the resultant

polymer, which method of production is characterized by the fact that said cross-linking agent during polymerization is a cross-linking agent possessing at least two polymerizable unsaturated groups and further possessing between said two polymerizable unsaturated groups at least one unit represented by the formula I:



wherein R¹ is an alkylene group of 2 to 4 carbon atoms, and possesses a molecular weight of 6000 or less, said cross-linking agent is used in a proportion in the range of from 0.03 to 0.2 mol% based on the amount of said water-soluble monoethylenically unsaturated monomer, further after polymerization, another cross-linking agent having at least two reactive groups capable of reacting with the functional groups of the polymer is mixed with the polymer, and then the heat treatment and reaction is carried out at a temperature in the range of from 160° to 230°C."

- (b) Claim 1 of the first auxiliary request differed from Claim 1 of the main request in that the water-soluble monoethylenically unsaturated monomer was defined as follows:

"... water-soluble monoethylenically unsaturated monomer containing 50% by weight or more of at least one member selected from the group consisting of acrylic acid and alkali salts, ammonium salt, and amine salts of acrylic acid ...".

- (c) Claim 1 of the second auxiliary request differed from Claim 1 of the main request in that the temperature range for the heat treatment was narrowed down to "180° to 200°C".
- (d) Claim 1 of the third auxiliary request differed from Claim 1 as granted in that it contained the restrictions of both previous auxiliary requests, namely the definition of the water-soluble monoethylenically unsaturated monomer and the restricted temperature range for the heat treatment.
- (e) The arguments of the appellant may be summarized as follows:

It had been established before the opposition division that Claim 1 of the now submitted main request (corresponding with Claim 1 of the eighth auxiliary request before the opposition division) complied with Articles 123, 84 and 54 EPC. Since this decision had not been appealed by the opponent, objections under these articles could no longer be raised.

The opposition division had used the benefit of hindsight to try and support a judgement of lack of inventive step over document G2 and/or document G19.

An object of the patent in suit was to provide a method for the production of an absorbent resin which had a high absorption ratio, contained a water-soluble component only in a small proportion,

and excelled in stability to withstand the effect of aging. Such beneficial effects in combination were not taught by G19. In fact, the overall properties of the resins of the patent in suit were substantially better than those of Example 4 of G19. This improvement was not obvious in the light of the disclosure of G19. In this connection, the appellant submitted a declaration executed by Mr Kunihiko Ishizaki and dated 25 August 2006 in which the content of water-soluble component of the resin of Example 4 of G19 was determined according to the method of the patent in suit. The measured value for Example 4 of G19 was 24% by weight which contrasted unfavourably with the values of 8-12% obtained in the examples in the patent in suit.

With regard to document G2, the appellant argued that the properties of the compositions obtained according to the claimed method were substantially better across the range of properties when compared with the examples in G2. In particular, with reference to Example 16 in G2, the properties of the resins made according to the claimed method were substantially better in the two main categories of the absorption ratio and the content of the water-soluble component.

VII. In a letter dated 22 May 2007, the respondent (opponent) submitted further prior art, namely

G22: EP 0 574 260 A1;

G23: EP 0 467 073 A1; and

G24: EP 0 450 924 A2.

The respondent disagreed with the appellant that objections under Articles 123, 84 and 54 EPC could no longer be raised against the claims of the main request, and referred in this connection to T 542/96.

According to the respondent, the subject-matter of Claim 1 of the main request was anticipated by the disclosure of G2 and G19.

Example 16 of G2 disclosed all the features of Claim 1 of the main request except that the heat treatment of the absorbent resin occurred at 130°C instead in the range of from 160-230°C. However, G2 also taught higher heat treating temperatures, such as 200°C in other examples or temperatures up to 220°C in the description of G2. Since the teaching of a document was not limited to the specific examples thereof, but had to be considered as a whole, the subject-matter of Claim 1 of the main request was not novel over G2.

A similar line of argument was brought forward in view of Example 4 of G19 which disclosed all the features of Claim 1 of the main request except the appropriate amount of the first cross-linking agent.

Furthermore, the subject-matter of claim 1 of the main request lacked novelty over G22, since the subject-matter of Claim 1 of the main request was not entitled to the claimed priority date of 5 March 1992.

The respondent agreed with the decision under appeal that the subject-matter of the eighth auxiliary request before the opposition division (now the subject-matter of the main request) lacked an inventive step. In particular, it had not been demonstrated that the combination of features as required in Claim 1 of the main request had any advantageous effect over G2 and G19.

