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D E C I S I O N
of 2 April 2004

Case Number: T 0873/01 - 3.3.3

Application Number: 92113221.3

Publication Number: 0530517

IPC: C08J 3/28

Language of the proceedings: EN

Title of invention:
Method of treating water-insoluble superabsorbent materials

Patentee:
KIMBERLY-CLARK WORLDWIDE, INC.

Opponent:
THE DOW CHEMICAL COMPANY
SCA Hygiene Products AB

Headword:
-

Relevant legal provisions:
EPC Art. 54(2)

Keyword:
"Novelty - prior disclosure - implicit features (yes)"

Decisions cited:
-

Catchword:
-

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Case Number: T 0873/01 - 3.3.3

D E C I S I O N
of the Technical Board of Appeal 3.3.3
of 2 April 2004

Appellant: (Proprietor of the patent)	KIMBERLY-CLARK WORLDWIDE, INC. 401 North Lake Street Neenah, Wisconsin 54956 (US)
Representative:	Dixon, Philip Matthew Frank B. Dehn & Co. 179 Queen Victoria Street London EC4V 4EL (GB)
Respondent 01: (Opponent 01)	THE DOW CHEMICAL COMPANY 2030 Abbott Road Dow Center Midland Michigan 48640 (US)
Representative:	Raynor, John W.H. Beck, Greener & Co 7 Stone Buildings Lincoln's Inn London WC2A 3SZ (GB)
Respondent 02: (Opponent 02)	SCA Hygiene Products AB S-405 03 Göteborg (SE)
Representative:	Egeröd, Lisbeth Ström & Gulliksson IP AB Sjöporten 4 S-417 64 Göteborg (SE)
Decision under appeal:	**Decision of the Opposition Division of the European Patent Office dated 3 April 2001 and posted 25 May 2001 revoking European patent No. 0530517 pursuant to Article 102(1) EPC.**

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. 0 530 517, with 20 claims, in respect of European patent application No. 92 113 221.3 in the name of Kimberly-Clark Worldwide, Inc., filed on 3 August 1992 and claiming a United States priority of 15 August 1991 (US 745319), was published on 3 June 1998 (Bulletin 1998/23). Claim 1 read as follows:

"A method of treating a once-dried water-insoluble superabsorbent material having up to 7 weight percent moisture, comprising heating the once-dried water-insoluble superabsorbent material in a preheated forced air oven at a temperature of 125°C or greater for a time of from 5 minutes to 60 minutes to increase the 2-minute Absorbency Under Load of the superabsorbent material, which is determined under an applied load of 0.021 kg/cm^2 (0.3 pounds per square inch), at least 1 gram per gram."

Claims 2 to 20 were dependent claims directed to elaborations of the method according to Claim 1.

II. Notices of opposition were filed by:

(a) The Dow Chemical Company (opponent 01) on 2 March 1999, and

(b) SCA Hygiene Products AB (opponent 02) on 3 March 1999.

The grounds of opposition raised were the grounds of Article 100(a) EPC, ie lack of novelty and lack of inventive step, and the grounds of Article 100(b) EPC, ie insufficiency of disclosure. The oppositions were supported - *inter alia* - by the document D2:

D2: EP-A-0 509 708.

III. By a decision announced orally on 3 April 2001 and issued in writing on 25 Mai 2001, the opposition division revoked the European patent for the following reasons:

(a) The proprietor's main request (rejection of the opposition and maintenance of the patent as granted) was refused because the subject-matter of Claim 1 was not novel over Example 5 of D2 (Article 54(3) and (4) EPC). Although D2 did not explicitly disclose values for the 2-minute Absorbency Under Load (AUL), it was held that the polymer obtained in Example 5 of D2 inherently had the required increase in 2-minute AUL. In this respect, the decision relied upon the evidence of Dr Herbert Gartner's further declaration submitted with letter dated 23 February 2001. According to his further declaration, Dr Gartner had repeated Example 1 of D2 and had heat treated the resultant polymer (SAP1) in accordance with Example 5 of D2. Although there were differences between the procedure carried out by Dr Gartner and the procedure described in Example 1 of D2, the opposition division was of the opinion that the repetition of Dr Gartner demonstrated without any reasonable doubt that the heating regime detailed

in Example 5 of D2 produced a superabsorbent polymer having the required improvement in 2-minute AUL since the slight differences in the preparation would not affect the properties of the polymer obtained.

