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D E C I S I O N
of 9 March 2000

Case Number: T 0597/98 - 3.5.2

Application Number: 90310956.9

Publication Number: 0422851

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Language of the proceedings: EN

Title of invention:
Deceleration control system

Patentee:
Fujitsu Limited

Opponent:
Interessengemeinschaft für Rundfunkschutzrechts GmbH
Schutzrechtsverwertung & Co. KG

Headword:
-

Relevant legal provisions:
EPC Art. 56, 114(2)
EPC R. 55(c)

Keyword:
"Inventive step (yes)"
"Late adduced facts - disregarded"

Decisions cited:
-

Catchword:

-

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Beschwerdekammern | Boards of Appeal | Chambres de recours

Case Number: T 0597/98 - 3.5.2

D E C I S I O N
of the Technical Board of Appeal 3.5.2
of 9 March 2000

Appellant: (Proprietor of the patent)
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Decision under appeal: **Decision of the Opposition Division of the European Patent Office posted 23 March 1998 revoking European patent No. 0 422 851 pursuant to Article 102(1) EPC.**

Composition of the Board:

Chairman: W. J. L. Wheeler

Members: F. Edlinger
C. Rennie-Smith

Summary of Facts and Submissions

I. The patentee filed this appeal against the decision of the opposition division revoking the European patent No. 422 851. The reason given for the revocation was that the subject-matter of claim 1 lacked an inventive step. EP-A-0 309 704 (D4) was considered as reflecting the closest prior art from which the subject-matter of the contested patent only differed, according to the contested decision, in that it involved a choice between basically equivalent alternatives for deriving the beam moving velocity at a track immediately preceding the target track.

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

"A deceleration control system for an optical disk unit which includes an optical head (12) for recording information on and/or reproducing information from tracks of an optical disk, (10) which rotates at a constant velocity, by use of a light beam emitted from the optical head, a track actuator (14) for moving the light beam in a direction traversing the tracks of the optical disk, a tracking error signal generation circuit (54) for deriving a tracking error signal TES from a signal which is output from the optical head and is dependent on a light beam received from the optical disk, said tracking error signal being generated every time the light beam traverses a track, velocity control means (16) coupled to the optical head (12) and including first means (161) for generating a target velocity V_t, second means (162) for detecting a beam moving velocity V based on the tracking error signal TES derived by the tracking error signal generation

circuit (54), and third means (163) for detecting a velocity error V_e of the beam moving velocity V with respect to the target velocity V_t and for controlling the track actuator (14) so as to minimize the velocity error V_e;
deceleration means (20, 20A) for decelerating the track actuator, characterized in that said deceleration means includes first means (22) for deriving a deceleration time T on the basis of the beam moving velocity V at a track which immediately precedes the target track and subsequently supplying a deceleration pulse to the track actuator for the deceleration time T starting from a time when the light beam is a predetermined distance from the target track, so that the beam moving velocity is equal to zero at the end of the deceleration time T."

Claims 2 to 17 as granted are dependent on claim 1.

III. Oral proceedings were held before the Board on 9 March 2000 during which the respondent (opponent) referred to a further document, EP-A-0 289 143 (D1), which had been cited in the search report and in the notice of opposition.

IV. The appellant essentially argued as follows:

(a) Claim 1 basically related to a control system for deceleration of a track actuator when a light beam traversed a plurality of tracks in a track jump. Although it did not explicitly exclude a single track jump, the terms of claim 1 implied, and had the appropriate features for, decelerating the track actuator which moved the light beam at a

controlled velocity across a plurality of tracks towards a target track. In this context, deriving a deceleration time T at a track which immediately preceded the target track implied that the light beam did not start from the track immediately preceding the target track. The deceleration pulse was subsequently supplied at a specified time which started when the light beam was a predetermined distance from the target track and its duration was such as to bring the beam moving velocity to zero at the end of the pulse. This interpretation was confirmed by the description (eg with reference to Figure 8).

(b) The preamble of claim 1 indicated as part of the prior art a deceleration control system comprising velocity control means and deceleration means. However, it could not be considered as proved that the state of the art indicated in the contested patent (Figures 1 to 3) was actually available to the public before the priority date of the contested patent because it often happened that applicants indicated in-house state of the art. The appellant objected to the introduction of D1 in the oral proceedings before the Board because D1 had been merely cited, but not relied on in argument either in the notice of opposition or later.

(c) D4 disclosed a track-by-track access of an optical disk without velocity control. The light beam was moved from one track to the adjacent track by an acceleration pulse immediately followed by a first braking pulse B1. A time T was measured from the

start of pulse B1 until the light beam reached a predetermined position reflected by a point (P) on the tracking error signal curve. A second braking pulse B2 was supplied an unspecified time after the position P was reached because time was needed for the calculation of the characteristics of pulse B2. The velocity of the light beam was not zero at the end of pulse B2 since the tracking error signal in the drawing of D4 showed that the light beam continued to be moved at the end of pulse B2.

(d) Therefore, D4 did not disclose all the features of the preamble of claim 1, and in fact it had not been used as a basis for delimiting claim 1 in the two-part form. The system disclosed in D4 differed from that of claim 1 in that D4 did not disclose velocity control means as specified in claim 1 (see column 16, lines 10 to 20 of the patent specification); it did not derive a deceleration time on the basis of the beam moving velocity; the deceleration time did not start when the light beam was a predetermined distance from the target track; and the beam moving velocity was not zero at the end of the deceleration time.

