

Publication in the Official Journal *Yes* / No

File Number: T 277/87 - 3.5.1

Application No.: 83 103 425.1

Publication No.: 0 094 504

Title of invention: Lock mechanism for a carriage assembly particularly for
use in a disk storage device

Classification: G11B 21/02

D E C I S I O N
of 29 January 1991

Applicant: International Business Machines Corporation

EPC Article 123(2), Article 56

Keyword: "Extension of subject-matter (yes)" -
"Inventive step (no)"



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Boards of Appeal

Chambres de recours

Case Number : T 277/87 - 3.5.1

D E C I S I O N
of the Technical Board of Appeal 3.5.1
of 29 January 1991

Appellant : International Business Machines Corporation
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United States of America

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Decision under appeal : Decision of Examining Division of the European
Patent Office dated 11 February 1987 refusing
European patent application No. 83 103 425.1
pursuant to Article 97(1) EPC.

Composition of the Board :

Chairman : Van Voorthuizen J.A.
Members : Riewald W.P.H.
Lewenton M.V.E.

Summary of Facts and Submissions

- I. European patent application No. 83 103 425.1 (publication No. 0 094 504) was refused by a decision of the Examining Division dated 11.02.87.
- II. That decision was based on the ground that the subject-matter of the application did not involve inventive step having regard to
- DE-A-2 738 033 (D1)
Chip No. 4, April 1981, pages 70-71 (D2).
- III. The Appellant (Applicant) lodged a notice of appeal against this decision on 16.04.87 and paid the appeal fee on the same date. A Statement of Grounds was submitted on 16.06.87 accompanied by a set of amended Claims 1-6, Claim 1 thereof reading as follows:
1. In an actuator having a frame (11, 61, 62) and a transducer carriage (67) for positioning a transducer with respect to a recording media,

a lock mechanism for holding said carriage in a fixed position relative to said frame, said lock mechanism being of the type comprising:

a support member (100) mounted on a shaft (101) fixed to said frame,

a lock pin (105) affixed to said support member,

said support member being movable between a first position wherein said lock pin engages said carriage

and a second position wherein said lock pin is clear of said carriage,

spring means (121) biasing said support member toward said first position,

solenoid means (131) having a magnetic coil (130) and an armature means (132) and mechanically coupled to said pin support member,

means for energizing said solenoid in response to a signal indicating a predetermined velocity of said media relative to said transducer to move the said pin member from said first position to said second position, characterized in that:

said carriage contains a hole (120) for accommodation of said lock pin at a position opposite said lock pin when said carriage is in the fully extended position.

Claims 2-6 are dependent on Claim 1.

- IV. In a communication of 13.07.89 issued by the Board an objection under Article 123(2) EPC was raised against this claim. Furthermore, objections under Article 56 EPC were formulated.
- V. In the course of oral proceedings held on 29.01.1991 the Appellant filed amended Claims 1-4 by way of an auxiliary request, Claim 1 thereof reading as follows:
1. In an actuator having a frame (11, 61, 62) and a transducer carriage (67) for positioning a transducer with respect to a recording media, a lock mechanism for holding said carriage in a fixed position

relative to said frame, said lock mechanism being of the type comprising:

a support member (100) mounted on a shaft (101) fixed to said frame,

a lock pin (105) affixed to said support member, said support member being movable between a first position wherein said lock pin engages said carriage and a second position wherein said lock pin is clear of said carriage,

spring means (121) biasing said support member toward said first position,

solenoid means (131) having a magnetic coil (130) and an armature means (132) and mechanically coupled to said pin support member,

means for energizing said solenoid in response to a signal indicating a predetermined velocity of said media relative to said transducer to move said pin member from said first position to said second position, characterised in that:

- said carriage contains a hole (120) for accommodation of said lock pin at a position opposite said lock pin when said carriage is in the fully extended position, and in that said means for energising said solenoid includes:
- counter means (170) for generating an output signal, representative of a rotational velocity of said disk which is sufficient to make said transducer fly at a safe distance from said disk, in response to a predetermined count,

- means for enabling said counter in response to a start motor signal,
- means for applying to said counter pulses derived in response to motion of said recording media,
- solenoid control means (181) for applying current to said solenoid in response to an output signal from said counter,
- said armature means being operative to move said support member from said first position to said second position when said solenoid is energised, thereby releasing said carriage for movement.

Claims 2-4 (corresponding to Claims 2, 5, 6 as filed on 16.06.87) are dependent on Claim 1.

VI. In his Statement of Grounds, in his reply to the aforesaid communication and in the oral proceedings, the Appellant argued essentially as follows:

It is contested that Claim 1 as filed on 16.06.1987 contains subject-matter which extends beyond the content of the application as filed, as far as it recites in the preamble "means for energizing said solenoid in response to a signal indicating a predetermined velocity of said media relative to said transducer".

Such means is generally known and described in D1 and has, therefore, been introduced in the preamble of Claim 1.

The means specific to the present invention (i.e. the counter co-operating with the motor and the solenoid control means) is defined in Claims 3 and 4 as filed on 16.06.87.

In D1 the lock mechanism for holding the carriage in a safeguard or home position relative to the frame comprises an added V-shaped support fixed to said carriage.

In the claimed invention, no extra parts or mass are added to the moving carriage. Moreover, by providing a hole in the carriage for engagement by the pin member fixed to the frame, the mass is reduced. As a consequence of this reduced mass, less power is required by the VC motor for positioning.

Another consequence of the reduced mass is a reduced inertia of the carriage, giving an increased precision to the track accessing and following procedures, without the need for sophisticated closed-loop servo systems which otherwise would be required if extra mass, as in D1, was added.

