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D E C I S I O N
of 13 March 1996

Case Number: T 0328/94 - 3.5.2

Application Number: 86116836.7

Publication Number: 0229292

IPC: G11B 11/00

Language of the proceedings: EN

Title of invention:
Optical-magnetic recording medium

Patentee:
Hitachi Maxell Ltd.

Opponent:
HOECHST Aktiengesellschaft Werk Kalle-Albert

Headword:
-

Relevant legal provisions:
EPC Art. 56

Keyword:
"Inventive step (after amendments, yes)"
"Remittal to the Opposition Division"

Decisions cited:
G 0009/91, G 0010/91, T 0433/86

Catchword:
-

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Case Number: T 0328/94 - 3.5.2

D E C I S I O N
of the Technical Board of Appeal 3.5.2
of 13 March 1996

Appellant: (Opponent)
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Zentrale Patentabteilung KA
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Representative:
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Respondent: (Proprietor of the patent)
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Decision under appeal: **Interlocutory decision of the Opposition Division of the European Patent Office posted 16 February 1994 concerning maintenance of European patent No. 0 229 292 in amended form.**

Composition of the Board:

Chairman: W. J. L. Wheeler
Members: M. R. J. Villemin
C. Holtz

Summary of Facts and Submissions

I. The Appellant filed an opposition against European patent No. 0 229 292 and now contests the interlocutory decision of the Opposition Division that account being taken of the amendments made during the opposition proceedings, the patent and the invention to which it related met the requirements of the EPC.

The Opposition Division took the view that the subject-matter claimed in the amended patent was novel and involved an inventive step having regard to the following prior art submitted with the notice of opposition:

D1: EP-A-0 184 034, considered under Article 54(3) EPC,
D2: JP-A-59-84358 with translation into English,
D3: DE-C-2 342 886 and
D4: DE-A-3 317 101.

II. In the statement of grounds of appeal, the Appellant made, inter alia, the following points.

The inclusion of the alternative Co alone for the transition metal in the amended Claim 1 maintained by the Opposition Division infringed Article 123(3) EPC. The claimed recording medium was not new, because D2 disclosed the formula (rare earth)(Fe and/or Co)(additive) and gave terbium as an example of the rare earth component and gave many examples for the additive which were the same as many of the additives mentioned in Claim 1. The claim also lacked novelty vis-à-vis D1. D3 and D4 taught that the resistance to corrosion of such alloys could be improved by various additives which were mentioned in the claims maintained by the Opposition Division.

III. Oral proceedings took place before the Board on 13 March 1996. As announced in the letter of 20 February 1996, the Appellant did not attend. In the oral proceedings the Respondent submitted a new set of claims 1 to 7.

Claim 1 reads as follows:

"1. An optical-magnetic recording medium comprising a recording layer formed by an alloy of a rare earth metal, a transition metal and in addition thereto a first additive element wherein the rare earth metal is terbium, the transition metal is Fe and/or Co and characterized in that the first additive element has resistance to corrosion in elementary form and is at least a kind of element selected from the group of chromium, aluminum and copper excluding the combination of chromium being the first additive element with the single transition metal being Fe alone or in combination with Co."

Claim 2 reads as follows:

"2. An optical-magnetic recording medium comprising a recording layer formed by an alloy of a rare earth metal, a transition metal and in addition thereto a first additive element, wherein the rare earth metal is terbium, the transition metal is Fe and/or Co and the first additive element has resistance to corrosion in elementary form and is at least a kind of element selected from a group consisting of titanium, platinum, zirconium, vanadium, tantalum, molybdenum, ruthenium, rhodium, palladium, niobium, iridium, hafnium, chromium, aluminum and copper, characterized in that the layer furthermore comprises a second additive element being at least a kind of element selected from the group

consisting of silicon, germanium, boron, carbon and phosphorus, excluding the combination of aluminum being the first element and silicon being the second element with a single transition metal being Fe alone or in combination with Co."

Claims 3 to 7 are dependent on Claims 1 or 2.

