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Aktenzeichen / Case Number / N° du recours : T 26/85 - 3.5.1

Anmeldenummer / Filing No / N° de la demande : 81 107 188.5

Veröffentlichungs-Nr. / Publication No / N° de la publication : 0 048 414

Bezeichnung der Erfindung: Magnetic recording medium
Title of invention:
Titre de l'invention :

Klassifikation / Classification / Classement : G11B 5/70

ENTSCHEIDUNG / DECISION

vom / of / du 20 September 1988

Anmelder / Applicant / Demandeur : Kabushiki Kaisha Toshiba

Patentinhaber / Proprietor of the patent /
Titulaire du brevet :

Einsprechender / Opponent / Opposant :

Stichwort / Headword / Référence : Thickness of magnetic layers/Toshiba

EPÜ / EPC / CBE Articles 54, 56

Schlagwort / Keyword / Mot clé : - Overlapping ranges of thickness -
- Novelty (yes) -
- Inventive step (yes) -

Leitsatz / Headnote / Sommaire

I. Article 54 EPC has to be interpreted in the sense that anything comprised in the state of the art can only be regarded as having been made available to the public in so far as the information given to the person skilled in the art is sufficient to enable him to practise the technical teaching which is the subject of the disclosure, taking into account also the general knowledge in the field to be expected of him.

Therefore, in assessing the novelty of the invention under examination over the prior art in a case where overlapping ranges of a certain parameter exist, it has to be considered whether the person skilled in the art would in the light of the technical facts seriously contemplate applying the technical teaching of the prior art document in the range of overlap. If it can be fairly assumed that he would do so it must be concluded that no novelty exists.

.../...

II. If there exists in a prior art document disclosing a range of a parameter a reasoned statement dissuading the person skilled in the art from practising the technical teaching of the document in a certain part of the range, such part has to be regarded as novel for the purposes of Article 54 EPC.

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Case Number : T 26/85 - 3.5.1

D E C I S I O N
of the Technical Board of Appeal
of 20 September 1988

Appellant : Kabushiki Kaisha Toshiba
72 Horikawa-cho Saiwai-ku
Kawasaki-shi Kanagawa-ken 210
Japan

Representative : Patentanwälte
Henkel, Pfenning, Feiler, Hänzel & Meinig
Möhlstrasse 37
D-8000 München 80

Decision under appeal : Decision of Examining Division 067 of the European Patent Office dated 17 August 1984 refusing European patent application No. 81 107 188.5 pursuant to Article 97(1) EPC

Composition of the Board :

Chairman : P.K.J. Van den Berg
Members : J.A.H. Van Voorthuizen
P. Ford

Summary of Facts and Submissions

I. European patent application No. 81 107 188.5 filed on 11.09.81 (Publication No. 0 048 414) claiming a priority of 22.09.80 (JP) was refused by a decision of the Examining Division 067 dated 17.08.84. That decision was based on Claims 1-7 as originally filed, with minor amendments submitted on 22.07.83. Claim 1 of this set of claims reads as follows:

A magnetic recording medium which comprises: a low coercive force material; and a magnetic recording layer which is formed on the low coercive force layer and whose magnetic anisotropy is perpendicular to the surface of said recording layer and wherein the magnetic recording layer is of a smaller thickness than 0.3μm.

II. In its decision the Examining Division cited GB-A-2 006 508 (Document (1) and EP-A-15 692 (Document (2)) and considered essentially the following:

Document (1) discloses a recording medium which comprises a low coercive force material and a magnetic recording layer which is formed on the low coercive force layer and whose magnetic anisotropy is perpendicular to the surface of said recording layer, the thickness of said recording layer being no greater than 3μm and preferably from 0.1 to 3.0μm. Whilst said thickness according to Claim 1 is smaller than 0.3μm, the claimed and the known ranges overlap for a thickness between 0.1 and 0.3μm.

As there is a technical trend to reduce the thickness of magnetic layers, which reduction reduces layer deposition time and the costs of manufacturing, and it is common practice that in design work an engineer has to try to

find a suitable compromise between different and possibly conflicting mechanical and electrical requirements, the Examining Division considered it to be within the scope of the practice and knowledge of a skilled man to come to a compromise saying that the thickness should be smaller than 0.3μm.

Thus, the subject-matter of Claim 1 did not involve an inventive step.

III. The appellant lodged an appeal against this decision on 09.10.1984. The appeal fee was paid on the same date. The Statement of Grounds for the appeal was filed on 19.12.1984.

IV. The appellant maintained the same set of claims and argued its allowability essentially as follows:

As can be clearly seen from the large number of thickness values disclosed in Document (1), only the range between 0.5μm and 2.0μm or even 3.0μm corresponds to really preferred embodiments so that the man skilled in the art will of course choose values of the thickness within this range.

Document (1) imparts a prejudice to any man skilled in the art concerning the thickness of the recording layer from 0.1 to 0.5μm. The teaching of this document with respect to a thickness range between 0.1 to 0.5μm would never give the best results, and the reader of Document (1) gets rather the impression that a recording layer between 0.1 and 0.5μm would be at best an inferior embodiment, so it can be regarded as a "negative disclosure".

