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D E C I S I O N
of 22 October 1999

Case Number: T 0376/97 - 3.3.3

Application Number: 89305692.9

Publication Number: 0348062

IPC: C08J 7/04

Language of the proceedings: EN

Title of invention:
Polymeric films

Patentee:
E.I. du Pont de Nemours and Company

Opponent:
Hoechst AG Werk Kalle-Albert

Headword:
-

Relevant legal provisions:
EPC Art. 56, 83

Keyword:
"Disclosure - sufficiency (yes) - undue burden (no)"
"Inventive step - non-obvious combination of known features"

Decisions cited:
-

Catchword:
-

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Case Number: T 0376/97 - 3.3.3

D E C I S I O N
of the Technical Board of Appeal 3.3.3
of 22 October 1999

Appellant: (Opponent 01)
Hoechst AG
Werk Kalle-Albert
Patent- u. Lizenzabteilung KA
65174 Wiesbaden (DE)

Representative:
-

Respondent: (Proprietor of the patent)
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Representative:
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Decision under appeal:
Decision of the Opposition Division of the European Patent Office posted 5 March 1997 rejecting the opposition filed against European patent No. 0 348 062 pursuant to Article 102(2) EPC.

Composition of the Board:

Chairman: C. Gérardin
Members: P. Kitzmantel
J. A. Stephens-Ofner

Summary of Facts and Submissions

I. Mention of the grant of European patent No. 0 348 062 in respect of European patent application No. 89 305 692.9 in the name of Imperial Chemical Industries PLC (now assigned to E.I. Du Pont de Nemours and Company), which had been filed on 6 June 1989, claiming priorities from 22 June 1988 (GB) and 27 October 1988 (US), was announced on 21 September 1994 on the basis of 11 claims. Independent Claims 1 and 9 read as follows:

"1. A metallised film comprising a substrate layer of a synthetic polymeric material having, on at least one surface thereof, an adherent layer, and a metallic layer on the surface of the at least one adherent layer remote from the substrate, characterised in that the adherent layer comprises a copolyester resin derived from

(a) in aromatic polycarboxylic acid, or polyester-forming equivalent thereof,

(b) a sulphonic acid derivative of an aromatic polycarboxylic acid, or polyester-forming equivalent thereof, and

(c) a stoichiometric amount of at least one polyhydric alcohol, or polyester-forming equivalent thereof, wherein the alkali metal content of the copolyester resin is within the range of from 0.0001 to 0.005 gramme atoms percent."

"9. A method of producing a metallised film by forming a substrate layer of a synthetic polymeric material, applying to at least one surface thereof an adherent layer, and depositing a metallic layer on the surface of the at least one adherent layer remote from the substrate, characterised in that the adherent layer comprises a copolyester resin derived from

(a) an aromatic polycarboxylic acid, or polyester-forming equivalent thereof,

(b) a sulphonic acid derivative of an aromatic polycarboxylic acid, or polyester-forming equivalent thereof, and

(c) a stoichiometric amount of at least one polyhydric alcohol, or polyester-forming equivalent thereof, wherein the alkali metal content of the copolyester resin is within the range of from 0.0001 to 0.005 gramme atoms percent."

II. Notice of Opposition requesting revocation of the patent in its entirety on the grounds of Article 100(a) and (b) EPC was filed by Hoechst Aktiengesellschaft on 14 June 1995.

The opposition was i.a. based on documents

D1: EP-A-0 185 470 and

D6: US-A-3 563 942.

III. By its decision announced orally on 28 January 1997 and issued in writing on 5 March 1997 the Opposition

Division rejected the opposition.

That decision held that the objection under Article 100(b) EPC, namely that the opposed patent did not disclose the invention in a manner sufficiently clear and complete for it to be carried out by a person skilled in the art, was unfounded, because, although this was not explicitly stated, the teaching of the patent necessarily implied that the quality of the water used as dispersion medium was such that the sodium content of the copolyester resin was not enhanced over and above the claimed upper limit of 0.005 gramme atoms percent.

