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File Number: T 124/90 - 3.3.3

Application No.: 84 304 358.9

Publication No.: 0 132 951

Title of invention: Polyester film and magnetic recording medium made therefrom

Classification: G11B 5/704

D E C I S I O N
of 28 January 1993

Applicant: Toray Industries, Inc.

Proprietor of the patent:

Opponent: Hoechst Aktiengesellschaft

Headword:

EPC Articles 56, 123(2)

Keyword: Inventive step (yes, after amendment)

Admissibility of disclaimer (yes, even though it excludes more than the specific prior art concerned)



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Boards of Appeal

Chambres de recours

Case Number : T 124/90 - 3.3.3

D E C I S I O N
of the Technical Board of Appeal 3.3.3
of 28 January 1993

Appellant : Hoechst Aktiengesellschaft, Frankfurt (Main)
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Decision under appeal : Interlocutory decision of the Opposition Division
of the European Patent Office of 25 October 1989,
issued on 8 December 1989 concerning maintenance
of European Patent No. 0 132 951 in amended form.

Composition of the Board :

Chairman : F. Antony
Members : R. Young
J. Stephens-Ofner

Summary of Facts and Submissions

I. The grant of European patent No. 0 132 951 in respect of European patent application No. 84 304 358.9 filed on 27 June 1984 and claiming priorities of

15 July 1983 (JP 128004/83);

29 September 1983 (JP 181246/83);

14 October 1983 (190969/83) was announced on 26 November 1986 (cf. Bulletin 86/48).

Claim 1 read as follows:

"An oriented polyester film containing, per 100 parts by weight of polyester,

(A) from 0.005 to 2 parts by weight of fine particles having an average size of 0.05-3 μm , and

(B) from 0.005 to 2 parts by weight of at least one aliphatic monocarboxylic acid having from 10 to 33 carbon atoms or ester thereof."

Claims 2-14 were directed to preferred embodiments of this film, Claims 15-18 to a composite polyester film comprising the oriented film, and Claims 19-24 to a magnetic recording medium comprising the oriented or composite film respectively.

II. Notice of Opposition was filed on 26 August 1987 on the ground of Article 100(a) EPC.

The Opposition was supported inter alia by the documents

(2) JP-A-56-139551 (considered in the form of a full translation into English),

and the late filed, but admitted

(7) EP-A-0 066 997.

III. By a decision which was given at the end of Oral Proceedings held on 25 October 1989 and issued in writing on 8 December 1989, the Opposition Division maintained the patent in amended form on the basis of Claims 1-24 filed with the letter dated 23 August 1989, the definition of component (B) of Claim 1 of which read:

"(B) from 0.005 to 2 parts by weight of at least one aliphatic monocarboxylic acid having from 10 to 33 carbon atoms or an ester thereof with a monovalent or divalent straight or branched alcohol containing from 2 to 33 carbon atoms".

Claims 2-24 corresponded to Claims 2-24 as granted.

According to that decision, the closest state of the art (7) differed from the subject-matter of Claim 1 of the patent in suit only in using an ester of an aliphatic polyol having at least 4 hydroxyl groups in its molecule, instead of the component (B). This difference, which led to the maintenance of the surface flatness and slipperiness properties but apparently not to the alleged improvement in adhesion obtained according to the patent in suit (the comparative tests filed with the letter dated 23 August 1989 not having been taken into consideration for lack of relevance), resulted in the technical problem being one of finding an alternative. The teaching in (7) that esters derived from alcohols having only 3 hydroxyl

groups would not have had sufficient slipperiness meant, however, that the skilled person would not instead have used esters with even fewer hydroxyl groups, such as the montanic acid ester salts of dihydric alcohols disclosed in (2). The use of the free carboxylic acid or ester was also not obvious from (2) itself because of the requirement in the latter for at least partial neutralization of this additive.