In addition, the respondent pointed out that Claim 1 of the main request did not indicate the duration of the heat treatment. It could not be expected that very short heat treatments (eg duration of only one minute) would produce any advantageous effect over the prior art.

VIII. In a letter dated 5 August 2008, the appellant pointed out that the claim to priority was correct. Therefore, there was no lack of novelty in view of G22. Further, neither G2 nor G19 disclosed the claimed subject-matter directly and unambiguously.

With regard to inventive step, the appellant pointed out that, according to the invention, the decrease in the absorption capacity could be repressed and the stability of the swelled gel could be improved without increasing the content of water-soluble component. In this connection, two statutory declarations executed by Mr Kunihiko Ishizaki were submitted to confirm the content of the "Additional Comparative Experiments" filed with the letter of 6 February 2006 during the opposition procedure and the comparative data filed with the letter of 7 September 2006.

Finally, the appellant requested that the case be remitted to the opposition division for a full consideration of the ground of sufficiency, since the respondent had remarked upon an alleged insufficiency and this issue had not been a ground of opposition.

- IX. In a letter dated 20 October 2009, the appellant summarized its position and elaborated on the "Additional Comparative Experiments" filed with the letter of 6 February 2006 during the opposition procedure.
- X. In a letter dated 16 November 2009, the respondent objected under Article 123(2) EPC against Claim 1 of the main request, because the combination of features as presented in the claim was not clearly and unambiguously derivable from the application as filed, in particular not the combination of a specific molecular weight and amount of a first cross-linking agent with a heat treatment in the presence of a further surface cross-linking agent.

With regard to lack of novelty in view of G2, G19 and G22, the respondent reiterated its position. Further, it was argued that the claimed subject-matter was not inventive, whether when starting from Example 4 of G19 as the closest prior art or when starting from Example 16 of G2. The additional comparative experiments relied upon by the appellant could not demonstrate any technical advantage over the closest prior art. In fact, these additional experiments did not provide a proper comparison against the closest prior art.

Apart from that, the respondent questioned the criticality of the heat treating temperature indicated in Claim 1, since different types of surface cross-linking agents required different temperatures. In this connection, documents G25 and G26 were filed.

G25: Affidavit of Dr L. Wattebled dated 16 November 2009; and

G26: Modern Superabsorbent Polymer Technology, edited by F.L. Buchholz and A.T. Graham, 1998, John Wiley & Sons, Inc., pages 152-153.

XI. On 16 December 2009, oral proceedings were held before the board.

(a) The respondent maintained its objection that that the combination of features as presented in Claim 1 of the main request was not clearly and unambiguously derivable from the application as filed. The appellant disagreed with this opinion and pointed to the various passages in the application as filed which formed the basis for Claim 1. Further, the respondent pointed out that Example 6 of the application as filed was an example according to Claim 1 of the main request and therefore supported the claimed combination of features.

(b) With regard to sufficiency of disclosure, the appellant did not pursue its written submission that the case be remitted to the first instance for a full consideration of this issue.

- (c) With regard to novelty in view of G2, G19 and G22 (including the issue of priority), the parties basically relied upon their written submissions.

- (d) With regard to inventive step, both parties basically relied on their written submissions whereby the respondent considered Example 4 of G19 to represent the closest prior art. The respondent pointed out that there was no convincing evidence on file for a technical effect achieved by the claimed subject-matter over the closest prior art. Thus, the objective technical problem had to be seen in the provision of an alternative method. The solution of this problem was, however, obvious from G19 itself.

The appellant argued that G25 and G26 should not be admitted into the proceedings.

- (e) When the chairman pointed out that the inventive step arguments presented in connection with the main request equally applied to the subject-matter of each Claim 1 of the first to third auxiliary requests, the representative of the appellant stated that he had nothing further to add.

XII. The appellant requested that the decision under appeal be set aside and the patent be maintained on the basis of the main request, or, in the alternative, on the basis of the first, second or third auxiliary requests, all requests filed with letter dated 7 September 2006.

The respondent requested that the appeal be dismissed.

Reasons for the Decision

1. The appeal is admissible.

2. *Scope of the appeal*

2.1 The appellant has argued in its written submissions, that objections under Articles 123, 84 and 54 EPC could no longer be raised against the claims of the main request, since the opposition division had already acknowledged that these claims met the requirements of these articles and the respondent (opponent) had not appealed against this decision (point VI(e), above).