The films according to Claim 1 were also novel and inventive over D1, because this document was silent on the alkali metal content of the copolyester resin used (Eastman WD Size) and did not address the existing technical problem of improved humid ageing characteristics of the metallised films; D1 could not, therefore, suggest the claimed solution of this problem, i.e. the reduction of the alkali metal content of the copolyester adhesive resin. None of the further citations, D6 included, was considered by the Opposition Division to be relevant to the issue of inventive step.

IV. On 29 March 1997 the Opponent (Appellant) lodged an appeal against the decision of the Opposition Division and paid the appeal fee on the same day. The Statement of Grounds of Appeal was submitted on 15 July 1997, in which the Appellant maintained its objections under Article 100(a) and (b) EPC.

(i) In its submission, the opposed patent did not disclose the invention in a manner sufficiently clear and complete for it to be carried out by a person skilled in the art, because its disclosure comprised the use as dispersion medium of sodium-containing tap water and of sodium alkyl sulphosuccinate as wetting agent, both these measures, independently from each other, being able to enhance the sodium concentration over and above the upper limit set out in Claim 1.

(ii) It also submitted that the Opposition Division's recognition of an inventive step over D1 was not correctly based on a comparison with the closest prior art embodiment disclosed in D1, i.e. a sulphocopolyester composition whose sulpho group counter-ion was not sodium but hydrogen or ammonium. As set out in the Declaration of Dr. R.G. Posey ("Posey-Declaration" attached to the Statement of Grounds of Appeal), the use of such known "virtually sodium-free" sulphocopolyesters provided the same excellent metal adhesion and humid ageing properties as the "low-sodium" sulphocopolyesters according to the patent in suit. These properties of the "low-sodium" sulphocopolyesters used according to the patent in suit could not, therefore, establish an inventive step over D1. This conclusion was furthermore supported by the teaching of D6 which comprised the use of sodium-free ammonium sulphocopolyesters for the preparation of adhesive compositions for forming laminates.

V. The counterstatements of the Respondent (Proprietor of

the patent) presented in its written submission dated 24 February 1998 can be summarized as follows:

(i) Concerning the Appellant's objection of insufficiency of disclosure (Article 100(b) EPC), the Respondent denied that the use of sodium containing tap water as well as the possible addition of sodium alkyl sulphosuccinate as wetting agent would lead to a transgression of the upper limit of the sodium content of the copolyester resins used according to the patent in suit.

(ii) In the Respondent's opinion the results reported in the Posey-Declaration confirmed, rather than confuted the conclusion of non-obviousness reached in the decision under appeal, because the alleged comparative "virtually sodium-free" sulphocopolyester was indeed prepared according to the patent in suit and its sodium content should, thus, be within the range set out in Claim 1. Neither was document D6 of any help to the Appellant's case because the preponderance of the use in the worked examples of D6 of alkali metal derivatives of sulphocopolyesters made clear that this was the preferred embodiment.

VI. Originally both parties asked for oral proceedings in the event that their respective requests would not be allowed on the basis of their written submissions.

Therefore, on 18 March 1999 the parties were summoned to attend oral proceedings. In the annex to these summons the Rapporteur indicated that the Appellant's

interpretation of the Posey-Declaration could not be followed.

By its submission dated 29 September 1999 the Appellant withdrew its original request to hold oral proceedings and requested that the matter be decided on the basis of the previously submitted arguments and documents.

In consequence, the Board's summons to oral proceedings was cancelled.

VII. The Appellant requested that the decision under appeal be set aside and that the European patent No. 348 062 be revoked.

The Respondent requested that the appeal be dismissed.

Reasons for the Decision

1. The appeal is admissible.

2. *Sufficiency of the disclosure*

The Appellant's objection that the opposed patent did not disclose the invention in a manner sufficiently clear and complete for it to be carried out by a person skilled in the art is based on a twofold reasoning: first, on the alleged use of tap water for the preparation of the aqueous dispersion of the sulphonated copolyester and, secondly, on the possible addition of sodium alkyl sulphosuccinate to this

aqueous dispersion.

