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D E C I S I O N
of 20 November 2001

Case Number: T 0375/99 - 3.5.2

Application Number: 91122292.5

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Title of invention:
High density magnetic recording medium

Patentee:
Diafoil Company, Limited

Opponent:
Teijin Limited

Headword:
-

Relevant legal provisions:
EPC Art. 56

Keyword:
-

Decisions cited:
G 0007/95, T 0150/82, T 0205/83

Catchword:
-

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Case Number: T 0375/99 - 3.5.2

D E C I S I O N
of the Technical Board of Appeal 3.5.2
of 20 November 2001

Appellant: (Opponent 01)
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Decision under appeal: Decision of the Opposition Division of the European Patent Office posted 11 February 1999 rejecting the opposition filed against European patent No. 0 492 648 pursuant to Article 102(2) EPC.

Composition of the Board:

Chairman: W. J. L. Wheeler
Members: R. G. O'Connell
B. J. Schachenmann

Summary of Facts and Submissions

I. This appeal is against the rejection of the single remaining opposition to European patent No. 492 648. A second opposition was withdrawn during the opposition procedure.

II Claim 1 of the patent as granted is worded as follows:

"A high density magnetic recording medium comprising a polyester film formed of a plurality of layers laminated by coextrusion and oriented by stretching, which simultaneously satisfies the conditions of the following relations (1) to (4); a back coat layer which is provided on the rougher surface side of said polyester film layer and the surface roughness of which simultaneously satisfies the conditions of the following relations (5) and (6); and a magnetic film layer provided on the less rough surface of said polyester film.

$Ra^A \leq 0.008$ (1)

$0.005 \leq Ra^B \leq 0.02$ (2)

$0.005 \leq Ra^B - Ra^A \leq 0.015$ (3)

$9 \leq F_5 \leq 30$ (4)

$0.015 \leq Ra^C \leq 0.040$ (5)

$0.003 \leq Ra^C - Ra^B \leq 0.035$ (6)

wherein

Ra^A stands for the average centerline roughness (μm) of the less rough surface side of the polyester film;

Ra^B stands for the average centerline roughness (μm) of the rougher surface of the polyester film;

Ra^C stands for the average centerline roughness (μm) of the surface of the back coat layer; and

F_5 stands for the tensile strength of the polyester film when longitudinally stretched by 5% (kg/mm2)."

Claims 2 to 7 are dependent on claim 1.

III. The sole ground of opposition raised by the remaining opponent was lack of inventive step of the subject-matter of all claims of the patent. The withdrawn opposition raised in addition the ground of insufficiency, but this has not been argued on appeal. The following prior art documents which featured in the opposition procedure remain relevant to the present decision:

D1: EP-A-0 238 985

D2: EP-A-0 088 635

D9: JP-A-62-219 318 with partial translations I and II filed 21 August 1997 and 27 November 1998.

In addition the following documents were filed with the statement of grounds of appeal:

D12: Experimental Report

D13: Partial translation III of D9.

IV. Oral proceedings were held before the board on 20 November 2001.

V. The appellant opponent argued essentially as follows:

Given that the ground of lack of novelty had not been raised in the opposition procedure and that the proprietor did not agree to its introduction into the appeal procedure, the appellant's submissions were to be considered only in the context of assessment of inventive step pursuant to the decision of the Enlarged Board of Appeal G 7/95 *Fresh grounds for opposition* OJ EPO 1996, 626 (Headnote). The contention in the written appeal procedure that claim 1 could be read onto Example 5 of D2 was not maintained.

The conflicting requirements for the surface of a polyester film for use as a high density magnetic recording medium were that it should be, on the one hand, as smooth as possible to avoid signal degradation and, on the other hand, not so smooth as to be hard to wind and unwind as a result of poor film/film and film/roller slipperiness which in turn could lead to scratch defects and poor running durabilty. The subjective and objective technical problem solved by the magnetic recording medium specified in claim 1 was to reconcile these conflicting requirements.

Generally in the prior art this problem had been solved by providing the magnetic recording medium with a smooth obverse recording face and a rough reverse winding face. A first way was the use of a back coat layer as disclosed in prior art document D9; a second way was coextrusion to produce a multilayer laminate combining a rough material with a particle filling and a smooth material with no particle filling as disclosed in D1.