IV. On 13 February 1990 a Notice of Appeal against the above decision was filed, together with payment of the prescribed fee. In the Grounds of Appeal filed on 14 April 1990 and a later submission dated 19 April 1991, the Appellant (Opponent) argued that:

- (i) the restriction of the ester alternative of component (B) in Claim 1 to those esters derived from alcohol components with one or two hydroxyl groups failed to establish novelty over (2), since according to the latter the montan wax (a long chain carboxylic acid) and esters thereof with divalent alcohols were not required to be more than partially neutralised, and consequently the residual (unneutralised) free acid or ester fell under the terms of the claim, which did not exclude the additional salt component; the addition of fine inorganic powders in any case being disclosed in (2);
- (ii) taking into account the essential similarity of the film of the patent in suit - which was claimed per se - and the film of (2), which contained the same additive and additionally 20% of a salt thereof, the omission or exclusion of the salt itself could not be inventive in the absence of any surprising effect, in view of the teaching in (7) to use, in the same context and without neutralisation, ester

components differing only trivially from those of the patent in suit; the precise amounts of inorganic powder to be added also being obvious in consideration of the combined disclosures of (2) and (7).

- V. On 8 January 1991 the Respondent (Patentee) filed four new sets of claims, forming a main request and three auxiliary requests together with new comparative data (Experimental Report II) intended to prove an unexpected effect over (7). Further comparative data (Experimental Report III) intended to show an effect over (2) were filed with a submission dated 29 September 1992. A fifth set of claims forming a fourth auxiliary request was filed with the submission dated 6 November 1992.

Claim 1 of the main request reads as follows:

"An oriented polyester film containing, per 100 parts by weight of polyester,

- (A) from 0.005 to 2 parts by weight of fine particles having an average size of 0.05-3 μm , and
- (B) from 0.005 to 2 parts by weight of at least one aliphatic monocarboxylic acid having from 10 to 33 carbon atoms or an ester thereof with a monovalent or divalent straight or branched alcohol containing from 2 to 33 carbon atoms, the film not containing a neutralised or partly neutralised form of the said acid or ester."

Claims 2-24 correspond to Claims 2-24 as granted.

The Respondent argued that:

- (i) the only disclosure of films in (2) containing fine particles according to the patent in suit, apart from a vague statement on page 3, lines 33 to 34, was in Examples 12 and 13 where, however, a completely neutralised form of montan acid was used, so that component (B) was lacking;
- (ii) it was clear from the language of (2) that the montan acid component was required to be neutralised, and therefore it was not obvious to omit the salt;
- (iii) it was on the other hand self evident that the patent in suit was not concerned with films containing a salt form of the acid or ester component (B); indeed, the presence of the salt would militate against the achievement of stability in the required film slipperiness characteristic;
- (iv) the teaching of (7) including its own comparative data pointed away from the subject-matter claimed in the patent in suit.

VI. The Appellant requests that the decision under appeal be set aside and the patent be revoked in its entirety (see Grounds of Appeal, page 5). An auxiliary request for oral proceedings was withdrawn with the letter dated 19 April 1991.

The Respondent requests in effect maintenance of the patent on the basis of the claims forming the main request, or alternatively oral proceedings and then for each of the sets of claims forming the auxiliary requests to be considered in turn (see letter dated 7 January 1991, page 1).

Reasons for the Decision

1. The appeal is admissible.
2. The Amendments
 - 2.1 The first part of Claim 1 up to "or an ester thereof" is supported by Claim 1 as filed, and the subsequent phrase "with a monovalent or divalent straight or branched alcohol containing from 2 to 33 carbon atoms", by the original description on page 7, lines 20-23 (patent in suit page 3, lines 27-30).
 - 2.2 The concluding phrase "the film not containing a neutralised or partly neutralised form of the said acid or ester" in Claim 1 is in the form of a negative limitation, i.e. a restriction on the scope of Claim 1 to require a particular feature to be absent, usually termed a "disclaimer".
 - 2.2.1 Although there was no positive statement in the original version that neutralised forms of the acid or ester (salts) should be absent, it was nevertheless clear for the skilled person that neutralised or partly neutralised forms of the acid or ester were no part of the teaching of the patent in suit, since there was no mention of any such components having been neutralised or partly neutralised. The amendment thus had the effect of excluding subject-matter which was in any case already absent.
 - 2.2.2 Even if one were not prepared to recognise this as justifying such an amendment, however, it is the jurisprudence of the Board that, when there is an overlap between the prior art and the claimed subject-matter defined in generic terms, a specific prior art may be

excluded even in the absence of support for the excluded matter in the original documents (see decision T 433/86 of 11 December 1987, point 2 of the reasons). This has been further developed in decision T 313/86 of 12 January 1988 (not published in OJ EPO) which allowed the exclusion of a smaller sub-area of the generically claimed subject-matter not simply by reference to the state of the art, but because of being "non-functioning", i.e. failing to solve the existing technical problem (see point 3.5 of the reasons).