(b) In the first auxiliary request, the proprietor requested the deletion of the sentence on page 2, lines 49 to 50 in the patent specification. However, the opposition division considered this request inadmissible in view of Rule 57a EPC because the aim of this request was only the removal of an inconsistency between the claims as granted and the patent specification.

(c) The second auxiliary request corresponded to the main request, except that in Claim 1 the word "simply" was introduced before "heating". According to the decision, this amendment was not suitable to establish a difference over D2. Therefore, also the subject-matter of Claim 1 of the second auxiliary request was not novel.

IV. On 27 July 2001, the proprietor (hereinafter referred to as the appellant) filed a notice of appeal against the above decision, the prescribed fee being paid on the same day.

In the statement of grounds of appeal, filed on 4 October 2001, the appellant submitted that the decision of the opposition division was based on an incorrect evaluation of the evidence provided by the declaration of Dr Gartner. That declaration was alleged to show what happened when the material of Example 1 of

D2 (SAP1) was heated in accordance with Example 5 of D2. However, the polymerization and drying procedure according to the declaration differed so much from the procedure of Example 1 of D2 that the polymer obtained in the declaration could not be considered to be a reproduction of SAP1. Hence, the opponent had not shown "beyond all reasonable doubt" what the inevitable result of carrying out Examples 1 and 5 of D2 would be. Consequently, the declaration could not be used to support a finding of lack of novelty in view of D2.

In support of the point that the starting material was different in Dr Gartner's declaration compared to that in Example 1 of D2, the appellant filed a declaration of Dr Dave A. Soerens and a supporting declaration of Dr Jian Qin, who had tried to reproduce Example 1 of D2. Drs Soerens and Qin were unable to obtain a polymer with AUL values close to those reported in Table I of D2, whether by following the procedure disclosed in D2 or by modifying this procedure. However, without a successful reproduction of Example 1, Example 5 could not be repeated, and it was Example 5 which, according to the decision under appeal, deprived the subject-matter of Claim 1 of novelty.

V. In a letter filed on 11 February 2002, opponent 02 (hereinafter referred to as respondent 02) supported the arguments submitted by the other opponent concerning lack of novelty over D2. Furthermore, it maintained its arguments with respect to inventive step submitted during the opposition procedure.

VI. Opponent 01 (hereinafter referred to as respondent 01) argued in its letter filed on 17 June 2002 that D2 disclosed, in perfectly general terms, the only process step of the opposed patent, namely heating a "once-dried" superabsorbent material, having the requisite moisture content at the specified temperature, and for the specified time, in order to increase its absorption under load. Table 1 of D2 showed that heat treating the material of Example 1 (SAP1) improved the 30-minute AUL from 23.3 g/g to 27.0 g/g (an improvement of 3.7 g/g). The only question left unanswered by D2 was whether the material obtained in Example 5 (SAP5) had an improvement of at least 1 g/g in 2-minute AUL. Just by analysing the data in the patent in suit itself and without referring to Dr Gartner's experiments it was possible to come to the definite conclusion that the 2-minute AUL of the SAP5 material of Example 5 must have improved by at least 1 g/g. In every example of the opposed patent where the improvement in 30-minute AUL by heat treatment was at least 3.7, the improvement in 2-minute AUL was at least 1 g/g. Thus, it was inevitable that an improvement of 3.7 g/g in 30-minute AUL (as between SAP1 and SAP5 in D2) would be reflected by an improvement of at least 1 g/g in 2-minute AUL. A set of charts using the data in the opposed patent was filed with the same letter. These charts should illustrate the relationship between 30-minute AUL and 2-minute AUL.