IV. The Respondent argued essentially as follows:

No prior document affected the novelty of the subject-matter of Claims 1 and 2. It was emphasized that the very problem underlying the contested patent was not the improvement of the Kerr rotation angle but the prevention of the deterioration of this angle with time. This was achieved by adding a material having resistance to corrosion, this material being selected from particular groups defined in Claims 1 and 2. D2 was considered as the document disclosing the prior art closest to the claimed invention. However, this document was not concerned with the prevention of corrosion in order to reduce the deterioration of the Kerr rotation angle with time, but rather with improving the value of this angle. Therefore, D2 alone was not suitable to give the skilled person any hint for the improvement of corrosion resistance of, in particular, the specific kinds of alloys as presently claimed. It was agreed that D4 was concerned with both the problem of improving the value of the Kerr rotation angle and the problem of corrosion of an optical-magnetic recording medium. However, the use of Tb alone was not hinted at in D4, for the teaching of this document was focused on GdTbFe and GdTbFeCo alloys to which Si alone or Si and Cr or Si and another element such as Al might be added. Thus there was no reason to combine the teachings of D2 and D4 in order to improve the corrosion resistance in the manner indicated in Claims 1 and 2.

V. The Appellant requested in the notice of appeal that the decision under appeal be set aside and that the European Patent No. 0 229 292 be revoked.

VI. The Respondent requested that the patent be maintained on the basis of Claims 1 to 7 filed in the oral proceedings.

Reasons for the Decision

1. The appeal is admissible.

2. *Amendments*

2.1 In order to comply with Rule 29(1)(a) and (b) EPC, the precharacterising preambles of Claims 1 and 2 filed in the oral proceedings are based on the prior art disclosed in D2.

2.2 Regarding the Appellant's contention that the inclusion of the alternative Co alone (i.e. without Fe) in the claims infringed Article 123(3) EPC, because it extended the scope of protection, the Board notes that in the patent as granted, Claim 1 was not limited to any particular choice of transition metal. In the opinion of the Board, the wording "at least a kind of Fe and Co" in granted Claim 4 was just bad English for "at least one of Fe and Co" and covered, inter alia, the use of Co alone as the transition metal. Independent Claims 1 and 2 now specify which rare earth metal (Tb) and which transition metal (Fe and/or Co) is used. The first additives Cr, Al and Cu in Claim 1 belong to the group of the first additives indicated in granted Claim 1.

Claim 2 now comprises the features concerning the second additive element Si, Ge, B, C and P listed in granted Claim 2. Thus the scope of protection has been restricted, not extended.

2.3 Claims 1 and 2 now contain disclaimers directed to the exclusion of particular combinations of elements. The reasons for these disclaimers are to be found in prior art document D4 indicating special effects of Cr, Si and Al in the case of specific kinds of alloy (see D4, in particular column 6, lines 14 to 24; column 6, line 55 to column 7, line 5 and column 7, lines 24 to 30 and 42 to 47). These disclaimers are admissible having regard to the case law following from the decision T 433/86 (unpublished), according to which "specific prior art may be excluded even in the absence of support for the excluded matter in the original description." The Board notes that the remaining claimed subject-matter in Claims 1 and 2 is fully supported by the granted patent. Claim 3 relates to the specific proportions of elements Tb, Fe and Co entering in the composition of the various alloys mentioned in tables 5 to 8 of the granted patent. Claims 4, 5, 6 and 7 correspond to granted Claims 3, 5, 7 and 10.

2.4 All the amendments made during the opposition and appeal proceedings to arrive at the present claims comply with Articles 123(2) and (3) EPC, since they are all supported in the application documents as originally filed and these amendments do not extend the protection conferred by the claims as granted.

2.5 It is noted that in the notice of opposition no objection was raised under Article 100(b) EPC to a possible insufficiency of disclosure of the invention according to granted Claim 1 which covered the use of any transition metal. Nor was any objection raised under

Article 100(c) EPC to the wording of granted Claim 4. These matters do not appear to have been considered at all during the proceedings before the Opposition Division. Therefore the Board cannot investigate them (see decision of the Enlarged Board of Appeal G 9/91, OJ EPO, 1993, 408).

