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Datasheet for the decision of 24 October 2022

Case Number: T 1884/19 - 3.3.03

Application Number: 12828832.1

Publication Number: 2752430

IPC: C08F2/32, C08J3/24, A61L15/60, B01J20/26, C08F2/30

Language of the proceedings: EN

Title of invention:
METHOD FOR PRODUCING WATER-ABSORBENT RESIN, AND WATER-ABSORBENT RESIN OBTAINED BY SAME

Patent Proprietor:
Sumitomo Seika Chemicals Co., Ltd.

Opponent:
Nippon Shokubai Co.,Ltd.

Relevant legal provisions:
RPBA 2020 Art. 12(2)
RPBA Art. 12(4)
EPC Art. 100(b), 54, 56
EPC R. 43(1)

Keyword:

Documents admitted into the proceedings by the opposition division to be taken into account (yes)
Admittance of document submitted with the reply to the statement of grounds of appeal (yes)
Sufficiency of disclosure (yes)
Novelty (yes)
Inventive step (yes)

Decisions cited:

G 0003/14, T 0150/82, T 0205/83, T 0279/84, T 0137/01, T 1568/12, T 0026/13, T 1845/14, T 0487/16, T 2603/18

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Case Number: T 1884/19 - 3.3.03

D E C I S I O N
of Technical Board of Appeal 3.3.03
of 24 October 2022

Appellant: (Opponent)	Nippon Shokubai Co.,Ltd. 1-1, Koraibashi 4-chome Chuo-ku Osaka-fu Osaka 541-0043 (JP)
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Respondent: (Patent Proprietor)	Sumitomo Seika Chemicals Co., Ltd. 346-1, Miyanishi Harima-cho Kako-gun, Hyogo 675-0145 (JP)
Representative:	J A Kemp LLP 80 Turnmill Street London EC1M 5QU (GB)
Decision under appeal:	**Decision of the Opposition Division of the European Patent Office posted on 23 April 2019 rejecting the opposition filed against European patent No. 2752430 pursuant to Article 101(2) EPC.**

Composition of the Board:

Chairman	D. Semino
Members:	F. Rousseau
	W. Ungler

Summary of Facts and Submissions

I. The appeal lies against the decision of the opposition division rejecting the opposition against European patent No. 2 752 430, whose independent claims 1 and 6 read as follows:

"1. A method for producing a water-absorbent resin, comprising the step of subjecting a water-soluble ethylenically unsaturated monomer to a reversed phase suspension polymerization in a petroleum-based hydrocarbon dispersion medium in the presence of a radical polymerization initiator and a dispersion stabilizer, wherein the dispersion stabilizer is an ether-ester type nonionic surfactant which is selected from at least one of polyoxyethylene cetyl ether stearate, polyoxyethylene stearyl ether stearate, polyoxyethylene lauryl ether stearate or polyoxyethylene lauryl ether isostearate.

6. A water-absorbent resin obtainable by the method of any one of claims 1 to 5, wherein the water-absorbent resin has a water-retention capacity of saline solution of 25 g/g or more, a water-absorption rate of saline solution of 50 seconds or less, and a flow index under moisture absorption of 70% or more."

Claims 2 to 5 were method claims dependent on claim 1.

II. The opposition proceedings were based among others on the following items of evidence:

D1: EP 2 184 300 A1
D2: US 5,817,844

D3: WO 2006/014031 A1
D4: WO 2005/092955 A1
D5: WO 2005/092956 A1
D6: WO 2004/113452 A1
D7: WO 2006/033477 A1
D8: Kojo Sosa Seriizu Zoho Furuiwake, Factory Operation Series, Expanded Edition, Sieving, editor: T. Misawa, pages 20-27, 1983 and partial English translation D8a
D9: Funtai Kogaku Binran, Powder Technology Handbook, editor: Funtaikogakukai, pages 528-537, 1986 and partial English translation D9a,
D10: Funtai Kiki Sochi Handobukku, Powder Machine and Apparatus Handbook, pages 160-163, 1995 and partial English translation D10a
D11: Kagaku Daijiten, Gross Dictionary of Chemistry, page 278, 1989, HLB and partial English translation D11a
D12: Shin Kaimenkasseizai Nyumon, New introduction to surfactants, pages 132-133, 1996 and partial English translation D12a
D13: US 4,497,930
D17: JP 2004-2499 A and partial English translation
D18: JP H9-127732 A and partial English translation
D19: JP H9-124879 A and partial English translation
D20: Iida-Seisakusho Japan Corporation; Ro-tap catalogue and partial English translation
D21: Funtai Gijutsu Soran, Powder Technology Overview, and partial English translation
D24: Experimental report submitted by the opponent with letter of 17 January 2019
D25: JP 2001-158802 A and partial English translation D25a
D26: EP 2 650 025 A1
D27: EP 2 289 982 A1
D28: WO 2009/074909 A2
D29: EP 1616 912 A1

D30: EP 1 649 928 A1.