D21: Set of charts analysing the data in the patent in suit with respect to "Absorption under Load".

Furthermore, it was argued that the alleged differences in Dr Gartner's repetition of Example 1 of D2 had no bearing on the fundamental purpose of these experiments which was to demonstrate that a material prepared generally as in D2, according to the preparation of SAP1 in Example 1, and which displayed an improvement in 30-minute AUL of around 3.7 g/g after heating at 200°C for 10 minutes would inevitably have its 2-minute AUL improved by at least 1 g/g.

VII. In a letter filed on 3 January 2003, the appellant reiterated its position that the material referred to in the declaration of Mr. Gartner was not the material of Example 1 of D2 and was not disclosed by D2. Thus, respondent 01 was unable to provide evidence that any of the examples of D2, and in particular Example 5, disclosed a method according to Claim 1 of the patent in suit.

VIII. In a communication, issued on 8 December 2003, accompanying a summons to oral proceedings, the salient issue of the appeal was identified by the board as being the question of whether or not the material SAP5 obtained in Example 5 of D2 inherently exhibited an improvement in 2-minute AUL of at least 1 g/g. In this connection, the board noted that the experiment carried out in Dr Gartner's further declaration submitted on 23 February 2003 was indeed not a true reproduction of Example 1 of D2. Furthermore, the board noted the conspicuous absence of any literature showing a relationship between 30-minute AUL and 2-minute AUL.

IX. In view of the criticism made of Dr Gartner's previous reproduction of Examples 1 and 5 of D2, respondent 01 once more carried out a reproduction of Examples 1 and 5 of D2 and submitted on 8 January 2004 a further experimental report carried out by Dr Gartner (hereinafter referred to as D22) which was unsigned. According to respondent 01, this further experimental report demonstrated beyond any doubt that the material prepared in Example 5 of D2 was a material in accordance with Claim 1 of the patent in suit. In a letter filed on 4 March 2004, respondent 01 submitted a formally signed copy of D22.

D22: Further reproduction of Examples 1 and 5 of D2.

Furthermore, respondent 01 requested "that the Board of Appeal indicate **as soon as possible**, and certainly well in advance of the Oral proceedings whether, it will wish to take a decision on all the issues, or whether in the event of a finding for the Appellant on novelty, it would anticipate remission of the case for further consideration by the Opposition Division".

X. In reply to a communication of the board (16 January 2004) in which it was stated that a decision on the question of referral back would be taken in the oral proceedings after having heard the parties, a further letter was received on 4 March 2004 from respondent 01, containing the wording "it would be very much appreciated if the Board could take a firm decision, in advance of the hearing, of what the position would be in the event of a successful appeal in relation to the novelty issue". In a further communication (15 March 2004), the board repeated that this issue would be

decided after having heard the parties on novelty in the oral proceedings scheduled for 2 April 2004. However, the board noted that neither respondent 01 nor respondent 02 wished to discuss the issue of inventive step which had not been dealt with by the first instance and that it had no intention to deprive the parties of a level of jurisdiction in this respect.

XI. By letter filed on 24 February 2004, respondent 02 briefly presented its arguments with respect to inventive step. In a further letter filed on 17 March 2004, it informed the board that it would not attend the oral proceedings scheduled for 2 April 2004 and submitted its final requests (see point XIV, below).

XII. In a letter filed on 2 March 2004, the appellant informed the board that it would not attend the oral proceedings scheduled for 2 April 2004 and submitted its final requests (see point XIV, below).