2.1 Tap water argument

According to Example 1 of the patent in suit deionised Eastman WD Size was used as copolyester resin adhesive. By the step of deionisation the sodium content of the Eastman WD Size was reduced from 0.0405 gramme atoms percent on the solids resin content to 0.00036 gramme atoms percent. This procedure is also described on page 3, lines 7 to 11 of the specification and in Claim 11. Furthermore, it is emphasised on page 3, lines 24 to 27 of the specification that "(A)lthough the pendant sulphonate groups may be in the free acid form, by total elimination of alkali metal, particularly acceptable behaviour is achieved when the alkali metal content of the adherent polyester is within a range of from 0.0001 to 0.0005 gramme atoms percent."

It is thus entirely clear that - as distinct from the teaching of D1 - the presence of only very low amounts of alkali metal ions in the copolyester resin is a vital feature of the subject-matter of Claim 1 of the patent in suit. The Appellant's assumption that the skilled person would ignore this essential teaching and forego the effect achieved by the deionisation step by diluting the aqueous dispersion of the copolyester with high sodium content tap water is therefore at variance with the whole teaching of the patent in suit.

Contrastingly, one skilled in the art would, as a matter of course, employ only water whose alkali metal content is such as not to exceed the limit set in

Claim 1. This is not an exceptional measure in industry, which uses deionised water for many processes, as confirmed on page 6, penultimate paragraph of D10 (T.V. Arden et al., Water Purification by Ion Exchange, London, Butterworths (ICI Intelligence Library date stamp of 16 January 1969)).

2.2 Wetting agent argument

Among the wettings agents, which may be added in order to improve the wetting and levelling properties of the aqueous dispersions of the sulphonated copolyester resin on a thermoplastic film substrate, sodium alkyl sulphosuccinate is mentioned (specification page 4, lines 6 to 8). The Appellant asserted in the Statement of Grounds of Appeal (page 2, lines 16 to 20) that the addition of one drop of a commercial sodium alkyl sulphosuccinate on a surface area of 10 cm^2 of the copolyester adhesive layer would suffice to exceed by far the upper limit of the sodium content of the copolyester resin of 0.005 gramme atoms percent. The Appellant, however, failed to indicate which sodium alkyl sulphosuccinate he meant and in what concentration its solution should be applied. This argument is thus unable to prove that by the addition of any sodium alkyl sulphosuccinate in usual amounts the sodium content of the copolyester resin must inevitably transgress the upper limit of 0.005 gramme atoms percent.

Moreover, the argument developed in point 2.1 supra with respect to the essential nature of the teaching in the patent in suit concerning the use of low sodium sulphonated copolyesters also applies here. In view of

this teaching the skilled person would not consider adding any sodium alkyl sulphosuccinate wetting agent in amounts leading to a transgression of the upper limit of the sodium content as specified in Claim 1. In this respect the Respondent submitted in his response to the Statement of Grounds of Appeal (page 2, first paragraph, last 8 lines) the maximum amount of sodium dioctyl sulphosuccinate which might be added without contravening this requirement.

2.3 In view of the above considerations and also the fact that the patent specification contains an example which the Appellant did not demonstrate that it could not be reproduced without undue burden, it must be concluded that the Appellant failed to establish that the opposed patent did not disclose the invention in a manner sufficiently clear and complete for it to be carried out by a person skilled in the art.

3. *Citations*

3.1 Document D1

This document relates to a metallised film comprising a substrate layer of a thermoplastic polymeric material having on at least one surface thereof an adherent layer and a metallic layer on the surface of this adherent layer remote from the substrate, wherein the adherent layer comprises (a) a polyester resin containing free sulphonate groups SO_3R (with R being hydrogen, (substituted) ammonium or an alkali metal), and (b) an ethoxylated alkyl phenol (cf. Claim 1 to 4; page 2, lines 3 to 7).

The polyester resin (a) may be prepared by cocondensation of (i) ammonium and alkali metal salts of 4-sulphophthalic acid, 5-sulphoisophthalic acid or sulphoterephthalic acid, of (ii) unsulphonated polycarboxylic acids, including phthalic acid and its isomers, and of (iii) polyhydric alcohols, e.g. ethylene glycol (page 2, lines 22 to 35).