III. According to the reasons for the contested decision which are pertinent for the appeal proceedings:

Admittance of documents

(a) D25 to D30, whose content had been summarized by the patentee, could be quickly evaluated and merely supported arguments already submitted. They were therefore admitted in the proceedings. As the opponent had had sufficient time "to defend the opposed patent", postponement of the oral proceedings was not necessary.

Sufficiency of disclosure

(b) As demonstrated by D24 the flow index under moisture absorption was dependent on the motions of the shaking machine used for measuring this parameter. Many of the documents submitted by the opponent concerned the use of shaking machines for different purposes. They did not relate to water-absorbent particles contrary to documents D25 to D30, the latter showing that similar conditions, far from the extreme conditions used by the opponent in experimental report D24, were used for water-absorbent particles. Accordingly, the skilled person would know how to measure the flow index under moisture absorption. Moreover, there was no evidence that slight variations for determining the flow index under moisture absorption would influence the measured values to the extent that the skilled person could not prepare the water-absorbing particles of claim 6.

(c) The opponent's objection that the water-retention capacity defined in claim 6 could not be meaningfully measured, since no temperature was indicated either for the measurement or the liquid used for said measurement, was not convincing, because a temperature of 25°C was specified in paragraphs [0101] and [0104] of the description and no reason existed for the skilled person to use another temperature for the liquid.

(d) Even if the alleged lack of reproducibility of example 7 of the specification had been demonstrated, which was not the case, this objection concerned a single example among others. The objection was therefore irrelevant.

(e) The absence of any definition in the claims of the molecular weight of the polyoxyethylene part of the surfactant had not been shown to imply an insufficient disclosure. No evidence had been submitted in this respect and the skilled person having regard to the surfactants used in the examples and the preferred HLB values taught in the description would find with a reasonable amount of experimentation which molecular weights should be selected for the polyoxyethylene part of the surfactant.

Novelty

(f) The method of claim 1 was novel, since none of D3 to D7 described a reversed phase suspension polymerization in the presence of a surfactant as defined in said claim.

(g) The examples of D3 to D7 cited by the opponent did not disclose water absorbent resins having parameters similar to those of granted claim 6 and which had been prepared with the surfactants defined in claim 1. Although not explicitly defined in claim 6, said surfactant characterized the water-absorbent resins of claim 6. There was no reason to consider that purification steps could be added to the process of claim 1 and, even it were the case, it had not been shown that such steps could remove all the surfactant. Moreover, claim 6 defined a water-absorbent resin, but not any composition comprising such resin and additives. In addition the water-retention capacity values as measured in the patent in suit could not be deduced from the disclosure of the resins exemplified in D3 to D7, since the centrifugation conditions used in those documents and in the patent in suit were different. Novelty of claim 6 was therefore also acknowledged.

Inventive step

(h) As agreed by the parties example 1 of D1 represented the closest prior art for the method of claim 1, which differed therefrom by the nature of the surfactant.

The opposed patent demonstrated with the results presented in table 1 that an improvement of the flow index under moisture absorption had been achieved with the surfactants tested, which results would credibly be obtained for all surfactants defined in claim 1, as they presented a structure similar to those tested. In this respect, sucrose stearate used as surfactant in the comparative

examples of the patent in suit was similar to the surfactants used in D1. The objective problem solved over the closest prior art by the method of claim 1 was therefore the provision of a method leading to a water-absorbent resin with improved flow index under moisture absorption.

In spite of disclosing a surfactant of the same nature as those defined in claim 1, D2 did not suggest the claimed solution, since it did not concern water-absorbent resins. The same would be valid, even if the objective problem were the mere provision of an alternative.

The method of claim 1 was therefore inventive.

(i) Concerning the assessment of inventive step of the water-absorbent resin of claim 6, D1 was a better starting point than any of D3 to D7. This resulted not only from the fact that D3 to D7 did not disclose the water properties recited in claim 6, because a comparison of the parameters defined in claim 6 and those described in D3 to D7 was not meaningful, but also from the use in granted claim 1 of surfactants which were structurally closer to those of D1, i.e. polyoxyethylene esters.

