BESCHWERDEKAMMERN DES EUROPÄISCHEN PATENTAMTS

BOARDS OF APPEAL OF THE EUROPEAN PATENT OFFICE

CHAMBRES DE RECOURS DE L'OFFICE EUROPEEN DES BREVETS

A		B		C	X

File No.: T 0555/90 - 3.3.3

Application No.: 82 109 304.4

Publication No.: 0 077 038

Classification: C08F 279/02

Title of invention: Process for producing impact resistant resins

D E C I S I O N
of 11 August 1993

Patentee: MITSUBISHI RAYON CO., LTD

Opponent: BASF Aktiengesellschaft

Headword:

EPC: Art. 56

Keyword: "Inventive step (yes)"

Headnote
Catchwords

Europäisches Patentamt | European Patent Office | Office européen des brevets

Beschwerdekammern | Boards of Appeal | Chambres de recours

Case Number: T 0555/90 - 3.3.3

D E C I S I O N
of the Technical Board of Appeal 3.3.3
of 11 August 1993

Appellant: (Opponent)
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Decision under appeal: **Interlocutory decision of the Opposition Division of the European Patent Office of 25 April 1990 issued on 7 June 1990 concerning maintenance of European patent No. 0 077 038 in amended form.**

Composition of the Board:

Chairman: F. Antony
Members: R.A. Lunzer
M.K.S. Auz Castro

Summary of Facts and Submissions

I. European patent No. 77 038 was granted on 15 July 1987 on the basis of application No. 82 109 304.4 filed on 7 October 1982, claiming priority based on Japanese applications Nos. 1 612 33/81 and 1 623 76/81, dated respectively 9 and 12 October 1981.

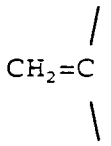
II. On 2 April 1988 an opposition was lodged by the Appellant on the grounds of Articles 100(a) and 100(b) EPC, alleging lack of novelty (Article 54 EPC), lack of inventive step (Article 56 EPC), and lack of sufficiency of disclosure (Article 83 EPC). The Opponent relied on eight documents, the contents of which were considered in the decision of the Opposition Division. In the course of the appeal proceedings particular attention was directed to:

(1) DE-B-1 669 735 and
(2) DE-B-2 427 960.

Claim 1 as amended during the proceedings before the Opposition Division took the following form:

"1. A process for producing an impact resistant graft polymer characterized by first polymerizing a 5-90% (by weight) portion of monomer group (b) consisting of 3-30% by weight of at least one α,ß-unsaturated carboxylic acid selected from the group consisting of acrylic acid, methacrylic acid, itaconic acid and crotonic acid, 97-35% by weight of at least one alkyl acrylate having C_1-C_{12} alkyl group and 0-48% by weight of other copolymerizable monomer (said 5-90% (by weight) portion of monomer group (b) does not contain said α,ß-unsaturated carboxylic acid), followed by consecutively

polymerizing the residual 95-10% (by weight) portion of monomer group (b) (said residual 95-10% (by weight) portion of monomer group (b) contains said α,ß-unsaturated carboxylic acid) in presence of an anionic or nonionic surfactant as emulsifier without forming any new particle to obtain an acid residue-containing copolymer (B) latex having an average particle diameter of 0.05-0,2 µm, adding 0,1-5 parts by weight (as weight of solid component) of said acid residue-containing copolymer (B) latex to 100 parts by weight (as weight of solid component) of synthetic rubber (A) latex which has been adjusted to pH7 or higher to obtain an agglomerated rubber (C) latex having a particle diameter of at least 0,2 µm, and then polymerizing 93-30 parts by weight of grafting monomer (d) consisting of 30 to 100% by weight of at least one monomer selected from the group consisting of styrene, acrylonitrile and methyl methacrylate and 0 to 70% by weight of a monomer having



copolymerizable therewith in the presence of 7-70 parts by weight (as weight of solid component) of said agglomerating rubber (C) latex."

III. By its decision given orally on 25 April 1990, and issued in writing on 7 June 1990, the Opposition Division held that no valid grounds of opposition existed to the maintenance of the patent as amended. It found the minor amendments to Claim 1 unobjectionable, since the meaning of the claim was unaltered by them. The opponent's argument to the effect that the disclosure was insufficient, particularly because it did not specify whether number average particle diameter, or weight average particle diameter, was meant in the

description and claims, was also rejected. Claim 1 covered both possibilities, and thus the invention was disclosed in a manner sufficiently clear and complete for it to be carried out by a skilled man in the art. Novelty was not challenged at the oral proceedings, and the Opposition Division was satisfied that, of the cited documents which were published before the priority date of the patent in suit and could therefore be taken into account, none disclosed all the features of Claim 1. The alleged invention was therefore novel.