Although not relied on as a formal argument, it could be said that, in a certain sense, the alleged invention was a combination of the solutions taught in D9 and D1.

In fact prior art document D2 combined D9 and D1; it had all the features of claim 1 of the opposed patent, addressed the same problem and provided the same solution. Comparing D2, page 3, lines 22 to 31 and the specification of the opposed patent (hereinafter briefly PS) at page 2, lines 4 and 5, it could be seen that the stated and objective technical problems were identical.

The magnetic recording medium disclosed in D2 was a polyester film structure (page 6, lines 3 to 6) comprising a plurality of laminated layers (page 4, lines 5 to 19). D2 taught that a covering layer (back coat lubricant layer C) was not absolutely necessary (paragraph bridging pages 12 and 13) but that it should preferably be provided to improve running durability.

The relationship between the subject-matter of claim 1 of the opposed patent and the disclosure of D2 was one of overlapping ranges. Comparing the parameters of claim 1 and D2 in turn (rugosity in nm):

PS, Claim 1	D2
(1) $Ra^A \leq 8$	$Ra^A < 5$ (page 4, line 10) - D2 encompassed by larger range of claim
(2) $5 \leq Ra^B \leq 20$	$5 < Ra^B < 40$ (page 4, lines 11 to 13) - considerable overlap of ranges
(3) $5 \leq Ra^B - Ra^A \leq 15$	$0 < Ra^B - Ra^A < 40$ (page 4, lines 9 to 13)
(5) $15 \leq Ra^C \leq 40$	$5 < Ra^C < 40$ (preferably 5-30) (page 13, lines 4 to 9)

(6) $3 \leq Ra^C - Ra^B \leq 35$ $-35 < Ra^C - Ra^B < +35$ (follows from D2 ranges for Ra^B and Ra^C)

- a very substantial overlap

- half of the range where $Ra^C > Ra^B$.

As regards the parameter F_5, equation (4) of claim 1, this was not mentioned explictily in D2, but an experiment on Example 5 of D2 gave 10.0 kg/mm2 (D12). In fact the F_5 value was an elasticity parameter which was an alternative to Young's modulus; it was a prescribed value in standard tape specifications. More documents could be adduced if this fact was not admitted by the respondent.

The criteria to be applied in relation to overlapping ranges were set out in decision T 26/85 OJ EPO 1990, 22 (points 9 and 13) where the test was framed as to whether the person skilled in the art would "seriously contemplate" working in the overlap range; these criteria were further developed in decisions T 666/89 OJ EPO 1993, 495 (point 7) and T 124/87 OJ EPO 1989, 491. Applying these criteria to the present case, it could be seen that there was nothing in D2 to dissuade the person skilled in the art from working in the range of overlap. The teaching of the latter was, in the context of applying a third layer, basically the common sense notion that if the reverse face B was too smooth it should be made rougher by appropriate selection of the roughness of the (external) face of a further layer C. In the teaching of D2 as to the range of roughness for the surface B (cf page 4, lines 11 to 24) there was no preference for any end of the range, while at page 13, lines 7 to 9, a preferred range of 5 to 30 nm for the roughness of surface C was specified. There

was nothing to prevent the person skilled in the art from working in the area of overlap where effectively the same solution was taught as in claim 1.

D2 solved the objective technical problem derivable from claim 1 of the opposed patent; the residual problem, if any, was to provide an alternative solution. But the distinction giving rise to this alternative, viz a particular difference between the surface roughness of the C and B layers provided no technical contribution. The final product had no B surface; the interior layer was inaccessible once manufacture was complete. Thus the parameter $Ra^C - Ra^B$ specified in equation (6) of claim 1 was technically irrelevant. In fact it was not legitimate to specify a product by such a parameter which could not be measured in the finished product, e.g to determine infringement; at least it could not be relied on to establish inventive step.

Although none of the examples in D2 destroyed the novelty of claim 1, Examples 3 and 5 showed that the teaching of D2 extended to a back coat layer C which was rougher than the underlying B layer.