The water-absorbent resins of claim 6 differed therefore from the closest prior art not only in the water properties, but also in the nature of the surfactant.

Similarly to claim 1, the problem successfully solved over the closest prior art by the water-absorbent resin of claim 6 was the provision of

water-absorbent resins with an improved flow index under moisture absorption.

For the same reasons as for claim 1, it would not be obvious for the skilled person to replace the surfactant used in D1 (or even the surfactants used in D3 to D7) by one of the claimed surfactant.

None of the documents disclosed the water-absorbent properties defined in claim 6 and the surfactant was still present in the water-absorbent resin.

The water-absorbent resins of claim 6 were therefore inventive starting from either D1 or any of D3 to D7 as the closest prior art.

IV. An appeal against that decision was lodged by the opponent (appellant).

V. The patent proprietor (respondent) submitted with their rejoinder (letter of 13 January 2020) first to third auxiliary requests whose wording is not relevant for the present decision, as well as among others the following documents:

D31: Surface Active Agents and Emulsifiers, EMALEX catalog, 2003, Nihon Emulsion Co., Ltd and partial English translation D31a.

VI. In preparation of oral proceedings the Board issued a communication pursuant to Article 15(1) RPBA 2020 in which a preliminary opinion was given in respect of all objections raised by the appellant.

VII. Oral proceedings, originally scheduled to take place on 21 October 2022, were cancelled after the appellant had

indicated with letter of 18 October 2022 that they would not attend the oral proceedings.

VIII. The appellant requested that the decision under appeal be set aside and that the patent be revoked.

IX. The respondent requested that the appeal be dismissed, or alternatively that the decision be set aside and the patent be maintained on the basis of any of the first to third auxiliary requests filed with letter of 13 January 2020.

X. The parties' submissions, in so far as they are pertinent, may be derived from the reasons for the decision below. The disputed issues essentially concerned whether (i) documents D25 to D30 should be taken into account, (ii) sufficiency of disclosure could be acknowledged for the method of claim 1 and the product of claim 6, (iii) the product claim 6 was novel over each of examples 2 and 3 of D3, examples 4 and 9-12 of D4, examples 9-18 and 29 of D5, example 4 of D6 and examples 5 and 6 of D7, (iv) the method of claim 1 involved an inventive step over example 1 of D1 and (vi) the product of claim 6 was inventive starting from any of D3 to D7.

Reasons for the Decision

Status of documents D25 to D30

1. The appellant argues that documents D25 to D30 admitted into the proceedings by the opposition division should not be allowed to the proceedings. The reason invoked is that these documents were very voluminous and had

been filed only 5 working days before the oral proceedings, so that no sufficient time was available for their study.

D25 to D30 were not only admitted into the proceedings, but considered by the opposition division for assessing sufficiency of disclosure of claim 6 as granted. There is in such a case no legal basis for excluding documents D25 to D30 from the appeal proceedings (see also T 0487/16, point 3.1 of the Reasons for the decision, as well as the case law developed under RPBA 2007, e.g. T 0026/13, point 2 of the Reasons for the decision; T 1568/12, point 2.4 of the Reasons for the decision; T 2603/18 points 1.1 to 1.2 of the Reasons for the decision).

Accordingly, D25 to D30 are part of the appeal proceedings (Article 12(2) RPBA 2020) and shall be taken into account by the Board (Article 12(4) RPBA 2007).

Admittance of documents D31 and D31a

2. The admittance of D31 and D31a which were submitted with the reply to the statement of grounds of appeal is subject to the Board's discretionary power under Article 12(4) RPBA 2007 in view of Article 25(2) RPBA 2020. These documents relate to surfactants that were available at the time of filing, and are relevant to counter the appellant's arguments regarding the alleged absence of a teaching in the patent in suit concerning the molecular weight of the polyoxyethylene part of the surfactant. Under these circumstances and considering the absence of any objection to their admittance, the Board has no reason to make use of its discretionary power under Article 12(4) RPBA 2007 to hold those

documents inadmissible. D31 and D31a are therefore in the proceedings.

Sufficiency of disclosure

3. The appellant has submitted four separate arguments as to why claim 1 or claim 6 would lack sufficiency of disclosure.