Although this argument was no longer pursued at the oral proceedings before the board, it appears appropriate to point out at this juncture that the opposition division has revoked the patent in suit, and that the respondent was not adversely affected by this decision within the meaning of Article 107 EPC, first sentence, because that decision was in conformity with the respondent's request for revocation of the patent in its entirety. Furthermore, as pointed out in G 9/92 (OJ EPO 1994, 875, points 8 and 11, second paragraph, of the reasons) "A non-appealing party as a respondent has the opportunity to make what it considers to be appropriate and necessary submissions in the appeal proceedings to defend the result obtained before the first instance." Thus, when a decision revoking a patent pursuant to Article 101(2) EPC has been taken, it is open to a respondent to re-argue matters which had already been on issue before the opposition division. If a respondent wishes to contend in the

appeal proceedings that a particular issue in the decision under appeal was wrongly assessed, even though the overall result of said decision was in its favour, there is nothing in the EPC which could prevent the respondent from doing so (in this context see eg T 169/93 of 10 July 1996, point 2 of the reasons, and T 542/96 of 11 May 2000, point 2 of the reasons, neither decision published in the OJ EPO).

Hence, the scope of the present appeal proceedings embraces the objections, in particular with regard to Articles 123 and 54 EPC, raised by the respondent against the claims of the main request.

- 2.2 The appellant requested in its written submissions that the case be remitted to the first instance for a full consideration of the ground of sufficiency (point VIII, above). The reason for this request was essentially the respondent's argument that the technical effect provided by the claimed process, if any, was not achieved over the whole scope of the claimed method, namely at very short heat treatments. However, this objection has been raised in connection with the issue of inventive step. Since, furthermore, a sufficiency objection has never been raised in the opposition and opposition appeal proceedings relating to the present case, the issue of sufficiency does not form part of the present appeal proceedings. Consequently, the appellant's request for remittal of the case is unfounded. Apart from that, the appellant has not pursued this issue at the oral proceedings before the board.

3. *Main request*

3.1 Amendments

3.1.1 Claim 1 of the main request (point VI(a), above) is based on:

- Claim 1 as originally filed, which is identical to Claim 1 as granted (point I, above),
- Claim 2 as originally filed, which is identical to Claim 2 as granted (upper limit of the molecular weight of the cross-linking agent),
- Claim 6 as originally filed, which is identical to Claim 6 as granted (0.03 to 0.2 mol% of cross-linking agent),
- Claim 11 as originally filed, which is identical to Claim 11 as granted (heat treatment in the presence of a second cross-linking agent),
- page 4, lines 16-31 of the application as filed (definition of the water-soluble monoethylenically unsaturated monomer),
- page 8, lines 24-30 of the application as filed (polymerization in aqueous solution), and
- page 12, lines 11-16 (mixing of the second cross-linking agent with the polymer and reaction).

3.1.2 The respondent has never challenged that each of the features of Claim 1 of the main request has a basis in the application as filed. The thrust of its objection under Article 123(2) EPC was that the combination of features as presented in Claim 1 of the main request is not clearly and unambiguously derivable from the application as filed, in particular a specific molecular weight and amount of the first cross-linking agent in combination with a heat treatment in the presence of a further cross-linking agent (ie surface cross-linking).

It is true that the original claims provide no basis for this particular combination, because both Claim 2 as filed (basis for the molecular weight) and Claim 6 as filed (basis for the restricted amount) and Claim 11 as filed (basis for the heat treatment including surface cross-linking) each refer back to Claim 1 only. Thus, the original claim structure does not contemplate the combinations of Claims 1, 2, 6 and 12 as filed. However, the combination of these features is, in the board's view, clearly and unambiguously derivable from the application as filed for the following reasons. Firstly, it is stated on page 6, lines 15-16 of the application as filed that "The molecular weight of the cross-linking agent (I) preferably does not exceed 6,000." Likewise it is stated at page 8, lines 19-20 of the application as filed that "Preferably, this amount [ie of the cross-linking agent (I)] is in the range of from 0.03 to 0.2 mol%." Thus, it is evident that these passages describe a preferred structural property (the molecular weight) and a preferred amount to be used of one and the same chemical compound, namely the cross-linking agent (I). It is at least implicitly clear to

the person skilled in the art that different preferred aspects of one and the same compound mutually apply to each other.