3. *Novelty*

3.1 D1 is a prior art document according to Article 54(3) EPC. It discloses an optical-magnetic composition expressed by the formula

R(Fe,Co)M,

where R refers to a number of rare earth elements and M is an "additional element" selected from a group partly overlapping the group of "additive elements" defined in the present Claims 1 and 2. It is specified in D1 that the key elements of the magneto-optical composition are iron, rare earth elements or additionally Co, the rare earth elements being 70 - 100 atomic percent Nd and/or Pr, the balance of the rare earth fraction of the alloy being made up of one or more elements from a group comprising Tb (see D1, page 7, line 10 to page 8, line 2, and page 9, lines 3 to 6). The whole document D1 makes it clear that Nd and Pr are essential and therefore it does not anticipate any of the optical-magnetic compositions covered by Claims 1 and 2, which require Tb as the only rare earth element.

3.2 Document D2 discloses an optical-magnetic recording medium (cf. in particular Claims 1 and 2) defined by the formula

RTM,

where R is at least one of Gd, Tb or Dy, T represents at least one of Co and Fe, and M is at least one of the elements selected from a group containing none of the elements Cr, Al and Cu specified in the characterising part of Claim 1 of the amended patent in suit as "first additive elements" and none of the elements Si, Ge, B, C and P specified in the characterising part of Claim 2 as "second additives."

3.3 Neither of the documents D3 and D4 refers to an optical-magnetic recording medium formed by an alloy including terbium as the only rare earth component.

3.4 Therefore, the subject-matter of Claims 1 and 2 is novel with respect to the prior art known from any one of the documents D1, D2, D3 and D4.

4. *Inventive step*

Document D2 is regarded by the Board as describing the closest prior art. The problem to be solved according to D2 is to provide an optical-magnetic recording medium with a larger θ_k and a higher S/N ratio. Deleterious effects on θ_k arising from corrosion of the recording layer are neither mentioned nor implied in D2. Starting from the optical-magnetic recording medium known from D2, the problem addressed in the patent in suit can be defined as providing an optical-magnetic recording medium with a satisfactory Kerr rotation angle value θ_k and showing an improved resistance to corrosion in order to maintain the value of θ_k as constant as possible.

4.2 Claim 1

4.2.1 It would be natural for the skilled person to explore the promising field available from D2 and thus perform as many experiments as desired based on the choice of any of the elements R, T and M mentioned in this document (see Claims 1 to 3 and page 2, second paragraph of the English translation of D2). For example, in view of Claim 2 of D2, Tb as rare earth and Fe and/or Co as transition metal could be envisaged as a possible combination of elements worth investigating, as correctly reflected by the prior art portion of the amended Claim 1 of the patent in suit. However, the use of Cr, Al or Cu is not indicated in the list of the elements M recited D2, and it is even pointed out in D2 that elements such as Cr and Cu fail to improve θ_k (see D2, page 3, third paragraph of the English translation).

4.2.2 Of all the documents cited by the Appellant, only D4 is explicitly concerned, in addition to the aim of providing an acceptable value of the Kerr rotation angle, with the problem of improving the resistance to corrosion of an optical-magnetic recording medium. The preferred medium described there comprises Gd in combination with Tb and Fe, with or without Co (see D4, Claims 1 and 6). The material made of Tb alone in combination with Fe is regarded as not advantageous because of its low Curie point and the small value of its Kerr rotation angle (see D4, column 2, lines 1 to 8 and table 1). D4 emphasizes the use of the combination Gd-Tb-Fe, showing the greatest θ_k, with the addition of Co which further increases the value of θ_k (see English translation of D4, column 3, lines 22 to 32).

4.2.3 Although the combination of Tb with Fe and/or Co could be envisaged by the skilled person from the teaching of D2, the combination Fe-Tb is not recommended by D4 and neither D2 nor D4 discloses the use of at least one element selected from the group of Cr, Al and Cu. According to examples 13 and 14 in D4, the resistance to corrosion of a medium comprising GdTbFeCoSi or GdTbFeSi improves as the amount of Si increases (see D4, column 6, lines 20 to 23 and column 7, lines 1 to 5 and 24 to 30). It is further indicated in D4 that the resistance to corrosion of "the material of the invention" (thus based for example on GdTbFeCo or GdTbFe, cf. Claims 1 and 6 of D4) can be improved by adding Si and Cr, or Si with another element such as Al. However D4 does not hint at the use of Cr, Si or Al in an alloy containing only Tb as rare earth element. Thus, in the Board's opinion, D2 and D4, taken alone or in combination, do not render obvious the recording medium according to Claim 1 of the patent in suit.