Measurement of the flow index under moisture absorption

3.1 The appellant submits that claim 6 lacks sufficiency of disclosure since the above index cannot be unambiguously determined, as its measure is dependent on the type of rotating and tapping shaker machine, the tapping pattern, and the size or shape of the sieves used. The appellant relies upon experimental report D24 concerning the influence of the number of vibrations and tappings used while operating a ro-tap shaker and documents D8 to D10 to show the influence of the above mentioned conditions on the measurement of the index. The appellant submits that this argument is still valid and that not only documents D25 to D30 should be considered.

3.1.1 This argument concerning the difficulty to exactly determine the above index does not go beyond the argument that the boundaries of granted claim 6 are not clearly defined. This is a matter of clarity of a granted claim, which in view of the ruling of G 3/14 (OJ 2015, A102) cannot be examined, as submitted by the respondent. The appellant, however, did not explain how such alleged degree of uncertainty concerning the measure of the flow index under moisture absorption would prevent the skilled person from preparing the water-absorbent resin of claim 6.

3.1.2 The appellant also relies upon decision T 0137/01 of 15 December 2003 without explaining why this decision would be relevant to the present case.

In case T 0137/01, it was held that the proportion of particles of a superabsorbent material having a specific size (300 to 600 µm) was essential for the test results to be representative of the parameters defined in the claim under consideration, i.e. the deformation under load and the wicking index of the whole superabsorbent material (see penultimate paragraph of section 2.2.1 of the reasons). The claimed subject-matter was found to lack sufficiency of disclosure since the superabsorbent material as a whole was not suitable for achieving the desired effects underlying the patent in suit, which effects were obtained when the measured values of these parameters fell within specific numerical ranges (last paragraph of section 2.2.1 and sections 2.2.3 and 2.3.4 of the reasons). It is however apparent from section VI of the Facts and Submissions of said decision that the desired effects underlying the patent in suit were not part of the definition of the subject-matter of the claim under consideration.

For the reasons provided in decision T 1845/14 of 8 November 2018 (see points 8.7 to 9.8 of the Reasons for the decision) the Board does not agree to the rationale provided in T 0137/01. In a case of an alleged unclear parameter defined in a claim, whose values required in the claim might be essential to solving the problem underlying the patent at issue, the ability of the skilled person to solve that problem, when seeking to carry out the invention, is not a suitable criterion for assessing sufficiency of

disclosure, where the problem is not part of the definition of the claimed subject-matter. In the present case, operative claim 6 defines three parametric ranges, but a further technical effect which would be achieved by these parametric requirements is not part of the definition of that claim.

3.1.3 The first appellant's argument concerning sufficiency of disclosure fails therefore to convince.

Water retention capacity

3.2 The appellant submits that claim 6 is also insufficiently disclosed since this parameter depends on the temperature for carrying out the measurement and the temperature of the liquid used for the test. Similarly to the objection regarding the flow index under moisture absorption, this objection is merely an objection concerning the clarity of granted claim 6 which cannot be examined in view of the ruling of G 3/14. The appellant did not explain how the alleged degree of uncertainty concerning the measure of the water retention capacity would prevent the skilled person from preparing the water-absorbent resin of claim 6. The second appellant's argument in relation to sufficiency of disclosure is therefore not convincing either.

"In view of example 7 of the description"

3.3 The appellant argues a lack of sufficiency of disclosure of example 7 having regard to an alleged inconsistency between that example and comparative example 2. It was however not explained why such inconsistency would hinder the skilled person from repeating the example on the basis of its description.

Furthermore, it is the sufficiency of disclosure of the combination of technical features of the invention, i.e. as defined by the terms of the claims (see Rule 43(1) EPC), which has to be assessed and not that of an exemplified embodiment, which is not in the present case the subject-matter of a claim. In the absence of any submission by the appellant as to why a lack of reproducibility concerning one example of the patent would result in an insufficient disclosure without addressing the teaching of the patent in suit as a whole, including its numerous additional examples, this third argument does not convince either.

Selection of the surfactant in claim 1

3.4 Having regard to paragraph [0017] of the specification according to which the surfactant defined in claim 1 has preferably a HLB value within a specific range, the appellant submits on the basis of D11 and D12 that the HLB value depends on the method for its measurement or calculation, and ultimately on the molecular weight of the polyoxyethylene part of the surfactant, which is not defined in the present claims.

The appellant submits on that basis that the absence of a definition in claim 1 of the molecular weight of the polyoxyethylene part of the surfactant would not allow the skilled person to obtain water-absorbent resins meeting the required flow index under moisture absorption and water-absorption rate.