Secondly, it is stated at page 12, lines 11-15 that "In preparation for the heat treatment of the polymer at a temperature in the specific temperature range of this invention, the polymer may be mixed with a third cross-linking agent ...". Thus, the presence of a further cross-linking agent applies to all aspects of the invention, including the at least implicitly disclosed combination of the above mentioned preferred aspects of the cross-linking agent (I).

Finally, this combination of features is supported by Example 6 of the application as filed. This example discloses in particular the use of a cross-linking agent (I) having a molecular weight below 6,000 and being used in an amount of 0.1 mol% (ie in an amount falling within the range required in Claim 1) in combination with a heat treatment at 180°C including a further surface cross-linking agent.

In view of the above, the board comes to the conclusion that the combination of features in Claim 1 of the main request is clearly and unambiguously derivable from the application as filed. Hence, Claim 1 of the main request meets the requirements of Article 123(2) EPC.

3.2 Novelty

The respondent contested the novelty of the subject-matter of Claim 1 of the main request in view of G2, G19 and G22.

3.2.1 Document G2 relates to a method for the production of an absorbent resin (D), which method comprises polymerising (A) an aqueous solution of a water-soluble ethylenically unsaturated monomer containing (B) 0.005 to 5 mol% of a cross-linking agent and (C) 0.001 to 1 mol% of a water-soluble chain transfer agent (Claim 1). The surface region of the absorbent resin (D) may be further cross-linked with a hydrophilic cross-linking agent (E) capable of reacting with the functional groups of the absorbent resin (D) (page 7, lines 28-30). The surface cross-linking reaction is effected by mixing the absorbent resin (D) with the hydrophilic cross-linking agent (E) and heating the resultant mixture in the range of 40-250°C, preferably 90-220°C (page 9, lines 4-12).

It is particularly preferable to use acrylic acid as a main component of the monomer (A), whereby the content of acrylic acid and an alkali metal salt and/or an ammonium salt thereof is preferably not less than 50% by weight, preferably not less than 75% by weight.

The compounds useful as the cross-linking agent (B) are compounds "possessing at least two polymerically unsaturated groups or reactively functional groups in the molecular unit thereof", whereby the former are preferred (page 4, lines 26-28 and lines 41-42). On page 4, lines 28-33 it is stated that "The compounds possessing at least two polymerically unsaturated groups in the molecular unit thereof and usable as the cross-linking agent (B) include N,N'-methylenebisacrylamide, (poly)ethylene glycol di(meth)acrylates, (poly)propylene glycol di(meth)acrylates, glycerol

tri(meth)acrylates, glycerol acrylate methacrylate, polyvalent metal salts of (meth)acrylic acids, trimethylol propane tri(meth)acrylates, triallylamine, triallyl cyanurate, triallyl isocyanurate, and triallyl phosphate". No reference is made to a molecular weight limit for the cross-linking agent (B).

In Example 16 of G2, an absorbent resin is obtained by polymerizing acrylic acid and sodium acrylate in the presence of 0.2 mol% polyethylene glycol diacrylate (n=8) (ie having a molecular weight well below 6000). Then the resin is surface cross-linked at a temperature of 130°C, ie a temperature below the range defined in Claim 1 of the main request.

It is clear from the above analysis of G2 that G2 individually discloses all the elements of Claim 1 of the main request, but there is no disclosure for the **combination** of features set out in Claim 1 of the main request. In order to arrive at such a combination, one would have to make several selections from the disclosure of G2, namely one would have to select a (poly)ethylene glycol di(meth)acrylate as cross-linking agent (B), having a molecular weight of 6000 or less, and a temperature within the range of 160-230°C for the heat treatment, if surface cross-linking were to be applied.

As set out in, for example, T 453/87 of 18 May 1989 (not published in the OJ EPO; point 7.2 of the reasons) and T 653/93 of 21 October 1996 (not published in the OJ EPO, point 3.2 of the reasons), in case of a "multiple selection", one would have to show that the "combined selection" emerges from the prior art.