4.2.4 The present invention relates to the magneto-optical Kerr effect which causes the rotation of the plane of polarisation experienced by a beam of plane-polarized light when it passes through the recording medium exposed to a magnetic field produced by signals to be recorded. D3 discloses a recording medium suitable for a magnetic bubble domain memory (see in particular column 2, lines 18 to 20 and column 14, lines 29 to 55). It is well known that in such a memory, digital recording takes place in the form of magnetic domains created by magnetic means only, namely a writing coil. Although in D3 the recording layer formed by an alloy of a rare earth metal, a transition metal, which can be Fe or Co, and an element having resistance to corrosion selected from a group including Cr, Al and Cu, could possibly have optical-magnetic properties, the problem to be solved in D3 is to achieve thin magnetic bubble

memory layers having an improved storage density, which are easy to fabricate and are such that conventional material deposition methods may be used (see D3, column 3, lines 19 to 35). There is no suggestion in D3 of aiming to improve the value of the rotation angle, or its constancy, if **recording was performed by using Kerr effect**. On this ground, the Board is of the opinion that the teaching of D3 has no relevance to the claimed subject-matter and does not render it obvious.

4.3 Claim 2

The disclosure in D2 makes available to the public a large number of different optical-magnetic recording media in accordance with the preamble of Claim 2, comprising a recording layer formed by an alloy of Tb as rare earth metal, Fe and/or Co as transition metal and a first additive element having resistance to corrosion in elementary form and being at least one element selected from a group consisting of, inter alia, titanium, platinum, zirconium, vanadium, tantalum, molybdenum, ruthenium, rhodium, palladium, niobium, iridium and hafnium. Neither D2 nor any of the other cited documents suggests the addition thereto of a second additive element being at least one element selected from the group consisting of silicon, germanium, boron, carbon and phosphorus, excluding the combination of aluminum being the first element and silicon being the second element with a single transition metal being Fe alone or in combination with Co.

5. Summarising, none of the prior art documents cited during the appeal proceedings discloses, or remotely suggests, the optical-magnetic recording medium as defined in the amended Claims 1 and 2 of the patent in suit. The Board therefore concludes that the claimed subject-matter is novel and involves an inventive step over the cited prior art.

6. It should be noted that the Board has not examined the dependent Claims 3 to 7 (apart from checking that they are dependent) to see if they meet the requirements of the EPC. The description and drawings will require extensive amendment to remove inconsistencies with the amended Claims 1 and 2. This means that many of the examples will have to be deleted. Furthermore, it would be appropriate to cite documents D2 and D4 in the description in order to comply with Rule 27(1)(b) EPC. Rather than do this itself, the Board makes use of its powers under Article 111(1) EPC to remit the case to the Opposition Division for further prosecution. This has the advantage of giving the Appellant an opportunity to comment on the amendments.

7. For avoidance of doubt, it is pointed out that according to Article 111(2) EPC the Opposition Division is bound by the present decision only to the extent that it has been decided that the subject-matter of Claims 1 and 2 as filed in the oral proceedings on 13 March 1996 (recited in paragraph III above) involves an inventive step over the prior art considered in the present decision. According to the opinion of the Enlarged Board of Appeal G 10/91 (OJ EPO 1993, 420), point 2, the Opposition Division could even, exceptionally if it deemed it appropriate, take up the points mentioned in paragraph 2.5 of the present decision.

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 for further prosecution on the basis of Claims 1 and 2 as filed in the oral proceedings on 13 March 1996, having regard to the remarks in paragraphs 6 and 7 above.

The Registrar:

M. Kiehl

The Chairman:

W. J. L. Wheeler