Further, in the lock mechanism of D1, the V-shaped support does participate in the carriage motion when the storage disk is slowing down in as much as both the motor and the V-shaped support combine their effects and force the carriage towards its safeguard position. It should be noted in that respect that the additional motion which is imparted to the carriage by the V-shaped support results from the forcible engagement between the pivoting element and the V-shaped support under the influence of the biasing spring and that this additional motion cannot be system controlled in as much as it depends only upon the mechanical parameters, wear conditions, ... of the different parts. As a further consequence, the time at which the carriage will stop cannot be determined precisely and in certain circumstances, the actions of the V-shaped support and the motor may be in opposite directions.

Admittedly, the actuator according to the invention does not bring the carriage back to its home position in case of a power failure as is done in D1. This is not a disadvantage, however, as it has to be realised that with an ever increasing recording density and reduced access times it is preferable that the transducer head destroys a single track on the disc rather than being drawn over the surface of the disc to a fixed position thereby damaging a large number of tracks.

Furthermore, D2 merely suggests waiting for a dozen of rotations of a magnetic disc after the last pick up of data before "removing" the transducer head from the disc. This is done in order to avoid the rattle of the transducer positioning mechanism.

Therefore, the subject-matter of Claims 1 in both versions involves, in the Appellant's view, an inventive step.

- VII. The Appellant requested the grant of a European patent based on Claim 1 as filed on 16.06.1987 (main request) or based on Claim 1 as filed in the oral proceedings (auxiliary request).

Reasons for the Decision

1. The appeal is admissible.
2. Claim 1 as filed on 16.06.1987 has been extended with respect to previous versions in that the features relating to the counter means and its way of co-operating with the motor and the solenoid control means have been replaced by a more general reference to "means for energising said solenoid in response to a signal indicating a predetermined

velocity of said media relative to said transducer". Although the Appellant is correct in saying that this generalised feature is known from the state of the art as represented by D1 so that its inclusion in the precharacterising part of the claim cannot be objected to, the fact remains that by omitting the features specifically relating to the counter and its associated means a broadening of the scope of Claim 1 results.

3. Broadening of a claim by deleting a technical feature is allowable under Article 123(2) EPC as long as there is a basis for a claim lacking this feature in the application as originally filed. In the case under consideration here the invention is presented in the original application consistently as comprising the now omitted feature, cf. description page 2, lines 10-22, page 5, line 27 ("The electronic control system for the lock ...") and Claim 1. The person skilled in the art could not, therefore, clearly and unambiguously recognise that the use of electronic control means other than those specifically disclosed had ever been contemplated by the applicant, even if such other means might be known in themselves.
4. In the absence of a proper basis in the application as filed for an extension of Claim 1 the Board concludes that the main request has to be rejected.
5. The preamble of Claim 1 according to the auxiliary request is known from D1. The lock mechanism in this known device comprises a V-shaped support mounted on the carriage and a pivotable rollerarm for fixing the carriage in its inoperative position by means of a spring. In this way it is guaranteed that the carriage is brought to its inoperative position when the disc drive is switched off and also in case of a power failure. The device in accordance with the present application relies only on the

voice coil motor to bring the carriage to its inoperative position. It will be clear to the person skilled in the art that if this automatic positioning feature of the device according to D1 is not required a simpler lock mechanism can be used. A lock mechanism consisting of a hole and a movable pin is generally used to fix a mechanical part in a desired position and no inventive step can be appreciated in the application of this kind of mechanism to the device known from D1.

6. According to D1, the carriage is released when the disc has reached 90% of its final velocity which guarantees a sufficient flying height of the head (cf. page 5, lines 13-17, page 2, paragraph 2). This is also the problem of the subject-matter of the present application which becomes clear from page 6, last paragraph, defining a corresponding "safe speed".
7. D1 does not mention any means for determining said condition of 90%. Such means are, however, well within the scope of the knowledge and practice of a skilled person. It is especially obvious to a skilled person to use, instead of means for precisely detecting the speed e.g. on the basis of a tachometric signal, simple delay means determining the time from the start of the disc to the point the disc can be expected to have attained said safe speed.

With regard to a suitable timer, it is well known to use the rotation (motion) of the disc as a clock by supplying a digital counter, cf. D2, page 71, column 1, paragraph 5. Such counter means can be supplied by index pulses or, of course, also by tachopulses of the disc driving motor (cf. Figure 5 of the application).

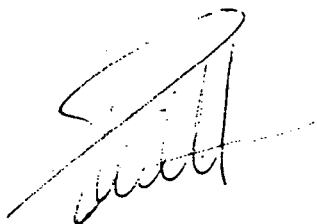
8. The applicant's arguments with respect to inventive step are not convincing. While it is true that by the use of a simple pin and hole means the mass of the carriage is reduced, this would seem to be of minor importance considering the total mass of the carriage plus transducer head. Moreover, the actuator according to D1 is brought to its inoperative position under all circumstances, which is not the case for the actuator according to the invention. Although this might not be an optimal feature where a disc operating with a high recording density and a short access time is used, the insight that under such circumstances that feature could be dispensed with and consequently a simpler lock mechanism could be used does not fall outside the abilities to be expected from the person skilled in this art.
9. In the opinion of the Board, therefore, Claim 1 lacks inventive step so that also the auxiliary request has to be rejected.

Order

For these reasons, it is decided that:

The appeal is rejected.

The Registrar:



M. Kiehl

The Chairman:



J.A.H. van Voorthuizen

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