While it is true that G2 generally mentions that the heat treatment could be carried out at a temperature preferably in the range of from 90°C to 220°C in the presence of the hydrophilic cross-linking agent, this does not, however, imply that the heat treatment is inevitably carried out in the range between 160°C and 220°C when the first cross-linking agent is a polyethylene glycol di(meth)acrylate, which is the only cross-linking agent among the listed cross-linking agents (B) which would meet the requirements set out in Claim 1 of the main request, without, however, specifying its molecular weight. On the contrary, Example 16, where a polyethylene glycol diacrylate is used as the cross-linking agent (B), shows that the heat treatment, although carried out at a temperature (130°C) belonging to the preferred range mentioned in G2, is effected at a temperature well outside the range required in Claim 1 of the main request (ie 160-220°C).

Thus, in the present case, a person skilled in the art had no reason, when applying the teaching of G2, to concentrate on the combination of features set out in Claim 1 of the main request. Such a combined selection is neither explicitly disclosed nor implicitly hinted at in G2 and therefore not clearly and unambiguously derivable from G2. Consequently, the subject-matter of Claim 1 of the main request, and, by the same token, the subject-matter of Claims 2-8, is novel over G2.

3.2.2 Document G19 discloses a water-absorbent resin of particular particle size and particle size distribution obtained from polymerization of a water-soluble ethylenically unsaturated monomer followed by surface

cross-linking the polymer particles. The surface cross-linking comprises heat-treating a mixture of the polymer powder and a surface cross-linking agent at a temperature in the range of from 40-250°C, preferably in the range of from 80-200°C (page 8, lines 31-41).

Acrylic acid is one of the preferred water-soluble ethylenically unsaturated monomers for making the water-absorbent resin (page 4, lines 49-58).

The water-absorbent polymer powder of G19 comprises a self-cross-linking polymer prepared in the absence of a cross-linking agent and a copolymer prepared with a small amount of cross-linking agent, which has polymerizable unsaturated groups or reactive functional groups. As examples for cross-linking agents having polymerizable unsaturated groups, reference is made to N,N-methylene-bis(meth)acrylamide, N-methylol(meth)acrylamide, ethylene glycol (meth)acrylate, polyethylene glycol (meth)acrylate, propylene glycol (meth)acrylate, polypropylene glycol (meth)acrylate, glycerol tri(meth)acrylate, glycerol mono(meth)acrylate, polyfunctional metal salts of (meth)acrylic acid, trimethylol propane tri(meth)acrylate, triallylamine, triallyl cyanurate, triallyl isocyanurate, triallyl phosphate, and glycidyl (meth)acrylate (page 5, lines 7-14). No reference is made to a molecular weight limit for the cross-linking agent (B). The amount of the cross-linking agent is in general 0.001 to 1.0 mol (page 5, lines 31-32).

In Example 4 of G19, 65.8 g of sodium acrylate (0.3 mol) and 21.6 g acrylic acid (0.7 mol) are polymerized in the presence of 0.076 g polyethylene

glycol diacrylate (n=14) as cross-linking agent in aqueous solution. The cross-linking agent is present during the polymerization in an amount of 0.0001 mol (0.01 mol% based on the amount of the monomers). The resulting polymer powder is dried at 80°C and then mixed with a surface cross-linking agent (glycerol). The resulting mixture is heat treated at 180°C. Thus, Example 4 of G19 discloses all the features of Claim 1 of the main request except that the amount of the first cross-linking agent, ie the polyethylene glycol diacrylate, is too low.

Thus, the novelty situation regarding G19 is similar to the situation regarding G2: All the elements of Claim 1 of the main request are individually disclosed in G19, but there is no disclosure in G19 concerning the combination of features set out in Claim 1 of the main request. Once again, in order to arrive at such a combination, one would have to make several selections from the disclosure of G19, namely one would have to select the copolymer type as the basis absorbent resin with a (poly)ethylene glycol (meth)acrylate as cross-linking agent, having a molecular weight of 6000 or less, and a temperature within the range of 160-230°C for the surface cross-linking heat treatment.

As in G2, a person skilled in the art had no reason, when applying the teaching of G19, to concentrate on the combination of features set out in Claim 1 of the main request. Such a combined selection is neither explicitly nor implicitly hinted at in G19 and therefore not clearly and unambiguously derivable from G19. Consequently, the subject-matter of Claim 1 of the

main request, and, by the same token, the subject-matter of Claims 2-8, is novel over G19.

- 3.2.3 The board agrees with the respondent that the criterion which has to be applied for the assessment of novelty is in principle the same which has to be applied when deciding on the allowability of amendments within the meaning of Article 123(2) EPC, namely as to whether or not the claimed subject-matter is clearly and unambiguously derivable from the prior art and the application as filed, respectively. In the present case, however, the application of this criterion leads to different results regarding the assessment of the amendments of the claims and novelty.