3.4.1 The appellant's point, however, does not go beyond the argument that the teaching provided in paragraph [0017] in relation to the HLB value of the surfactant is not specific enough. No indication, let alone evidence in this respect, has been provided on how the parametric

features of the water-absorbent resin addressed by the appellant would be dependent on variations of the HLB values of the surfactant due to the use of different measurement or calculation methods for determining said values.

3.4.2 Moreover, the appellant has convincingly shown on the basis of D31 and D31a that the surfactants used in the examples of the patent in suit had not only known HLB values, but also known molecular weights (i.e. known number of ethoxy units).

3.4.3 The Board concludes therefore that the fourth appellant's argument relating to the absence of indication of a molecular weight of the polyoxyethylene part of the surfactant in claim 1 fails to persuade.

3.5 Accordingly, no case has been made out that the invention as defined by the granted claims lacks sufficiency of disclosure.

Novelty of product claim 6

4. The appellant submits that the subject-matter of claim 6 lacks novelty in view of any of examples 2 and 3 of D3, examples 4 and 9-12 of D4, examples 9-18 and 29 of D5, example 4 of D6 and examples 5 and 6 of D7.

Examples 2 and 3 of D3

4.1 The appellant refers to the properties of the products obtained in these examples which are indicated in table 1 on page 83. According to the appellant the parameters centrifuge retention capacity, water-absorption speed and fluidity after moisture absorption, whose values are indicated in that table 1, correspond respectively

to the water-retention capacity defined in operative claim 6, the water-absorption rate of saline solution of operative claim 6 and the complement to 100 of the flow index under moisture absorption defined in operative claim 6.

The respondent does not dispute that the products alleged to be novelty destroying fulfil the parametric requirements of operative claim 6. The respondent, however, submits that the products obtained by the method of operative claim 1 must comprise the specific surfactant used for this method, which undisputedly is not used in the prior art opposed. Furthermore, the respondent argues that claim 6 defines a water-absorbent resin, but not a water-absorbent resin mixed with additional material. Reference is in particular made to fine particles of silicon dioxide and calcium stearate which are present in examples 2 and 3 of D3, respectively, in admixture with the water-absorbent resin.

4.1.1 The crucial issue for answering whether the products obtained in examples 2 and 3 of D3 anticipate the subject-matter of claim 6 is not only whether those products exhibit the water-absorbent properties defined in claim 6, but also whether they fulfil the other requirement of claim 1, namely that they represent a water-absorbent resin which can be obtained by a method as defined in operative claim 1. In this respect and in line with the decisions cited by the appellant, namely T 0150/82 (OJ EPO 1984, 309), T 0205/83 (OJ EPO 1985, 363) and T 0279/84 of 29 June 1997 the question to be answered is whether the method defined in operative claim 1 results in a structural differences vis-à-vis the products obtained in examples 2 and 3 of D3.

4.1.2 It is undisputed that unless specific measures are taken, the dispersion stabilizer mandatorily used for the reversed phase phase suspension polymerization in the method claim 1 is part of the water-absorbent resin obtained with said method. The respondent argues that said specific dispersion stabilizers are not a feature of claim 6, as claim 1 is openly defined, meaning it could comprise additional steps resulting in the dispersion stabilizer be washed out or get lost during these additional processing steps.

The absorbent resin obtained in example 1 of D3, which is used to prepare the products of examples 2 and 3 of D3, is also prepared by reversed phase suspension polymerization. It must therefore contain the sucrose fatty acid ester used as surfactant for obtaining the reversed phase suspension, since no steps are described in example 1 of D3 which would allow for the removal of the surfactant.

It means that a method in accordance which operative claim 1 which would lead to a product as disclosed in examples 2 and 3 of D3 should contain steps in addition to those recited in claim 1 as to ensure that the product obtained would among others (i) contain no detectable residue of the specific dispersion stabilizer defined in operative claim 1, (ii) contain the level of stabilizer of the products of examples 2 and 3 of D3 (i.e. the sucrose fatty acid ester used in example 1 of D3) and (iii) nevertheless exhibits the parametric requirements of operative claim 6.

The appellant, however, did not specify which process steps in addition to those recited in operative claim 1 would achieve this result, let alone submitted any evidence in this respect. Already on that basis,

examples 2 and 3 of D3 have not been shown by the appellant to anticipate the subject-matter of claim 6.