So far as concerned the existence of an inventive step, document (2) was considered to be the closest prior art. It disclosed all the features of Claim 1, except for the two-step method of producing the acid residue containing copolymer (B) latex, and the average particle diameter of that latex. The problem with which the alleged invention was concerned was, in the view of the Opposition Division:

"the agglomeration of synthetic rubber (A) latex with an acid residue containing copolymer (B) latex to obtain an agglomerated rubber (C) latex having a particle diameter of at least 0.2 µm, so that a graft polymer having a very high impact strength could be obtained" (decision page 7).

An experimental report filed by the Respondent with its letter of 16 March 1990 was significant, insofar as it demonstrated that the particle diameter of the acid residue containing copolymer (B) latex was an essential feature for solving the problem. As the prior art did not disclose any pointer towards the use of an agglomerating latex which was acid residue containing, and had the prescribed particle diameter, in a process for producing impact resistant graft polymers, the

Opposition Division was satisfied that there was an inventive step.

IV. An appeal against that decision was lodged on 11 July 1990, the appeal fee was paid on the same day, and the Grounds of Appeal were filed on 10 October 1990. Together with its Statement of Grounds of Appeal the Appellant sought to introduce two further citations:

(9) EP-A-0 029 613, and
(10) DE-A-2 432 342,

contending that these documents demonstrated, contrary to the view of the Opposition Division, that acid group containing latices having an average diameter in the range of 0.05 to 0.2 µm were not novel.

V. A letter from the Appellant dated 18 April 1991 asked the Board to give a preliminary ruling on whether documents (9) and (10) would be admitted into the appeal. By a communication dated 23 December 1992, the Board admitted them into the proceedings as being the Appellant's response to the decision of the Opposition Division.

VI. The Appellant contended in its grounds of appeal, and during oral proceedings held on 11 August 1993, that document (1) at column 5 lines 3 to 12 clearly advocated the use of an agglomerating polymer produced by two successive steps of polymerisation, consisting of a first step in which the monomers (b), which contained no free acid groups were polymerised, which step was followed by copolymerisation of monomers (b), with monomers (a) containing acid groups. The indication in column 6 lines 28 to 30 that the agglomerating polymers could be used in the production of dispersions for use in the manufacture of coating materials, would have

suggested to the skilled reader that the properties of the coagulated products were those which were sought in accordance with the alleged invention. Although document (9) indicated at the top of page 7 that a non-ionic surfactant was essential for the purposes of agglomeration, it was clear that the patent in suit did not exclude their use, specific reference thereto being included in Claim 1 at line 35.

Regarding sufficiency of disclosure, the patent in suit could be regarded as sufficient only if it were accepted that the particle diameters defined in the claims were those which would **normally** be obtained. In the alternative, if the skilled addressee of the patent had to control the particle diameter to make products falling within the claims, the disclosure was not sufficient, because it did not identify how to achieve this, nor whether weight average, or number average, particle diameters were intended.

VII. The Respondent argued in its counterstatement, filed on 4 April 1991, and during the oral proceedings, that although document (1) disclosed the idea of a two stage polymerisation, in which the component having free acid groups was present only during the second stage of polymerisation, it took the matter no further than that bare disclosure. Not one of its 15 Examples mentioned any such two stage polymerisation, whilst at column 6, lines 28 to 30, the usefulness of the coagulating polymers was mentioned solely in the context of coating materials, but not in connection with solid moulded products having good impact resistance. The skilled worker, seeking improved impact resistance in solid components would therefore derive no incentive from this document to select its two stage polymerisation teaching.

Document (9) related to an entirely different agglomerating agent, which contained no acid residues. In accordance with that disclosure, the presence of a non-ionic surfactant was indispensable. An important feature of the invention was its two layer structure, with the outer layer containing acid residues. The agglomerating agent disclosed in document (10) was different from that in accordance with the alleged invention, lacking the essential two layer structure with acid residues in the outer layer. Furthermore, document (10) was not in any way concerned with the production of a graft polymer having enhanced impact resistance.

