

Publication in the Official Journal ~~Yes~~ / No

File Number: T 33/91 - 3.5.2

Application No.: 85 105 722.4

Publication No.: 0 203 207

Title of invention: System for testing magnetic head/disk interfaces

Classification: G11B5 455

D E C I S I O N
of 19 December 1991

Proprietor of the patent: IBM DEUTSCHLAND GMBH

Headword:

EPC Article 56

Keyword: Inventive step (no)

Headnote



Case Number : T 33/91 - 3.5.2

**DECISION
of the Technical Board of Appeal 3.5.2
of 19 December 1991**

Appellant : IBM DEUTSCHLAND GMBH
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Representative : Herzog, Friedrich Joachim, Dipl.-Ing
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Decision under appeal : Decision of Examining Division of the European
Patent Office dated 20 July 1990 refusing
European patent application No. 85 105 722.4
pursuant to Article 97(1) EPC.

Composition of the Board :

Chairman : R.E. Persson
Members : A.G. Hagenbucher
W.J.L. Wheeler

Summary of Facts and Submissions

I. The Appellant contests the decision of the Examining Division refusing the European patent application No. 85 105 722.4 (publication No. 0 203 207) on the ground that the subject-matter of Claim 1 does not involve an inventive step in view of the following prior art:

D1: EP-A-105 094

D2: IBM Technical Disclosure Bulletin, Vol. 27, No. 4B, September 1984, Page 2328.

D3: FR-A-2 011 048

II. Claim 1 reads as follows:

"1. Method for measuring and testing the properties of the interface of a slider carrying a magnetic transducer head and a disc in a magnetic disc storage apparatus, characterised by the following steps:

1. the rotational speed of the disc is adjusted such that there is a rubbing contact between the slider and the disc,
2. the triboelectric current generated by step 1 between disc and slider is measured during a measuring/testing period,
3. the amplitude curve of said tribo current over said time period is analysed."

III. In a communication dated 13 August 1991 prior to oral proceedings the Rapporteur expressed the preliminary view

that the subject-matter of Claim 1 possibly lacked an inventive step with respect to D1 and D2.

IV. At the end of oral proceedings, held on 19 December 1991, the Appellant requested the grant of a patent on the basis of Claims 1 to 10 (dated 7 June 1989) as considered by the Examining Division (main request) or on the basis of amended claims according to auxiliary requests I, Ia, II and III filed at the end of the oral proceedings.

V. The Appellant's arguments can be summarised as follows:

D3, which according to the Examining Division in combination with D2 would prove the lack of inventive step of the subject matter of Claim 1, discloses a method for detecting the relative velocity of two bodies in rubbing contact. A skilled man, searching for a method to test the behaviour and alteration of contacting head/disc interfaces would not consider this document as a possible source of information. Though D2 is concerned with the prediction of the long term behaviour of the head/disc assembly (life forecast), the disclosed method is based on the measurement of peaks of frictional force by means of strain gauges or a piezoaccelerometer, whereas in the invention amplitude of triboelectric current is monitored. There is no established relationship between frictional force and triboelectric current. Nowhere in the prior art is it mentioned that measuring triboelectric current can give an indication of the life of the disc. D1 is concerned with the monitoring of the head's flight for the purpose of removing any disc which results in excessive contact with the slider. Intermittent contacts between head and disc are detected with the help of triboelectric charges. It is, however, not clear what is measured and the reference on page 8 to piezoelectric glide systems is vague and does not imply the equivalence between triboelectric and piezoelectric measurements.

Reasons for the Decision

1. The appeal is admissible.

2. Main Request

2.1 In the contested decision considerable weight was given to D3. According to the Board, however, this document is less relevant in the present case, since it relates to a different field (textile machines) and a different problem (detection of a relative movement of two bodies).

2.2 Claim 1 of the present application is concerned with a method for measuring and testing "the properties of the interface" of a head slider and a magnetic disc. Since there is a direct link between the quality, namely the "properties" or "characteristics", of a head/disc assembly and its lifetime (description page 1, paragraphs 2 and 3), by determining the quality of the sliding surfaces a non-destructive prediction of the head/disc assembly lifetime can be made (cf. page 2b, lines 1 to 3, filed with letter of 7 June 1989). Therefore the Board accepts that the present application addresses the problem of making a life forecast for the head/disc assembly by means of a non-destructive test.

2.3 D2 relates to a method for predicting the long term behaviour of the head/disc assembly based on a non-destructive test cycle carried out at low speed, namely with the head and the disc in "rubbing contact" (cf. application, page 5, paragraph 2 and D2, last paragraph) and at normal contact pressure (the Appellant has acknowledged that "p", the unit used for the contact pressure in D2, stands for pond of the old German technical unit system). The parameter considered to assess

the quality of the head/disc interface is the occurrence of short frictional peaks, whose number is taken as indicative of the life of the head/disc assembly. These peaks are detected by monitoring the tangential friction with strain gauges or a piezoaccelerometer.

2.4 The method according to Claim 1 differs from the method disclosed in D2 in that the parameter measured to determine the quality of the head/disc interface and predict its lifetime is the triboelectric current generated when the slider and the disc are in rubbing contact.

2.5 The Appellant has stressed that triboelectric current is not a mere function of the friction coefficient between the contacting surfaces but it depends on several additional factors, such as thickness, electric parameters, stability of the lubricant over time (see letter of 7 November 1990). However, it should be noted that the purpose of the strain gauges or piezoaccelerometers considered in D2 is not to measure the friction coefficient per se but to determine the occurrence of "contacts" between the sliding surfaces. This is achieved in D2 by monitoring one of the physical parameters of the head/disc assembly which is affected by the occurrence of such contacts, namely the tangential friction.

Document D1, which relates to the monitoring of the flight of a slider over a disc, makes use of a different physical parameter, namely of the triboelectric charges generated at the head/disc interface, in order to determine the "amount of contact between rotating discs and their associated slider assemblies" (D1, page 1, paragraph 3). As pointed out in D1 (page 7, lines 9 to 21 and Claim 2) the magnitude and sign of the triboelectric charges depend on

the kind of contact (material, lubricant etc.). This implies that by measuring and analysing the flow of triboelectric charges at the interface, namely the triboelectric current, not only the occurrence of contacts between the head and the disc but also the "quality" of the interface can be determined (cf. present application, page 1, paragraph 3).

In view of the advantages offered by triboelectric measurements (see D1, page 8, 1st and 2nd paragraphs) it would have been obvious for the skilled person to replace the monitoring of the frictional force in the method according to D2 with the monitoring of the triboelectric charges in order to determine the occurrence of contacts between the head and the disc.

3. Auxiliary Requests

3.1 In the present case, the Appellant was informed about the Rapporteur's provisional opinion concerning a possible lack of inventive step of the subject-matter of Claim 1 according to the main request in the above communication of 13 August 1991, in which the Applicant was requested to file amended claims at least one month before the date fixed for the oral proceedings, if he wished to do so. The Appellant was thus given a period of about four months to prepare comments and amendments. Instead, the Appellant filed his four auxiliary requests only at the end of the oral proceedings. Since there was no justification for this late filing and, prima facie, the subject-matter claimed according to the auxiliary requests differs from that of the main request by only obvious routine measures, known from D1 and D2, the Board applying the principles laid down in decisions T 95/83 and T 153/85 (OJ EPO 1985, 75 and 1988, 1 respectively) does not admit the auxiliary requests into the proceedings.

Order

For these reasons, it is decided that:

The appeal is dismissed.

The Registrar:

The Chairman:

M. Kiehl

E. Persson