4.1.3 Moreover, concerning the respondent's argument that the products of examples 2 and 3 of D3 are not a water-absorbent resin obtainable by the process of claim 1, as required by operative claim 6, but a composition comprising a water-absorbent resin in admixture with additives, the functional definition of the product obtainable by the method a claim 1, i.e. the ability to absorb water, and the definition in claim 1 that the method comprises a reversed phase suspension polymerization imply in the Board's opinion that the terminology water-absorbent resin used in both claims 1 and 6 designates the collective of resin particles obtained by the method of claim 1, but not those in addition with additives.

4.1.4 Consequently, the subject-matter of claim 6 has not been shown to lack novelty over examples 2 and 3 of D3.

Examples 4 and 9-12 of D4, examples 9 to 18 and 29 of D5, example 4 of D6, examples 5 and 6 of D7

4.2 All these examples have in common that they describe the addition of various fine particles of inorganic materials to a water-absorbent resin which is not obtained via a reversed phase suspension polymerization, but by gel polymerisation, i.e. in the absence of a surfactant, the process involving pulverization and sieving of the dried resin before said fine particles of inorganic materials are added to the water-absorbent resin particles. Concerning D4, it is referred to reference examples 1, 3 and 4 on pages 64, 67 and 74 describing the preparation of the water-absorbent resins to which various fine particles of

inorganic materials are added, as described in examples 4 and 9-12. In respect of D5, it is referred to examples 1 to 8 and examples 28 on pages 71 to 74 and 84 which describe the preparation of the water-absorbent resins used in examples 9 to 18 and 29. As regards D6, referential example 4 on pages 92 and 93 describes the preparation of the water-absorbent resin to which example 4 on page 95 describing the addition thereto of aluminum sulfate refers. As to D7, reference is also made to particulate water-absorbing agents (2) and (3) described in examples 2 and 3 on pages 93, 94, 96 and 97 to which examples 5 and 6 on pages 99 and 100 refer. Accordingly, apart from the comments relating to the use of a sucrose fatty acid ester, the same comments as given in relation to the objection of lack of novelty over examples 2 and 3 of D3 are valid.

4.3 Accordingly, novelty of the product of operative claim 6 over each of the cited examples of D4, D5, D6 and D7 is also acknowledged.

Inventive step of method claim 1

Closest prior art and distinguishing feature

5. The choice by the opposition division of the method of example 1 of D1 as the closest prior art for assessing the existence of an inventive step for the method of granted claim 1 was not disputed. It is also undisputed that the method of claim 1 differs from the closest prior art solely in that a surfactant as defined in present claim 1 is used.

Problem successfully solved

6. Having regard to the closest prior art, the appellant and the respondent take differing positions as to which problem can be considered to be successfully solved by the subject-matter of operative claim 1.

6.1 Whereas the respondent submits in line with the finding of the opposition division that the tests shown with the examples of the patent in suit demonstrate an improvement over the resins of D1, as the surfactants of operative claim 1 would lead to water-absorbent resins having a high water-retention capacity and water absorption rate, whilst having excellent flowability under moisture absorption, the appellant argues that the objective technical problem solved by the subject-matter of claim 1 over the closest prior merely resides in the provision of a further method for producing a water-absorbent resin. The appellant submits in this respect that:

(a) the comparison offered in the patent in suit is made with sucrose stearate instead of an ether-ester surfactant, the latter being according to the appellant generally taught in D1 and structurally closer to the surfactants defined in operative claim 1,

(b) the alleged benefits have not been shown to be achieved over the whole breadth of claim 1, since there are no data available for the surfactants polyoxyethylene lauryl ether stearate and polyoxyethylene lauryl ether isostearate and

(c) claim 1 does not contain any limitation with respect to the amount of surfactant used, the

molecular weight of the polyoxyethylene part of the surfactant and the conditions used for the crosslinking and post-crosslinking reactions, which measures are all necessary to solve the problem defined in paragraph [0011] of the patent in suit. Concerning the latter argument, reference was made to D13.

6.2 The reasoning underlying argument (a) is in contradiction with the choice of the starting point for assessing inventive step mentioned above, as it implies that the closest prior art should be in fact a method which contrary to example 1 of D1 does not use sucrose stearate, but an ether-ester surfactant which would be in the appellant's opinion structurally closer to the surfactants used in granted claim 1. However, the only ether-ester surfactants of D1 mentioned by the appellant are polyoxyethylene castor oil and polyoxyethylene hardened castor oil (statement of ground of appeal, page 23, second paragraph). Those specific surfactants are described in paragraph [0037] of D1.