In accordance with decision T 694/92 Modifying plant cells/ Mycogen OJ EPO 1997,408 the scope of the claim should reflect the contribution to the art but in the present case the claimed range was an arbitrary, not a purposive, selection. Comparative Example 2 in the PS was said to give poor results, but in D2 the same values gave good results. It would appear that the difference in the PS resulted from the properties of the back coat layer, but these advantageous properties were neither disclosed nor defined.

VI. The respondent proprietor argued essentially as follows:

The respondent admitted that the range specified for F_5 in equation (4) of claim 1 corresponded to the conventional elasticity characteristics which tapes of this kind were required to meet.

Claim 1 taught certain requirements for the surface roughness of layers A, B and C, but above and beyond that the difference Ra^C - Ra^B specified in equation (6) of claim 1 was a key element of the teaching of the opposed patent for the reasons indicated at PS, page 4, lines 53 to 57.

Prior art document D2 disclosed two main embodiments (i) a two-layer structure with $5 < Ra^A < 40$ nm and (ii) a three-layer structure (protrusions on a flat plane) in which the other surface must have Ra in the range 5 to 40 nm. In D2 there was no suggestion that in a 3-layer structure there should be a difference between Ra^C and Ra^B.

It was not plausible to suggest that the claimed structure would be arrived at by following the teaching of D2. In particular, D2 covered the poor comparative example No. 2 described at PS page 6, lines 10 to 14, and hence taught away from the inventive concept specified in claim 1.

In considering the relation between the surface roughness of the layers B and C there were three posssibilities: (i) $Ra^C < Ra^B$ (which was included in the teaching of D2), (ii) $Ra^C = Ra^B$ (also included in D2) and (iii) $Ra^C > Ra^B$. The teaching of the opposed patent was a purposive non-aribitrary selection of the part 3 to 35 nm of the third possibility. There was no incentive in D2 to select this range.

From a more general point of view the problem of making the obverse face of a film as smooth as possible while not making the reverse face so smooth as to cause mechanical handling difficulties was known and had been solved in the prior art in at least three ways, represented by D1, a two-layer coextrusion of layers with different particle fillings; D9, one layer plus a back coat layer; and D2, which taught a form of roughening the smooth surface of a second layer by either an application of rough nodule formations or a third layer. All these prior art solutions dealt only with tailoring the final external reverse surfaces.

It should also be noted that equation (3) of claim 1 was not disclosed in D2 and that equation (5) specified a much narrower range than was disclosed in D2. In considering overlap one had to consider all features with their various differing overlaps, it was not a case of optimising a single parameter.

As regards the belated objection that Ra^B and hence $Ra^C - Ra^B$ were inaccessible internal parameters, the respondent proprietor did not accept that measurement of these parameters in the finished product would be impossible. As could be seen from the passage at PS page 4, lines 54 to 57 the roughness relationship had a real effect.

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

VIII. The respondent proprietor requested that the appeal be dismissed.

Reasons for the Decision

1. The appeal is admissible.

2. *Inventive step*

2.1 Technical background

The opposed patent relates to a high-density magnetic recording medium comprising a polyester film formed of a plurality of layers laminated by coextrusion and oriented by stretching. Such films give rise to the conflicting design requirements that the surface should, on the one hand, be as smooth as possible to optimise recording and playback performance and that, on the other hand, excessive smoothness gives rise to tape running difficulties. This is the subjective technical problem referred to in the introductory part of the specification of the opposed patent (PS) at page 2, lines 13 to 19. It is also the general problem addressed by prior art document D2 (page 3, lines 22 to 31).

2.2 Closest prior art and objective technical problem

Given that the respondent proprietor admits that the range specified for the film elasticity parameter F_5 in equation (4) of claim 1 is common general knowledge in the art in the sense that it corresponds to the range which is conventionally specified in the mechanical performance characteristics of such films, the board agrees with the appellant opponent's contention that document D2 represents the closest prior art. It is common ground that, starting from D2, in particular the embodiment of D2 referred to at page 13, lines 4 to 9, the objective technical problem implied by claim 1 of the opposed patent is to improve the running

performance of the magnetic recording medium by applying a back coat layer of suitable roughness to the polyester film substrate.