As regards the amendments in Claim 1 of the main request, the board has come to the conclusion that the combination of features in amended Claim 1 of the main request is clearly and unambiguously derivable from the application as filed, because that combination is hinted at by the general presentation of the individual features in the application as filed and by Example 6 in the application as filed (see point 3.1.2, above). By contrast, neither G2 nor G19 provide such pointers to the claimed subject-matter. Thus, the respondent's allegation that in the present case a positive finding on the allowability of the amendments to Claim 1 of the main request would entail a finding of lack of novelty over G2 and G19 cannot be accepted.

- 3.2.4 The respondent alleged that the subject-matter of Claim 1 of the main request also lacked novelty over G22 (filed on 10 June 1993 and claiming priority from two Japanese applications of 10 June 1992 and

12 October 1992), since the subject-matter of Claim 1 of the main request was not entitled to the claimed priority date of 5 March 1992. The priority of the initial Japanese application was incorrectly claimed for the reason that the combination of features as set out in Claim 1 of the main request could not be directly and unambiguously found in the priority document.

However, the features of Claim 1 of the main request are presented in the priority document in a similar way as in the application as filed and can be found in Claim 1 of the first priority document (basically identical to Claim 1 as filed), paragraph [0020] (upper limit for the molecular weight of the cross-linking agent), Claim 4 (0.03 to 0.2 mol% of cross-linking agent), Claim 9 (heat treatment in the presence of a second cross-linking agent), paragraph [0013] (definition of the water-soluble monoethylenically unsaturated monomer), paragraph [0029] (polymerization in aqueous solution), and paragraph [0039] (mixing of the second cross-linking agent with the polymer and reaction). As regards the basis for the combination of these features, the same argumentation given in connection with Article 123(2) EPC in point 3.1.2, above, equally applies to priority except that in the priority document Example 5 ((which corresponds to Example 6 of the application as filed) supports the claimed combination of features.

It follows from the above that the subject-matter of Claim 1 of the main request can be clearly and unambiguously derived from the priority document, ie there is a full disclosure of "the same invention" in

the priority document. Therefore, the priority claim is correct.

Since the claim to priority is valid, there can be no lack of novelty in view of the later document G22 whose earliest priority date (10 June 1992) is later than the priority date of the patent in suit (5 March 1992).

3.3 Inventive step

- 3.3.1 The claimed subject-matter relates to a method for the production of an absorbent resin having a high absorption ratio, having a small water-soluble component, and being excellent in stability to resist the effect of aging (page 2, lines 3-5 of the patent specification).

The water-absorbent resin of G19 is described as being, in particular, superior to water absorption capacity, water absorption rate, suction force, and gel strength. Furthermore, the amount of water-soluble resin (ie water-soluble component) is said to be small (page 3, lines 5-10). Thus, G19, and in particular Example 4 of G19, discloses technical features and effects most similar to the subject-matter of Claim 1 of the main request. Consequently, the board considers Example 4 of G19, in line with the respondent, to represent the closest prior art.

- 3.3.2 In the next step of the problem and solution approach the objective technical problem has to be formulated based on the technical effect(s), if any, that the claimed subject-matter provides over the closest prior art.

The appellant argued that the overall properties of the resins according to Claim 1 of the main request were substantially better than those of Example 4 of G19, in particular an increased absorption capacity without increasing the content of the water-soluble component of the resin. This was allegedly supported by the experimental data submitted by the appellant with the letter of 6 February 2006 in the opposition procedure and resubmitted in the form of a declaration with the letter of 5 August 2008. Of these additional comparative data, Experiments 21 and 22 appear to employ a cross-linking agent having the structure (I) of Claim 1 in an amount of 0.005 mol%. In connection with Experiments 21 and 22, the appellant submitted in the letter dated 20 October 2009 the following:

"If the amount of claimed cross-linking agent (I) is used in the polymerization step is too little, only an absorbent resin with high content of water-soluble component and weak gel stability can be obtained regardless of the operations of the heat-treatment. Therefore, it is demonstrated that the claimed amount (lower limit) of the agent (I) is crucial for the present patent."