According to page 3, lines 31 to 32 the polyester resin (a) is "conveniently applied to the substrate in the form of an aqueous solution or dispersion" and this is the manner employed in all examples (cf. "inventive" Examples 1, 4 and 5 on pages 9, 10, 12 and 13).

The metallised films according to D1 exhibit an improved adhesion between the substrate and the metallic layer, which effect is achieved by the use of the ethoxylated alkyl phenol component (b). This is evidenced by the results of the mean peel strength set

out in the Table on page 15 (cf. page 1, lines 23 to 24; Examples 1 to 9 on pages 9 to 14).

3.2 Document D6

This document relates to aqueous dispersions of a solvent-soluble linear copolyester which comprises the reaction product of at least two dicarboxylic acids, including from about 0.1 to about 10 mole% of a sulphonated aromatic dicarboxylic acid (or certain esters thereof) and of least one dihydric alcohol. The cation of the sulpho group may be an alkali metal or (substituted) ammonium (cf. Claim 1).

According to Example 5 the copolyester is prepared from terephthalic acid and ammonium dimethyl-5-sulphoisophthalate (cf. Examples 2 to 7 in column 8, line 70 to column 9, Table I; in conjunction with Example 1 in column 8, lines 17 to 69).

The dispersions are said to be useful for coating compositions which are excellent adhesives and can be used in forming laminates, e.g. by bonding polyethylene terephthalate film to i.a. aluminum foil (cf. column 7, line 71 to column 8, line 5).

4. *Novelty*

The ground for opposition of lack of novelty was not maintained in the oral proceedings before the first instance and was not brought forward in the appeal stage.

For the reasons to follow, the Board is satisfied that

the claimed subject-matter is novel over documents D1 and D6.

4.1 While D1 embraces the possible use of sulphonated polyester resins containing sodium-free sulphonate groups SO_3R, with R being hydrogen or (substituted) ammonium as starting materials (cf. page 2, lines 3 to 7), it may be assumed - in the absence of any information in D1 concerning the need for a special purity of the aqueous dispersions - that their aqueous dispersions are prepared with ordinary tap water and may, thus, contain sodium ions (cf. Example 1, page 9, last two paragraphs to page 10, line 7).

In view of the missing information on this issue, it is not possible to unambiguously assess the sodium content of the copolyester resins and it is, hence, not possible to conclude that this amount of sodium must be within the range specified in Claim 1 of the patent in suit.

The subject-matter of this claim is thus novel over D1.

4.2 The content of document D6 differs from the subject-matter of Claim 1 of the patent in suit by the lack of a conjoint disclosure of

(i) the use of a copolyester comprising (ia) units from a non-sulphonated aromatic polycarboxylic acid and (ib) units from a sulphonated aromatic polycarboxylic acid,

(ii) a dispersion of copolyesters constituted by the afore-mentioned units in deionised water, and

(iii) the use of such an adhesive dispersion for the preparation of metal coated laminates.

The subject-matter of Claim 1 is thus also novel over D6, irrespective of any considerations concerning the sodium content of the sulphonated copolyester.

4.3 Since the independent method Claim 9 of the patent in suit comprises the product definitions of Claim 1, its subject-matter is likewise novel over D1 and D6.

5. *Problem to be solved and solution thereof*

5.1 When starting from D1 as closest prior art, the problem to be solved is the provision of further metallised films having excellent adhesion between the substrate and the metal film, including improved adhesion after humid ageing (cf. page 2, lines 17 to 23 of the patent in suit).

In formulating this problem account is taken of the fact that D1 already achieves excellent adhesion between the substrate and the metal film, but, differently from the present invention, by selection of specific wetting agents (cf. point 3.1 supra, last paragraph).

5.2 According to the patent in suit this problem is to be solved by the use of sulphonated copolyester adhesive resins having a very low alkali metal content, as specified in Claim 1.

5.3 In view of the available evidence the Board is satisfied that the existing technical problem has

effectively been solved by the claimed features in all its aspects.

This conclusion is drawn on the basis of the experimental results reported for Examples 1 and 2 of the patent specification and for Examples A to F contained in the submission of the Applicant of 1 June 1993 during the stage of substantive examination. These tests results show that the peel strength of "inventive" laminates which are heat sealed to a dry film tape is superior before and after humid ageing to "comparative" laminates comprising an amount of alkali metal in the sulphonated copolyester which is in excess of the upper limit according to present Claim 1.