With respect to the "Further Reproduction" of Dr Gartner (D22), the appellant pointed out that it was stated in this report that the purity of the starting acrylic acid had improved since the filing date of D2. Consequently, Dr Gartner had used a material which was not available at the filing date of D2 and the polymer produced according to the report could not be an accurate reproduction of the relevant examples of D2. Thus, the respondent's argument of lack of novelty must fail. Furthermore, the appellant filed a graph of 30-minute AUL against 2-minute AUL for the materials in Tables 1 and 2 of the patent in suit. This graph (hereinafter referred to as D23) should demonstrate that it was impossible to determine the 2-minute AUL of

a given material from a measurement of the 30-minute AUL.

D23: AUL values of the materials from Tables 1 and 2 in the patent in suit.

XIII. On 2 April 2004, oral proceedings were held before the board at which respondent 01, but neither the appellant nor respondent 02, were represented. Since the latter parties had been duly summoned, however, the oral proceedings were continued in their absence in accordance with Rule 71(2) EPC.

The representative of respondent 01 emphasized that Dr Gartner's experiments in D22 were a fair and proper repetition of the relevant examples of D2. Although the AUL values of the polymers obtained in Dr Gartner's repetition, when measured according to the method of D2, differed slightly from the AUL values quoted in D2, these minor divergences could not challenge the validity of Dr Gartner's experiments. The most likely reason for this divergence was the use of a 99% pure acrylic acid in D2 and, consequently, by Dr Gartner. Within the impurity level of 1%, slight variations might occur which affected the absolute AUL values. Since these slightly different levels of impurities, although within the total of 1%, were difficult to measure and even more difficult to control, a person skilled in the art would in fact expect a slight variation in the AUL values even when exactly repeating the relevant examples of D2. Thus, a variation of less than 10% in the AUL values could not challenge the validity of Dr Gartner's experiments which demonstrated beyond any doubt that the heating regime of Example 5

of D2 met the requirements of the method of Claim 1. As regards the 2-minute AUL test implicitly referred to in Claim 1, it was argued that such a test was not an actual requirement of the claimed method and could, therefore, not provide a distinction over Example 5 of D2.

XIV. The appellant requested that the decision under appeal be set aside and the patent be maintained as granted or the case be remitted to the opposition division as the board see fit.

Respondent 01 requested that the appeal be dismissed, or, in the case that the board would set aside the decision under appeal on lack of novelty over D2, the case be remitted to the first instance for consideration of inventive step.

Respondent 02 requested that the appeal be dismissed and, in case the board would set aside the decision from the opposition division on lack of novelty over D2, the case be remitted to the first instance for examination of inventive step.

Reasons for the Decision

1. The appeal complies with Articles 106 and 108 EPC and Rule 64 EPC and is therefore admissible.

2. *Sufficiency of disclosure*

According to the decision under appeal, the granted patent complies with the requirements of Article 83 EPC. The board sees no reason to depart from that view. Nor was any objection under Article 83 EPC raised during the appeal proceedings by the respondents.

3. *Novelty*

3.1 The patent in suit is concerned in general with a method of heat treating superabsorbent materials. In particular, a superabsorbent material is heated for a period of time at a sufficiently high temperature to increase its in-use absorbent capacity, when measured under a load. This property of the superabsorbent material is measured by the Absorbency Under Load (AUL) test (page 2, lines 18 to 23 of the patent specification) which measures the ability of the superabsorbent material to absorb a liquid (0.9 weight percent solution of sodium chloride in distilled water) while under an applied load or restraining force (page 3, lines 6 to 7 of the patent specification). The weight of saline solution absorbed after 2, 4, 10 or 30 minutes is the AUL value for that length of time, expressed as grams saline solution absorbed per gram of superabsorbent (page 3, lines 38 to 40 of the patent specification).

3.2 According to the method of Claim 1, a superabsorbent material is heated at a temperature of 125°C or greater for a time of from 5 minutes to 60 minutes to increase the 2-minute AUL at least 1 g/g.