However, Experiments 21 and 22 by no means demonstrate that the lower limit in Claim 1 of the main request is responsible for an advantageous effect over the closest prior art. As is apparent from the novelty analysis of G19 in point 3.2.2, above, Example 4 of G19 differs from the method of Claim 1 of the main request only in that the first cross-linking agent is used in an amount of 0.01 mol% whereas Claim 1 of the main request requires an amount of 0.03 to 0.2 mol%. In Experiments 21 and 22, only an amount of 0.005 mol% of

cross-linking agent (I) is used, ie only half of the amount used in Example 4 of G19. Thus, Experiments 21 and 22 provide a comparison with something that does not represent the closest prior art and are therefore not suitable to demonstrate any advantage allegedly achieved by the claimed subject-matter over the closest prior art.

Nor can the declaration of Mr Ishizaki submitted with the statement of grounds of appeal and concerning the repetition of Example 4 of G19 (see point VI(e), above) support the presence of any advantageous technical effect. There is simply no fair comparison on file which would demonstrate that the use of a slightly higher amount of cross-linking agent (whereby all the remaining parameters of Example 4 of G19 are kept the same) would provide a surprising technical effect over the closest prior art.

Consequently, the objective technical problem to be solved by the claimed subject-matter can only be seen in the provision of a further method of producing an absorbent resin. The board has no doubt that this problem is in fact solved by the claimed process.

- 3.3.3 It remains to be decided if the suggested solution, ie the use of a slightly higher amount of cross-linking agent (I), is inventive.

A person skilled in the art starting from the process of Example 4 of G19 as the closest prior art and faced with the problem of providing a further process would immediately contemplate slight variations of the process of Example 4 of G19 within the limits generally

disclosed in G19. Changing the amount of cross-linking agent is in this context a simple and straightforward option, and one that the person skilled in the art would have seriously contemplated and adopted without any difficulty for the following reason. G19 itself allows in the general description (page 5, lines 31-32) the use of higher amounts of cross-linking agent than used in Example 4 of G19. Since, furthermore, it was generally known that an increase of the cross-linking agent reduces the amount of water-soluble component, a person skilled in the art could expect that a slight increase of the amount of the cross-linking agent in Example 4 of G19 would not negatively affect the absorption capacity of the resulting resin. Thus, the person skilled in the art had a clear incentive to increase the amount of cross-linking agent in Example 4 of G19 inevitably arriving at a process falling within the scope of Claim 1 of the main request. Consequently, Claim 1 of the main request lacks an inventive step over G19.

- 3.4 Claim 1 of the main request not meeting the requirements of Article 56 EPC, the main request has to be refused.

Under these circumstances there is no need to decide on the introduction of the late filed documents G25 and G26.

4. *First to third auxiliary request*

- 4.1 Claim 1 of the first auxiliary request differs from Claim 1 of the main request only in that the water-

soluble monoethylenically unsaturated monomer was defined as

"... water-soluble monoethylenically unsaturated monomer containing 50% by weight or more of at least one member selected from the group consisting of acrylic acid and alkali salts, ammonium salt, and amine salts of acrylic acid ...".

As explained in point 3.2.2, above, in Example 4 of G19 sodium acrylate and acrylic acid are polymerized in the presence of a small amount of polyethylene glycol diacrylate. Such a reaction system is fully within the scope of the further restricted definition of the monomer system of Claim 1 of the first auxiliary request. Hence, the reason as to why the subject-matter of Claim 1 of the main request is not inventive over Example 4 of G19 still applies to the subject-matter of Claim 1 of the first auxiliary request.

Consequently, the first auxiliary request has to be refused.

- 4.2 Further, also each Claim 1 of the second and third auxiliary requests do not include any limiting feature which would justify the recognition of an inventive step in the claimed subject-matter.

Claim 1 of the second auxiliary request (point VI(c), above) narrows the heat treatment down to 180° to 200°C. This range still includes the heat treatment of Example 4 of G19, which is carried out at 180°C.

Claim 1 of the third auxiliary request merely incorporated the two restrictions of both previous auxiliary requests, namely the definition of the water-soluble monoethylenically unsaturated monomer and the restricted temperature range for the heat treatment, neither of which can contribute to the recognition of an inventive step.

In summary, the reason as to why the subject-matter of Claim 1 of the main request is not inventive over Example 4 of G19 still applies to the subject-matter of Claim 1 of the second and third auxiliary requests. Consequently, also the second and the third auxiliary requests have to be refused.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar:

The Chairman:

E. Görgmaier

R. Young