6. *Obviousness*

6.1 For the reasons set out below the claimed solution of the existing technical problem is not obvious over D1, taken alone or in combination with D6.

6.2 Document D1 relates to metallised films having essentially the same structure as the films according to Claim 1 of the patent in suit, save for the larger amount of alkali metal ions in the copolyester resin layer, which - due to the use of tap water - is likely to arise even when non-alkali metal salts of sulphonated copolyesters are used (cf. point 4.1 supra).

D1 is totally silent on the importance for the adhesion between the substrate and the metal covering layer of the amount of alkali metal ions in the adhesive resin layer; nor is D1 in any way directed towards the

preservation of this adhesive property under humid conditions.

6.3 While, therefore, D1 teaches one way to improve the adhesion between the substrate and the metal covering layer, namely by incorporation of ethoxylated alkyl phenols as wetting agents into the adhesive resin composition, it does not suggest the solution taught by the present invention, i.e. the selection of a range for the amount of alkali metal ions. Contrastingly, all the worked examples set out in D1 use for the adhesive layer Eastman WD Size, i.e. an aqueous dispersion of a copolyester comprising units derived from sodium 5-sulphoisophthalate (cf. page 9, last paragraph) having a sodium content of 0.0405 gramme atoms percent (cf. patent specification page 6, lines 32 to 34), which is far in excess of the upper limit required by Claim 1 of the patent in suit.

Since D1 is totally silent on the humid ageing characteristics of the metallised films, nothing can be gained from this document by the skilled person for the solution of this aspect of the existing technical problem (cf. point 5.1 supra).

6.4 The Appellant's reasoning that the obviousness of the subject-matter of Claim 1 of the patent in suit should be assessed on the basis of sodium-free sulphonated copolyesters (cf. Posey Declaration attached to the Statement of Grounds of Appeal) cannot be accepted, because, even when non-alkali metal salts of sulphonated copolyesters are used as starting materials, it is highly likely that, after preparation of their aqueous dispersions, due to the use of tap

water, their alkali metal content will be considerably enhanced. Alkali metal free adhesive resins do not, therefore, represent state of the art that can be considered to be unambiguously disclosed in D1; purely speculative prior art embodiments must, however, be disregarded in the assessment of obviousness.

6.5 Document D6 is not able to supplement the teaching of D1 in a way to render the present invention obvious either.

Again this document teaches the preferred use of such sulphonated copolyester adhesives which are prepared from alkali metal sulphoaromatic dicarboxylic acids (cf. Examples 1 to 4, 6, 8 to 12) and does not contain any hint that the adhesive characteristics of the copolyesters, which are in the foreground of that subject-matter, might in any way be dependent on the amount of alkali metal ions in the copolyester resin.

Moreover, this document, while referring to adhesive characteristics, does not contain any information concerning the bonding strength to metal layers, which is the specific adhesive property to be optimized by the present invention (cf. point 5.1 supra). It follows that D6 is also silent on the humid performance of the adhesive resins in metallised films.

Thus, the mere mentioning of non-alkali metal containing sulphonated polyester resins in Claim 1 and in Example 5 (cf. column 9, Table I) of D6 cannot incite the skilled person to consider the use of such non alkali metal sulphonated resins as a solution to the existing technical problem (cf. point 3.1 supra).

6.6 The above reasoning confirms the statement made in point 6.1 supra, namely that the subject-matter of Claim 1 of the patent in suit is non-obvious over D1 and D6.

6.7 The same conclusion applies *a fortiori* to the subject-matter of the independent Claim 9, which relates to the preparation of the metallised films according to Claim 1.

6.8 Owing to their appendancy to, respectively, Claim 1 and Claim 9, the subject-matter of the dependent Claims 2 to 8 and 10 to 11 also complies with the requirement of Article 56 EPC.

7. Thus, the grounds for opposition under Article 100(a) and (b) EPC do not prejudice the maintenance of the patent.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar: The Chairman:

E. Görgmaier C. Gérardin