Such an exclusion may be achieved by way of a disclaimer, or more preferably in positive terms if this leads to a clearer and more concise language (cf. decision T 04/80, "Polyetherpolyols/Bayer", OJ EPO 4/1982, 149). In the present case, the device of a disclaimer is acceptable since the negative formulation is more concise and indeed more clearly representative of the true state of affairs, than a positive enumeration of all the (unneutralised) acids and esters which may be present.

- 2.2.3 The terms of the disclaimer are, however, more comprehensive than the specific prior art excluded since they apply to all such neutralised or partially neutralised acids and esters and not just the montan acids and esters disclosed in (2). In this connection it has been argued by the Respondent that the presence of the salt, which would bleed out of the film surface much more quickly than an acid or ester, would result in stickiness and dust attachment to the film and that this would militate against the achievement of stability in the required film slipperiness property. This argument, which confirms that the complete silence of the original application as to the excluded subject-matter reflected an enabling aspect of the disclosure, has not been specifically refuted by the Appellant and is convincing to

the Board, even without resorting to the supplementary data provided with the more recent submission of the Respondent (Experimental Report III filed with the submission dated 29 September 1992), upon which no comment has so far been received from the Appellant.

Consequently, in the light of the above jurisprudence, the scope of the disclaimer is held to be justified by the original enabling disclosure and hence to be admissible.

2.3 Claims 2-24 are supported by Claims 2-24 as filed.

There are thus no formal objections under Article 123(2) and (3) EPC to the claims of the main request since they are supported by the original disclosure and manifestly do not extend the protection conferred.

3. The closest state of the art

3.1 The patent in suit is concerned with an oriented polyester (PE) film, preferably a biaxially oriented polyethyleneterephthalate (PET) film, having desirable surface properties e.g. for use as a base for magnetic recording tapes. The film contains small quantities of micron sized particles and also an aliphatic monocarboxylic acid compound. Such films are known, for instance from (7) or (2).

3.2 According to (7), a biaxially oriented PET film having satisfactory surface flatness and slipperiness which is maintained even after repeated use, contains (in % based on the PET),

- (a) not more than 0.8 pbw of fine inorganic particles having an average particle diameter of not more than $1\mu\text{m}$, and

- (b) 0.01 to 5 pbw of an ester of an aliphatic polyol having at least 4, preferably 4 to 6, hydroxyl groups in the molecule with an aliphatic monocarboxylic acid having at least 8 carbon atoms (cf. (7), Claims 1, 2).

A biaxially stretched film formed from a melt-extruded blend of PET with titanium dioxide of average particle size $0.3\mu\text{m}$ (0.3 %) and pentaerythritol stearate (0.5 or 3 %) had good values for CLA (Centre line average) surface roughness (0.010 and $0.009\mu\text{m}$ respectively) and slipperiness (dynamic friction coefficient $\mu\text{d} = 0.28$ or 0.30 respectively; running friction coefficient $\mu\text{k} < 0.2$), the latter quality being durably maintained through repeated running cycles, whereas the same film with quantities of pentaerythritol stearate falling below or above the limits given in (a) above had higher dynamic friction coefficients (μd of 0.87 or >1 respectively), and a running friction coefficient μk which further increased in use (cf. Table 1; graphs I, II and III of Fig. 2). Comparably good results were also achieved using instead particles of calcium carbonate of average size $0.8\mu\text{m}$ (0.10 %) together with sorbitan tristearate, pentaerythritol tribehenate or tetrastearate, and arabitol dipalmitate (cf. Examples 3-6, Table 2). With esters derived from alcohols having not more than 3 hydroxyl groups, e.g. glycerol tristearate, however, an elevated value of $\mu\text{d} = 0.42$, corresponding to poor slipperiness, resulted (Comparative Example 5, Table 2).