2.3 Solution

The solution specified in claim 1 of the opposed patent, in particular by equation (6), is to choose the surface roughness of the back coat layer C such that it exceeds the surface roughness of the underlying layer B by at least 3 nm and at most 35 nm, while the surface roughness of the C layer itself lies in the range 15 to 40 nm. The rationale for these relationships is indicated in the patent specification at page 4, lines 54 to 57 where it states: "If the difference of the Ra's is less than 0.003 μm, the roughness of the B surface influences the roughness of the back coat layer and thus the evenness of the protrusions is impaired and running property degrades. On the other hand, if the difference of the Ra's is in excess of 0.035 μm, the protrusions of the back coat are irregular and the running durability deteriorates."

2.4 Obviousness

It is not disputed by the appellant opponent that D2 contains at least no explicit teaching that the surface roughness of the C layer should be related to the surface roughness of the B layer. He argues however that the person skilled in the art, in following the teaching of D2 in relation to the surface roughness of the C layer (D2, page 13, lines 7 to 9) would be led to work in a range which would in fact comply with equation (6) of claim 1 of the opposed patent. The board is not persuaded by this argument. Although it cannot be excluded that the person skilled in the art following the teaching **could** arrive at a structure

falling within claim 1 it is not plausible to contend that he **would** do so, given that there is no counterpart anywhere in D2 to the teaching in the opposed patent (cf passage at page 4, lines 54 to 57 referred to above) relating to the difference in the surface roughness of the the B and C layers. The board's judgement in this respect is confirmed by considering the preferred examples 1 to 5 in Table 1 of D2 which imply a Ra^C-Ra^B roughness difference of at most 1 nm, given that the Ra value of the B layer before coating is stated to be 0.014 μm (page 16, line 34 to page 19, line 10) whereas claim 1 of the opposed patent specifies a lower limit for Ra^c - Ra^B of 3 nm.

2.5 Non-measurable parameter

The appellant opponent contends that the surface roughness of the internal layer B is not measurable in the product which constitutes the subject-matter of claim 1 and that consequently, neither its value nor its difference with respect to the surface roughness of the external layer C are features which can legitimately be taken into account in assessing inventive step of the product claim. Apart from objecting to the belated presentation of this argument for the first time at the oral proceedings the respondent proprietor does not admit that Ra^B is not measurable in the finished product. However, even if, for the sake of argument, the non-measurablity of this parameter in the product is assumed, the board is not persuaded that it cannot legitimately be used to specify the product in a product by process sense. It is a natural characterisation of a novel structure which cannot readily be defined otherwise if at all. The appellant opponent's argument that infringement would be impossible to detect in the finished product is, strictly speaking, an issue of clarity rather than

inventive step but it would in any case, as the board views it, impose an evidential burden on the patent proprietor. Any person who made the product as specified in claim 1 would know - if he wished to know - that he had done so; legal certainty would not be a problem for him.

Insofar as the appellant opponent's argument is to be understood as implying that a product which is allegadly distinguished from the prior art by a parameter in the claim which is not measurable cannot be regarded as new within the meaning of Article 54 EPC, and therefore cannot be considered as involving an inventive step in accordance with decision **G 7/95** *Fresh grounds for opposition* OJ EPO 1996, 626, the board regards such a contention as running counter to the established jurisprudence of the EPO Boards of Appeal that products may be defined by features of their method of manufacture when a definition in terms of structural features is impracticable; cf "Case law of the Boards of Appeal of the European Patent Office", section II B 6. (pages 174 to 177 of the English language version), in particular the reference *inter alia* to decision T 150/82 (OJ EPO 1984, 309). See also decision T 205/83, "Vinyl ester/crotonic acid copolymers/ Hoechst, OJ EPO 12/1985, 363, reasons 3.2; in the present case the appellant opponent has not adduced any experimental evidence to establish that the product claimed does not in fact have any new properties resulting from its method of manufacture.

3. The board thus concludes that the subject-matters of the claims of the patent as granted are to be considered as involving an inventive step within the meaning of Article 56 EPC and that the ground of

opposition pursuant to Article 100(a) EPC does not prejudice the maintenance of the opposed patent in unamended form.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar: The Chairman

M. Hörnell W. J. L. Wheeler