Document (1) does not give any example of a recording layer in the said thickness range below 1.0μm. The reason

is that Document (1) is based on the idea that the output is decreased if the recording layer becomes thinner.

The present inventors have not only discovered that decreasing the thickness involves surprising advantages with regard to the reduction of noise and to the wavelength characteristic. Basically, they have theoretically clarified and experimentally confirmed that the output does not depend on the thickness of the recording layer, leading to the present invention, which thus permits improving the signal/noise ratio without sacrificing the output. This advantageous effect, produced by a specifically decreased thickness - below 0.3μm, is not described in Document (1), and it is the inventive merit of the present inventors that they made their experiments in spite of the severe prejudices mentioned above. Therefore, Document (1) does not provide a hint at the theory on which the present invention and its object are based, but discloses only theoretically a small range of values which overlaps the range as claimed in the present Claim 1. However, the man skilled in the art who carefully studies Document (1) will prefer at any rate an advantageous value between 0.5μm and 2.0μm which is clearly beyond the upper limit of 0.3μm according to the present invention.

Thus, the pending Claim 1 was believed to be fully patentable over the cited prior art.

V. In a communication of 13.11.1987 the Rapporteur informed the appellant that in the provisional opinion of the Board of Appeal Claim 1 could not be held allowable essentially for the following reasons: There being no indication in the application that the advantages of the invention would be obtained totally irrespective of the thickness of the low coercive force layer, Claim 1 appeared to be unduly

broadly worded and was therefore unallowable under Article 84 EPC. Furthermore, even if the overlapping range of 0.1-0.3μm was perhaps not regarded as the best embodiment as far as signal output was concerned it was certainly considered as usable by the inventor of Document (1). The person skilled in the art might well be led to choosing a thickness of the recording layer within the said range in spite of a reduced output signal. Therefore, Claim 1 appeared to lack novelty.

VI. The appellant filed an amended set of Claims 1-7 on 28.12.1987, the first claim of which reads as follows:

1. A magnetic recording medium which comprises:

a low coercive force layer (2); and
a magnetic recording layer (3) which is formed on the low coercive force layer and whose magnetic anisotropy is perpendicular to the surface of said magnetic recording layer (3),

characterized in that the magnetic recording layer (3) is of a thickness ranging between 0.02μm and 0.3μm.

He requested the grant of a European patent on the basis of these claims.

VII. In the course of oral proceedings held on 19.01.1988, after the Board had confirmed its provisional opinion as stated in the aforementioned communication, the appellant maintained his request as far as Claims 1-7 filed on 28.12.1988 were concerned as a main request and submitted an auxiliary request for the grant of a European patent on the basis of a new set of Claims 1-5, Claim 1 of which essentially being a combination of Claims 1, 3 and 7 filed on 28.12.1988.

VIII. The Board thereupon decided to dismiss the appellant's main request but stated that the procedure would be continued on the basis of the auxiliary request in order to provide the appellant an opportunity to make some amendments to the claims as required by the Board and to submit the amendments necessary to bring the description into conformity with the new claims.

IX. On 18.05.1988 the appellant filed Claims 1-5 in due form and amended pages 1, 2, 2a, 3, 6, 8 of the description.

Claim 1 now reads as follows:

1. A magnetic recording medium which comprises:

- a low coercive force layer (2), and

- a magnetic recording layer (3) which is formed on the low coercive force layer and whose magnetic anisotropy is perpendicular to the surface of said magnetic recording layer (3),

characterized in that

- the magnetic recording layer (3) is of a thickness in the range between 0.05μm and 0.1μm, and

- the low coercive force layer (2) is of a thickness in the range between 0.5 and 2.0μm.

Reasons for the Decision

1. The appeal complies with Articles 106-108 and Rule 64 EPC and is, therefore, admissible.

2. There are no formal objections against Claim 1 as the ranges of thickness claimed were explicitly disclosed in the application as filed. The description mentions on page 3, lines 13/14 a preferred range of thickness for the magnetic recording layer between 0.05 and 0.1μm and on page 9, line 27 a range of thickness for the low coercive force layer between 0.5 and 2.0μm (cf. also original Claim 4).

3. Document (1) refers to a magnetic medium for perpendicular recording which comprises a first layer of low coercive force having a thickness of at least 0.1μm and a second magnetic recording layer formed on the first layer having a thickness of less than 3μm (cf. Claims 1 and 9 of that document).

Main request

4. Turning to Claim 1 of the main request, in particular in connection with the advantages obtained by the invention, it has to be noted that Figure 2 and the corresponding part of the description of the present application show no more than that at a wavelength λ= 2μm the signal output is substantially uniform regardless of the thickness ℓ_A of the recording layer under the condition that the thickness of the low coercive force layer ℓ_B is 1μm. Although the Board accepts that this effect would probably also be obtained within a range of values for ℓ_B around 1um, there is no indication that it would be obtained totally irrespective of the value of ℓ_B. In fact, it seems very unlikely that this could be the case and the appellant did not present any evidence for it. Therefore, Claim 1 is considered to be unduly broadly worded as not stating all the essential features of the invention and consequently

must be held unallowable under Article 84 EPC and Rule 29 EPC (cf. T 32/82, OJ EPO 1984, 354). It follows that for this reason alone the main request has to be dismissed, irrespective of whether also novelty objections could be raised against Claim 1.