- 3.3 According to (2), PET or mixed PET-polybutylene terephthalate films for use in photography, magnetic tapes, packaging and electrical insulation and having satisfactory transparency and lubrication properties as well as adhesion and surface smoothness contain 0.01-2 pbw

of neutral or partly neutralised montan wax salt or montan wax ester salt (cf. Claim 1 and last 3 paras. on page 1).

The neutral or partly neutralised montan wax salt or montan wax ester salt is produced through reaction between the aliphatic monocarboxylic acid mixture (mainly 26-32C) constituting montan wax and 0.2 - 1.0 equivalent of metal hydroxide or oxide, which means that the montan wax is at least 20 % neutralized. As far as the montan wax ester salt is concerned, this is formed through esterification of montan acid with an equivalent of not higher than 0.9, preferably 0.5-0.8, of dihydric alcohol followed by neutralization with the metal hydroxide or metal oxide (see page 3, second para.).

According to Application Examples 12 and 13 the films contain 0.4 parts montan wax sodium salt (fully neutralized) as well as 0.02 and 0.03 parts respectively of kaolin having a mean particle size of $0.85\mu\text{m}$ per 100 parts pf PET (see page 6).

Thus, in the extreme case where the montan acid is 90 % esterified, the remaining 10 % carboxylic acid groups are necessarily completely neutralized.

3.4 The Board considers, as did the Opposition Division, that the disclosure of (7) represents the closest state of the art, dealing as it does more specifically than (2) with the problems of surface flatness and extent and durability of slipperiness properties and their relevance to the handling and running qualities of magnetic tapes.

4. The technical problem and its solution

4.1 Compared with the closest state of the art (7), the technical problem is to be seen in the provision of an

alternative PE film having effectively good adhesion, e.g. to a recording medium, whilst maintaining the same level of surface flatness and durable slipperiness properties.

4.2 The solution according to the patent in suit was to replace the ester additive of (7), in a PE film, with an aliphatic monocarboxylic acid (2-33C) or an ester thereof with a monovalent or divalent straight or branched alcohol (2-33C), using the latter in an amount of from 0.005 to 2 pbw % of the film. The particles, no longer necessarily inorganic, should also be present in amounts of 0.005 to 2 pbw % of the PE, their permitted size range being increased to 0.05-3 μ m.

4.3 It can be seen from the comparative data in the patent in suit that the claimed films have simultaneously good qualities of surface flatness and extent and durability of slipperiness as well as good adhesion to various types of coatings including magnetic recording layers, in comparison with tapes in which one or other of the additives is absent or present in a quantity falling outside the claimed ranges (cf. Examples 1-8 and 19; Table 1 and page 16).

4.4 As regards the closest state of the art, although the relevant surface quality parameters are not in all cases measured in precisely the same way, the similar values obtained for the CLA (centre line average) surface roughness in (7) and the surface roughness Ra in the patent in suit, as well as for the running friction coefficient (μ k) in (7) and the kinetic friction coefficient (μ k) in the patent in suit, indicate that the surface flatness and surface slipperiness of the claimed films are at a similar level to those of (7). Similar conclusions can be drawn as to the durability of the slipperiness in both cases.

- 4.4.1 The closest prior art is silent, however, as to the adhesion properties of the films. Furthermore, the supplementary comparative test supplied by the Respondent (Experiment Report II) does not relate to properties of adhesion.

There thus remain the comparative data from the patent itself, which can be considered to provide fair evidence of the effective adhesion capabilities of the claimed films.

- 4.4.2 The results of the test in Experimental Report II have in any case not been taken into account, firstly because the amount of carnauba wax given (3 pbw %) does not fall within the range allowed by claims of the patent in suit, and secondly because the tristearate of pentaerythritol is not disclosed in individualised form in (7). The test is thus not truly comparative.

In view of the comparative data in the patent and in (7) referred to above, however, it is nevertheless credible the technical problem is solved by the claimed measures.

5. Novelty

- 5.1 The claimed subject-matter is novel, since none of the documents cited discloses an oriented PE film containing the fine particles and the high aliphatic carboxylic acid or mono- or divalent alcohol ester thereof without a neutralised or partially neutralised form of the acid or ester being present.