3.2.1 In effect, that method claim is directed to a physical activity (heating) to produce a product (superabsorbent material with an increased 2-minute AUL value). The terminology "to increase the 2-minute AUL at least 1 g/g" represents, in the board's view, a further functional limitation of the heating conditions, namely temperature and time. This terminology does not require that a 2-minute AUL test is carried out when applying the method of Claim 1.

3.2.2 Moreover, the reference to the 2-minute AUL value provides instructions for a person skilled in the art how the functional feature can be reduced to practice. Thus, a person skilled in the art can verify with a 2-minute AUL test whether or not a specific combination of temperature and time achieves the desired result or can optimize the temperature/time relationship of the heat treatment for a particular superabsorbent material. Nevertheless, once these tests have been carried out, it is not a requirement of Claim 1 to perform the 2-minute AUL test again when, for example, the heat treatment is repeated under identical conditions for the same superabsorbent material.

3.2.3 The board therefore comes to the conclusion that Claim 1 on its true interpretation does not require the mandatory activity of carrying out the 2-minute AUL test.

3.3 The only document cited in the decision under appeal and by respondent 01 as being relevant for the question of novelty is D2 which was published on 21 October 1992 and forms part of the state of the art according to Article 54(3) and (4) EPC.

3.3.1 D2 discloses a process for preparing surface crosslinked particles of a carboxyl containing water-absorbent resin comprising coating carboxyl containing water-absorbent resin particles with a polyhydroxy compound and a surfactant or a polyhydroxy surfactant and heating the coated particles under conditions such that the polyhydroxy compound reacts with the carboxy moieties of the water-absorbent resin so as to crosslink the surface of the water-absorbent resin particles (Claim 6).

3.3.2 Example 5 of D2 has received particular focus, because in that example no "surface crosslinking agent" was added, the only post-treatment of the water-absorbent resin particles being a heat-treatment. As explained on page 8, lines 31 to 32, the material obtained in Example 1 and identified as SAP1 was simply heated in an air stream of 200°C for 10 minutes whereby a material designated SAP5 was obtained.

3.3.3 The material SAP1 itself was obtained by polymerizing 99% pure acrylic acid under the conditions specified in Example 1 of D2, granulating the resulting aqueous polymer gel to particles and drying these particles in a hot air stream of 160°C for approximately 20 minutes. Subsequently, the particles were ground in a knife cutter and sieved. Although the final water content of these "once-dried" SAP1 particles is not indicated in D2, SAP1 is a starting material as required in the method of Claim 1. As set out in point 7 of the submissions of the proprietor (appellant) filed on 31 January 2000 during the opposition procedure, "the term "once-dried" and the restriction to "up to

7 weight percent moisture" in Claim 1 are simply intended to distinguish the superabsorbent material on which the method is carried out, which is generally a commercially available solid superabsorbent material in the form of particles or granules, from a superabsorbent material at some stage during the manufacturing process. This is because the invention resides in a method of post-production treatment of the superabsorbent material rather than an additional step in the "wet" manufacturing process". It is evident from the above described preparation of SAP1 that a material with this intended limitation was obtained in Example 1 of D2.

3.3.4 Table I of D2 shows that the amount of saline solution taken up over 30 minutes (the 30-minute AUL) was improved by the heat treatment from 23.3 g/g (for SAP1) to 27.0 g/g (for SAP5), ie an improvement of 3.7 g/g. However, D2 did not measure the 2-minute AUL values of the water-absorbent particles. Thus, the decisive question is whether or not an improvement in the 2-minute AUL value by at least 1 g/g inherently was achieved by the heat treatment in Example 5.