VIII. The Appellant requested that the decision under appeal be set aside, and that the European patent No. 0 077 038 be revoked.

The Respondent requested that the appeal be dismissed.

Reasons for the decision

1. The appeal is admissible.

2 The Board confirms that documents (9) and (10) were admitted into the appeal as indicated in paragraph V. above.

3. *Admissibility of Amendments*

The Board agrees with the view of the Opposition Division on this issue referred to in paragraph III. above, and makes no further comment.

4. *Sufficiency of disclosure*

4.1 In the course of the oral proceedings, two distinct grounds were relied on in support of the objection of lack of sufficiency of disclosure. First, it was objected that unless it could be said that the claimed average particle diameter of the agglomerating latex was the natural result of carrying out the alleged invention as claimed, there was no sufficient instruction to the skilled reader as to how an agglomerating latex having an average particle size falling within the desired limits could be attained. With regard to that objection, the Board observes that the Respondent's experimental report filed on 16 March 1990 demonstrated that by suitable choice of surfactants, they were able to obtain at will a latex having an average particle diameter above or below the claimed limits, and thus able to demonstrate the importance of adhering to the claimed limits.

4.2 The patent in suit discloses a particular combination of agents, i.e. 2 parts of potassium oleate, and 1 part of sodium dioctyl sulfosuccinate, which, in the conditions in Example 1, did in fact give rise to an average particle diameter within the range of 0.30 to 0.38 µm. In the Board's view, the skilled worker would be able to repeat the Examples given in the patent, and in so doing would obtain particles of the desired size. Accordingly, that objection is rejected.

4.3 Regarding the second ground, as was noted in the decision under appeal (point 3, beginning on page 4) the objection of lack of sufficiency due to a failure to distinguish between number average, and weight average, particle diameter was raised for the first time at the oral proceedings before the Opposition Division. The Board accepts that if the skilled reader had been left

in genuine doubt as to how to carry the alleged invention into effect, due to uncertainty as to the maximum and minimum average particle diameters required of latex (B), and the minimum average particle diameter of latex (C), this objection would need to be considered under Article 83 EPC. However, the Board rejects this objection for lack of credibility.

4.4 If it had been true that the absence of further definition is something which would have caused the skilled reader genuine doubt as to the limits within which the desired results of the alleged invention are attainable, that objection would have been raised by the Appellant at the outset in its statement of grounds of opposition. The fact that it was raised for the first time as late as the oral proceedings before the Opposition Division suggests strongly that the point is without substance. In addition, in relation to this art it is the Board's view that when the term "average particle diameter" is used, without any indication in the document as to whether number average, or weight average, is meant, number average would be understood as the intended meaning.

5. *Novelty*

Novelty was conceded by the Appellant during the oral proceedings. Having reviewed the cited documents, the Board is satisfied that none of them discloses a process having all the features defined in Claim 1. Therefore the subject-matter of Claim 1 is novel within the meaning of Article 54 EPC.

6. *Closest prior art*

6.1 Document (10) is considered to be the closest prior art. Its disclosure, as far as it goes, is broadly similar to that of document (2), save that the size range for the agglomerating latex is given as 0.04 to 0.2 µm (page 9 penultimate para.) whereas document (2) is silent on this point, the ranges indicated referring either to the latex to be agglomerated (e.g. part "a)" of Claim 1; column 3 lines 67 to 68), or to the latex formed as a result of the agglomeration (e.g. part "b)" of Claim 1; column 4, lines 43 to 44).

6.2 Document (10) emanates from the present Respondent, and reflects earlier work in the same field. In common with the patent in suit, it starts from the well known fact that rubber particles are frequently included in polymers to counteract brittleness, and that there is a problem in finding economic ways of ensuring that the particle size of the rubber latex are large enough. It proposes the initial preparation of an agglomerating latex, which is then used in the agglomeration of a much larger bulk of rubber latex, so as to achieve the desired increased particle diameter in the final latex. The agglomerating latex of document (10) is produced in a single step by the co-polymerisation, at a pH of at least 4, of a mixture of 3 to 30% of acrylic acid, methacrylic acid, itaconic acid, and/or crotonic acid, and 70 to 97% of an alkyl acrylate having 1 to 12 carbon atoms in the alkyl group, in the presence of at least one anionic surfactant (cf. Claim 1). The agglomerating latex so produced can be used to increase the particle size of a synthetic rubber latex by addition to it at the rate of 0.01 to 10% (all %s are by weight).