- 5.2 The Appellant in any case did not further contest novelty as such (cf. submission dated 19 April 1991, page 2, first complete sentence).

6. Inventive Step

6.1 To decide the issue of inventive step it is necessary to establish whether the skilled person, starting from (7), would have considered making the combined modifications of the solution defined in section 4.2 above, in particular the replacement of the ester of an aliphatic alcohol having at least 4 hydroxyl groups in the molecule with the unneutralised high aliphatic carboxylic acid or ester thereof with a mono- or divalent alcohol, in the expectation of obtaining an alternative film with similarly good qualities of surface flatness and durable slipperiness, and, in addition, having good adhesion properties, e.g. to a magnetic recording layer.

6.1.1 Although (7) is directed to PE films having surface flatness and durable slipperiness, the absence of any mention of adhesion properties means that the skilled person could not have obtained any assistance from this source as to what modifications might favourably affect this property.

6.1.2 It is furthermore clear from (7) that the use of an ester of an alcohol having at least 4 hydroxyl groups in the molecule was regarded as essential if the required properties of slipperiness were to be obtained. In particular the fact that esters of alcohols having not more than 3 hydroxyl groups, such as glycerol tristearate, gave unsatisfactory results in this respect would strongly have discouraged the skilled person from employing instead esters formed from alcohols having even lower numbers of hydroxyl groups in the molecule (cf. page 6, lines 6-15; Comparative Example 5).

The Board thus concurs with the view expressed in the decision under appeal (see point 4.4 of reasons) that the skilled person would not, in view of this teaching, have seen any incentive to consider employing instead esters formed from mono- or divalent alcohols. Consequently, it would not have been obvious for the skilled person to use the neutralised wax esters of (2) in the films according to (7). This conclusion applies even more strongly to the use of the neutralised wax acids of (2) in the films of (7).

6.1.3 Even if, however, the skilled person were to have replaced the esters of (7) by the neutralised wax esters of (2), in spite of the clearly expressed discouragement referred to above, the result would still not have been something falling under any claim of the patent in suit because the terms of the latter specifically exclude the presence of neutralised or partially neutralised forms of the ester. The significance of this exclusion for the solution of the technical problem has been dealt with in section 2.2.3 above.

6.1.4 The notion put forward by the Appellant in this connection, that the skilled person would simply omit the neutralized part of the wax ester component in (2), on the grounds that the amount of neutralised additive was small, an unneutralised ester was used in (7), and the films of (2) and (7) were essentially similar, with only gradually changing properties (see section IV (ii) above), is unsupported by the teaching of either document. There is no pointer in (2) to the effect that the neutralisation might be dispensed with, nor in (7) that the surface properties might change gradually if the particular esters were modified. On the contrary, (7) teaches that a small change in the hydroxyl basis of the ester - itself a

factor relevant to neutralisation - can lead to an unacceptable loss of the required slipperiness properties.

- 6.1.5 The remaining documents are more remote from the subject matter claimed.

Consequently, the subject-matter of Claim 1 of the patent in suit does not arise in an obvious way from the teachings of the prior art.

- 6.1.6 The achievement of flatness and durable slipperiness properties simultaneously with the somewhat antithetical property of good adhesion, as demonstrated by the relevant comparative data is, moreover, regarded as a surprising result.

- 6.1.7 In summary, the subject-matter of Claim 1 involves an inventive step. Furthermore, Claims 2-24 which are dependent on Claim 1, or at least limited to products containing the film thereof, are by the same token consequently also directed to subject-matter which is both novel and inventive.

7. In view of the above finding, it was not necessary to hold oral proceedings or to consider the further sets of claims forming the auxiliary requests of the Respondent.

8. The description not yet having been brought into agreement with the claims of the main request, the Board makes use of its powers under Article 111 EPC to refer the case back to the first instance.

Order

For these reasons, it is decided that:

1. The decision under appeal is set aside.
2. The case is remitted to the Opposition Division with the order to maintain the patent on the basis of Claims 1-24 of the main request filed on 8 January 1991 and a description yet to be adapted thereto.

The Registrar



The Chairman