3.3.5 With the further declaration of Dr Gartner submitted with letter dated 23 February 2001, respondent 01 has attempted to show that carrying out Example 5 of D2 would inevitably achieve an increase in the 2-minute AUL of SAP1 of at least 1 g/g. In view of the appellant's criticism made of this reproduction of Examples 1 and 5 of D2 (see points IV and VII, above) and in order to dispel any doubt, respondent 01 has once more carried out a reproduction of Examples 1 and 5 of D2, ie D22, this time taking meticulous care

to address the supposed differences of experimental technique that were criticised in its previous reproduction. In fact, as is apparent from D22, respondent 01 exactly followed the procedure reported for Examples 1 and 5 in D2. The polymers obtained in this reproduction will be referred to as SAP1a and SAP5a. The AUL values of SAP1a and SAP5a, determined according to the method mentioned in the patent in suit, are shown in the table below (rows 1 and 2). It can be seen that the heat treatment causes the 2-minute AUL value to increase by 3.6, in which case Example 5 discloses the claimed method.

3.3.6 In order to verify that the products SAP1a and SAP5a are indeed proper reproductions of SAP1 and SAP5 specified in D2, respondent 01 also determined the AUL values of SAP1a and SAP5a by the method used in D2 which differs from the method disclosed in the patent in suit. The values are shown in rows 3 and 4 of the table below. For comparison, the values quoted in D2 are given in rows 5 and 6.

Experiment	AUL (g/g)		
	2 min	5 min	*30 min*
SAP1a (measured according to the patent in suit)	5.9	6.3	*13.7*
SAP5a (measured according to the patent in suit)	9.5	14.1	*28.4*
SAP1a (measured according to D2)	7.8	9.3	*23.2*
SAP5a (measured according to D2)	10.2	18.4	*29.3*
SAP1 (quoted in D2)	-	10.0	*23.3*
SAP5 (quoted in D2)	-	-	*27.0*

3.3.7 It can be seen from the table above that the AUL values for SAP1a and SAP5a, when measured according to the method of D2, differ slightly from the AUL values given in D2 for SAP1 and SAP5. However, a variation of less than 10% in the absolute AUL value is, according to respondent 01, not a large variation in this particular case. The most likely reason for minor variations in the absolute values for the AUL is that Example 1 of D2, and consequently Dr Gartner in its reproduction, used only a 99% pure acrylic acid which is the principal starting material. Within the remaining 1%, different levels of impurities may be present, such as slightly different concentration of moisture, dimer or degradation products, which will affect the absolute value of polymerization and hence the value of the AUL. Since even a difference of a few ppm in the impurity level may influence the absolute AUL value and such small differences are difficult to measure and even more difficult to control in acrylic acid, which is a commercially available product, a person skilled in the art would have to expect some variability when

repeating Examples 1 and 5 of D2. Thus, in spite of the slight variation in the absolute AUL values, a person skilled in the art would accept Dr Gartner's experiments D22 as a proper repetition of the prior art.

3.3.8 In view of this explanation, the board cannot accept the appellant's argument that the polymer produced according to Dr Gartner's report was not an accurate reproduction of the relevant examples of D2. Moreover, the board accepts that Dr Gartner's reproduction D22 is a fair and valid reproduction of Examples 1 and 5 of D2 and that the products SAP1a and SAP5a obtained in this reproduction are to all intents and practical purposes identical with the materials disclosed in D2. Hence, the reproduction of Dr Gartner demonstrates beyond any doubt that the heating regime disclosed in Example 5 of D2 inevitably improves the 2-minute AUL value by at least 1 g/g. Consequently, Example 5 of D2 inherently discloses the method of Claim 1.

3.4 In summary, the indication in the method of Claim 1 "to increase the 2-minute AUL of the superabsorbent material at least 1 g/g" is a functional limitation of the method of Claim 1 and has no effect beyond achieving a certain degree of transformation of the superabsorbent material by a heating regime. The heating regime disclosed in Example 5 of D2 inevitably results, according to the convincing evidence of respondent 01, in the relevant transformation of the product so that the functional limitation implied by a 2-minute AUL test is equally automatically fulfilled, there being no requirement to carry out a 2-miute AUL test when applying the method of Claim 1. Consequently,

Example 5 of D2 deprives the method of Claim 1 of novelty.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar: The chairman:

E. Görgmaier R. Young