Auxiliary request:
Novelty

5. In examining the appellant's auxiliary request, and in particular the issue of novelty, the Board considered the following points:

6. The ranges for δ_A and δ_B defined in Claim 1 of the auxiliary request fall within the broadest ranges stated in Document (1) (cf. paragraph 2 above). It would seem therefore at first sight that that claim lacks novelty. The Board feels, however, that a more careful consideration of the issue is required before arriving at a final conclusion.

7. When drafting a patent specification and claims, applicants not unreasonably tend to define the limits of the protection they are seeking as broadly as possible. Thereby quite often some parts of a broadly claimed range of values of a certain parameter, although formally included, appear at least at first sight to be speculative and of a less practical relevance than other parts. This applies in particular to the parts lying near the limits of the claimed range. Such a situation may be borne out by the indication of preferred ranges and/or by the examples which are given.

8. Article 54 EPC states "that an invention shall be considered to be new if it does not form part of the state of the art" which "shall be held to comprise everything

made available to the public by means of a written ... description ...". The Board interprets this as not only applying to the means of disclosure (e.g. the written description) but equally to the content, in the sense that anything comprised in the state of the art can only be regarded as having been made available to the public in so far as the information given to the person skilled in the art is sufficient to enable him to practise the technical teaching which is the subject of the disclosure, taking into account also the general knowledge in the field to be expected of him.

9. It appears to the Board, therefore, that a realistic approach in assessing the novelty of the invention under examination over the prior art in a case where overlapping ranges of a certain parameter exist, would be to consider whether the person skilled in the art would in the light of the technical facts seriously contemplate applying the technical teachings of the prior art document in the range of overlap. If it can be fairly assumed that he would do so it must be concluded that no novelty exists.

10. These conclusions appear to be consistent with the earlier case law of the Boards of Appeal: cf. e.g., T 198/84 (OJ EPO 7/1985, 209), T 17/85 (OJ EPO 12/1986, 406), T 25/87, 7.7.1988 (not published) and T 124/87, 9.8.1988 (to be published).

11. In the present case, Document (1) discloses in its broadest form thickness ranges $\delta_A \leq 3\mu m$ and $\delta_B \geq 0.1\mu m$. Preferred ranges are given as $0.1\mu m \leq \delta_A \leq 3.0\mu m$ and $0.1\mu m \leq \delta_B \leq 3.0\mu m$. Most preferred ranges are given as $0.5\mu m \leq \delta_A \leq 3.0\mu m$ and $0.5\mu m \leq \delta_B \leq 3.0\mu m$. Examples S1 to S6 are given in which $\delta_A = 1.0\mu m$ and δ_B ranges between $0.5\mu m$ and $2.0\mu m$.

Document (1), however, (cf. page 3, lines 6-23 of the description) states that "If the thickness of the recording layer is too small ... a low or insufficient reproduced output is obtained ... Therefore ... the minimum thickness of the recording layer is at least 0.1μm and preferably at least 0.5μm".

12. The said passage appears to indicate that although the range of 0.1-0.5μm was perhaps not regarded as the best embodiment in so far as signal output is concerned it was certainly considered as usable by the inventor of Document (1) in contrast to the range below 0.1μm.

13. In the present case, therefore, there exists in the prior art a reasoned statement clearly dissuading the person skilled in the art from using in a double layer medium a thickness of the recording layer below 0.1μm. In the light of the reasoning set out above, the Board is of the opinion that the range of thickness values below 0.1μm and in particular the range 0.05-0.1μm has to be regarded as novel.

Inventive step

14. As a surprising effect in the combination of this range with a specific range of thickness of the low coercive force layer asserted by the Appellant (cf. paragraph IV above) has been made plausible the Board finds that Claim 1 of the auxiliary request also involves an inventive step so that this claim must be held allowable.

15. The dependent Claims 2-5 describe further embodiments of the invention, they are not open to objection.

16. The amendments to the description filed on 18.05.1988 serve to bring the description in correspondence with the new claims, they are not open to objections.

17. However, in order that the description corresponds to the actual claims, it is required that on page 8 as submitted on 18.05.1988 the following correction be made: lines 23-25 should read "in the range between 0,05μm and 0,1μm according to the present invention. If the thickness δA decreases from 0,02μm, then defects appear in a magnetic".

Order

For these reasons, it is decided that:

1. The decision under appeal is set aside.

2. The appellant's main request is rejected.

3. The case is remitted to the first instance with the order to grant a European patent on the basis of the following documents:

   (a) Claims 1-5 filed on 18.05.1988
   (b) Description as amended on 18.05.1988, subject to the proviso that the correction indicated in paragraph 17 above be made.
   (c) Drawings as originally filed.

The Registrar: The Chairman:

S. Fabiani P.K.J. Van den Berg