6.3 Although document (10) does not mention explicitly any step subsequent to the agglomeration of the rubber particles, it is assumed in the Appellant's favour that the reference at page 1, paragraph 3 to the usefulness of the rubber particles in thermoplastics would be understood by the skilled reader as covering their use in a subsequent graft polymerisation step, such as that disclosed in document (2).

7. *Problem and its solution*

The patent in suit is concerned with securing an improvement in impact strength and surface gloss in graft co-polymers. Its Examples compare the effect of using an agglomerating latex (B-1), which is made in accordance with the alleged invention (the preparation of which is described at page lines 1 to 18), and of using a second agglomerating latex (B-2), which is made in a single step (described at page 6 lines 25 to 36), being virtually identical to the composition referred to as (A-1) at the foot of page 14 (typed numbering) of document (10). Table 1 on page 7 of the patent in suit shows that the use of the agglomerating latex in accordance with the alleged invention results in a better agglomerating effect and better latex stability, whilst the figures for impact strength in Tables 2, 5, and 6, and for surface gloss in Table 5, show that there is a significant improvement when the agglomerating latex (B-1) is used, as contrasted with the results obtained when using the latex (B-2). Accordingly, the Board is satisfied that the stated problem has been credibly demonstrated to be solved by the adoption of an agglomerating latex as defined in accordance with the alleged invention.

8. *Inventive step*

8.1 Document (10), the closest prior art, contains no suggestion of using the two-step polymerisation, which is an essential characteristic of the alleged invention, and in fact the only disclosure of making an agglomerating latex by such a procedure is in the passage at column 5 lines 3 to 12 of document (1). The issue of inventiveness thus turns on whether a skilled worker, starting from the disclosure of document (10), and seeking an improvement in impact resistance and surface gloss, would have found in document (1) a potential solution to that problem.

8.2 Although the above-mentioned passage in document (1) describes the agglomerating agent when made by the two-step process as being highly effective ("hochwirksam"), it is not explained in what respect it is believed to be so effective. The natural meaning of the passage is that it is highly effective as an agglomerating agent, rather than that it brings about incidental benefits, such as improved impact strength. The significance of this passage for the skilled reader is further reduced by the fact that although there are 15 Examples in document (1), not one of them suggest an agglomerating agent made other than by a single step polymerisation. The fact that the isolated mention, as an alternative, contained in column 5 is altogether ignored in the rest of document (1), must reduce its significance in the eyes of the skilled reader.

8.3 Taking the above factors into account, the Board does not consider that the skilled worker, starting from document (10), and being aware of the contents of document (1), and seeking a solution to the problem identified in 8.1 above, would have applied the two stage polymerisation proposal of document (1) to the

preparation of the agglomerating polymers disclosed in document (10), in the expectation of securing an improvement in the impact strength and surface gloss of graft polymers made using the resulting agglomerated latices.

8.4 In the alternative, even if document (2) were to be taken as a starting point, the Board agrees with the finding of the Opposition Division that it lacks both the teaching of making the agglomerating polymer by a two-step process, and any direction towards complying with the limits of its particle size, which are shown by the Respondent's experimental report of 16 March 1990 to be important for the attainment of the desired results (see paragraph III. above).

8.5 Although some reliance was placed by the Appellant on document (9), the Board does not regard the agglomerating latex there disclosed as being as relevant as those disclosed in documents (1),(2),and (10). The agglomerating agents there described do not contain the acid monomeric units essential to the patent in suit, and besides are said to be effective only in the presence of a non-ionic surfactant, whereas the agglomerating latex of the patent in suit is particularly effective in the presence of an anionic surfactant. Consequently, the Board does not consider that this citation advances the Appellant's case.

9. *Conclusion*

The subject-matter of Claim 1 of the patent in issue thus involves an inventive step as required by Article 56 EPC. The dependent Claims 2 to 12 relate to modifications of the process falling wholly within the scope of Claim 1, and on that ground alone they are also

entitled to be upheld. The same reasoning applies to Claim 13, which is effectively a dependent claim.

Order

For these reasons, it is decided that:

The appeal is dismissed.

The Registrar: The Chairman:

E. Görgmaier F. Antony