It was not disputed by the appellant that these compounds result from an ethoxylation reaction between a polyethylene glycol and the hydroxyl groups borne by the castor oil or the hardened (hydrogenated) castor oil. This means that the ester moieties present in this etherified product are not attached to the polyoxyethylene chain, but are present within the castor structure, contrary to the surfactants of operative claim 1 for which the end groups of the polyoxyethylene chain have been reacted to form an ether group with a fatty alcohol and an ester group with a fatty acid.

Moreover, it would not be appropriate to provide a comparison with a polyoxyethylene castor oil or a polyoxyethylene hardened castor oil, since the latter do not constitute preferred surfactants of D1, as shown by the preferred surfactants listed in paragraph [0037] of D1 and those used in the examples.

Under these circumstances, the comparison provided in table 1 of the patent in suit with sucrose stearate which is used in comparative example 1 is appropriate.

6.3 It is undisputed that a comparison of the properties of the water-absorbent resins obtained in comparative example 1 and examples 1 to 5 which are reported in table 1 of the contested patent demonstrates that the use of a polyoxyethylene stearyl ether stearate brings about an improvement of the flow index under moisture absorption.

6.4 Concerning argument (b), having regard to the structural similarities between a polyoxyethylene stearyl ether stearate and a polyoxyethylene lauryl ether stearate or a polyoxyethylene lauryl ether isostearate, it is in the Board's opinion credible that the technical benefits over the closest prior art linked to the use of polyoxyethylene stearyl ether stearate, are also obtained for the surfactants polyoxyethylene lauryl ether stearate and polyoxyethylene lauryl ether isostearate. This second argument by the appellant is therefore also not convincing.

6.5 On that basis, the arguments (a) and (b) give no reason to the Board to reject the conclusion of the opposition division concerning the problem successfully solved over the closest prior art by the method of granted

claim 1, namely the provision of a method leading to a water-absorbent resin with improved flow index under moisture absorption.

6.6 Additional argument (c) does not address the problem defined by the opposition division, but the problem defined in paragraph [0011] of the specification which is the provision "*of a water-absorbent resin having a high water-retention capacity and an excellent water-absorption rate, and further having an excellent flowability under moisture absorption as the properties suitable for a water-absorbent material usable in hygienic materials, and a water-absorbent resin obtained thereby*". This argument which concerns a problem seemingly defined in absolute terms, i.e. without reference to the corresponding property obtained in the closest prior art, and on the vague term "*excellent*" is therefore not relevant. Having regard to the functional feature of claim 1 according to which the method includes a reversed phase suspension polymerization and produces a water-absorbent resin, the absence of a limitation with respect to the amount of surfactant used, the molecular weight of the polyoxyethylene part of the surfactant and the conditions used for the crosslinking and post-crosslinking reactions has no impact on the formulation of the problem solved over the closest prior art. Argument (c) is therefore also rejected.

Obviousness of the solution

7. It remains to be decided whether the skilled person desiring to solve the problem defined in above point 6.5 would, in view of the disclosure of D1, possibly in combination with other prior art documents or with common general knowledge, have modified the method of

example 1 of D1 in such a way as to arrive at the method of operative claim 1. The appellant submits in this respect that the surfactants defined in claim 1 were known to the skilled person from D2.

7.1 Whereas the specific surfactants defined in operative claim 1 are encompassed by the general formula given in claim 1 of D2, the only surfactant of operative claim 1 mentioned in this document is polyoxyethylene stearyl ether stearate.

This specific compound, however, is disclosed only in relation to the background art (D2, column 1, lines 15-24). Polyoxyethylene stearyl ether stearate is indicated in this passage to be known as an emulsifier, a dispersant, or an oil-phase adjuster in the cosmetic field and in various industrial fields. There is no apparent indication that it would be suitable as dispersion stabilizer for a reversed phase suspension polymerization in a petroleum-based hydrocarbon dispersion, let alone for the production of water absorbent resins. It follows *a fortiori* that D2 does not suggest that this specific surfactant would be advantageous for improving the flow index under moisture absorption of water-absorbent resins produced by a reversed phase suspension polymerization.

7.2 The same holds true concerning the teaching relative to the invention of D2, which in addition is not focused on polyoxyethylene fatty alkyl ether fatty acid esters, as is shown by the group of preferred surfactants disclosed in column 4, lines 15-18 and those used in the examples whose alkenyl groups have preferably one to four carbon atoms. The focus of D2 is rather on improving cleaning properties, such as foaming (column 12, lines 46-51). This problem is addressed in D2 by

providing a method of manufacturing the polyoxyethylene alkyl ether fatty acid ester leading to a narrower molecular weight distribution and a reduced amount of unreacted fatty acid alkyl ester (column 2, lines 32-36). Due to the reduced amount of unreacted fatty acid, the surfactants obtained by the method of D2 exhibit an improved odor, making them useful for base materials of household cleaning agents and cosmetics, and base materials of cleaning agents in the chemical industry. D2 does not teach that this general group of surfactant, let alone polyoxyethylene fatty alkyl ether fatty acid ester, would be suitable as dispersion stabilizer for a reversed phase suspension polymerization in a petroleum-based hydrocarbon dispersion. This applies all the more to the improvement of the flow index under moisture absorption of the water absorbent resins obtainable by such polymerization method.

7.3 On that basis the appellant's objection that the method for producing a water-absorbent resin of operative claim 1 is obvious to a person skilled in the art having regard to the disclosure of documents D1 and D2 and therefore lacks an inventive step must be rejected.

Inventive step of product claim 6

8. The appellant submits that the water-absorbent resin of claim 6 lacks an inventive step over the water-absorbing resins described in any of documents D3 to D7, which in the appellant's opinion would also satisfy the parametric requirements of claim 6. Although the appellant did not specify which specific water-absorbent resins within these documents were taken as the starting point for assessing inventive step, it was considered for the purpose of the preliminary opinion

provided in the Board's communication that the resins considered by the appellant were those on the basis of which lack of novelty of claim 6 over each of D3 to D7 had been argued. This was not disputed by the appellant.

The respondent submits, in line with the contested decision, that none of these references is a suitable starting point for assessing inventive step.

8.1 It is apparent from point 53 of the reasons for the contested decision that the selection of the closest prior art by the opposition division was made on the basis of functional (water-absorbent properties) and structural (type of surfactant) considerations. There is, however, no indication either in the contested decision or in the parties' submissions on appeal of a detailed comparison between the products of D1 and those of D3 to D7 in this respect.

8.2 The appellant submits that "the residue of some surfactant is a feature that is not clearly and concisely disclosed by claim 6" (statement of grounds, page 27, section 14, first paragraph). As indicated in above point 4.1.2, unless specific process steps are taken, the dispersion stabilizer as mandatorily used in claim 1 is part of the water-absorbent resin obtained by the method of claim 1. In the absence of any indication by the appellant of process steps in addition to those recited in operative claim 1 which would achieve a removal to all traces of the surfactant used in the method of claim 1, but at the same time would allow for the production of a resin meeting the parametric requirements of claim 6, it has to be considered that the surfactants defined in operative claim 1 indeed characterize the product of claim 6.

8.3 Concerning D3, as indicated in above point 4.1.2 (second paragraph) the absorbent resin used in examples 2 and 3 of D3 is prepared in its example 1 by reversed phase suspension polymerization, using a surfactant which is not selected from those defined in operative claim 1, but a sucrose fatty acid ester. The appellant's submissions concerning a lack of inventive step starting from document D3, however, do not address the presence of a different type of surfactant used for the method of operative claim 1 in the product of granted claim 6. Under these circumstances, the appellant's objection concerning a lack of inventive step of the water-absorbent resin of claim 6 over D3 cannot as such be successful. Moreover, as pointed out in above points 7.1 to 7.2, the sole document cited by the appellant concerning one of the surfactants to be used in accordance with the present invention does not suggest their use for the production of water-absorbent resins obtainable by reversed phase suspension polymerization.

8.4 Concerning the objections starting from any of D4 to D7, the water-absorbent resins described in the examples addressed by the appellant are not prepared by a reversed phase suspension polymerization, as already outlined in above point 4.2, i.e. their preparation does not require any surfactant. Taking also into account that the use of the surfactants mandatorily employed for the present invention is not suggested by the prior art referred to by the appellant for the production of water-absorbent resins obtainable by reversed phase suspension polymerization, it is concluded that the water-absorbent resin of granted claim 6 has not been shown to be obvious having regard to any of D4 to D7.

8.5 Consequently, even if to the benefit of the appellant references D3 to D7 are considered to constitute suitable starting points for assessing inventive step, it must be concluded that the subject-matter of granted claim 6 has not been shown to lack an inventive step having regard to those documents.

9. In the absence of additional objections against the patent as granted, the respondent's main request is therefore considered to be allowable.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar: The Chairman:

B. ter Heijden D. Semino

Decision electronically authenticated