(e) Starting from a track-by-track access with short acceleration pulses as disclosed in D4, the person skilled in the art had no reason to include velocity control means. Alternatively, starting from a control system as specified in the first part of claim 1 with a velocity controlled track jump actuator, there was no reason for the person skilled in the art to consider the teaching of D4

because D4 gave no answer to the problem arising from velocity errors in a track jump access.

V. The respondent essentially argued as follows:

(a) The terms of claim 1 of the contested patent did not specify the number of tracks traversed by the light beam. D4 proved that it made technical sense, in a track-by-track access, to derive a deceleration time on the basis of the light beam moving velocity. Claim 1 did not therefore exclude a track-by-track access.

(b) A deceleration control system as specified in the preamble of claim 1 under consideration was known in the art. This is proved by D1, which had already been cited in the notice of opposition. D1 should therefore be admitted as evidence for the state of the art indicated by the preamble of claim 1 because it did not change the basis of this opposition.

(c) The basis on which the deceleration time was derived in accordance with the teaching of D4 was totally equivalent to that of the contested patent because the track distances, the light beam moving velocity and the time were linked with each other by well known physical equations. The time T taken for the light beam to move a predetermined distance from a position of the preceding track where pulse B1 started (MI, one quarter track pitch to the right from the middle M1 of the track; cf D4, column 3, lines 51 to 56) to the predetermined position P at the adjacent target

track depended on the beam moving velocity at the beginning of pulse B1. Since the duration of pulse B2 was determined by the length of the measured time T, the deceleration time (duration of B2) was likewise derived on the basis of the beam moving velocity at the immediately preceding track. D4 (column 4, lines 24 to 28) also disclosed that the track actuator was halted, in response to pulse B2, when the light beam was in the middle (M2) of the target track. The velocity thus had to be zero when pulse B2 ended. Pulse B2 also had to start at a predetermined distance from the middle of the target track because its duration was chosen so as to halt the track actuator when the light beam was in the middle of the target track after pulse B2 ended in the same way as with embodiments of the contested patent. The drawing of D4 was only schematic. Therefore, one could not deduce information therefrom which was contrary to this disclosure in the description.

(d) D4 thus disclosed all the features of claim 1 of the contested patent save the features relating to the velocity control means.

(e) In a system according to the preamble of claim 1, when, due to an error in the beam moving velocity at the preceding track, the light beam was not correctly centred at the target track after deceleration, the person skilled in the art had only two possibilities to solve this problem. On the one hand, he could improve the accuracy of a velocity regulation control means which was known

as such in combination with the features of the preamble of the contested claim 1. On the other hand, he could provide a deceleration pulse, the duration of which was based on the beam moving velocity at the immediately preceding track as it was disclosed in D4. The subject-matter of claim 1 thus lacked an inventive step. This would also be the case if the subject-matter of claim 1 were considered to be limited to a track jump over a plurality of tracks because D4 (column 5, lines 11 to 16) also envisaged track jumps over a plurality of tracks.

VI. The appellant requested that the decision under appeal be set aside and that the patent be maintained.

VII. The respondent requested that the appeal be dismissed.

Reasons for the Decision

1. The appeal is admissible.

2. *The subject-matter of claim 1*

2.1 Claim 1 of the contested patent specifies in its first part "means ... for controlling the track actuator (14) so as to minimize the velocity error V_e". To this end, means are included for "detecting a beam moving velocity V based on the tracking error signal TES". These features, in combination with the remaining features, define a "deceleration control system". The characterising part of claim 1 again refers to the "beam moving velocity V", on the basis of which the

duration (deceleration time T) of a deceleration pulse is derived which is started "a predetermined distance from the target track, so that the beam moving velocity is equal to zero at the end of the deceleration time T." The features relating to the velocity control means of the first part of claim 1 are therefore closely linked with the determination of the deceleration pulse as specified in the characterising part of claim 1.

2.2 This interpretation is corroborated by the description of the contested patent (column 1, lines 34 to 37; column 6, lines 33 to 36; column 7, line 40 to column 8, line 2; column 11, lines 34 to 47; Figures 5, 9A and 9B) which repeatedly refers to the problem that the velocity error V_e may be different from zero at the time when the deceleration starts, and consequently the beam moving velocity would not be zero after a deceleration pulse of a predetermined (constant) duration. This could cause stability problems when the tracking servo operation starts (column 3, lines 8 to 35).

2.3 Claim 1 thus has to be construed as defining a deceleration control system which is suitable for a track jump at regulated beam moving velocity. Although it does not expressly exclude a single-track jump as a borderline case, the system is basically concerned with a track jump over a plurality of tracks, where the beam moving velocity is controlled in accordance with a predetermined pattern of target velocity, eg at a steady target velocity after a short acceleration time (cf Figure 8 of the contested patent). Since the errors of the beam moving velocity V at the track which

immediately precedes the target track cause the problem underlying the subject-matter of the contested patent, the beam moving velocity referred to in the characterising part of claim 1 has to be construed as the velocity detected by the means specified in the first part of claim 1. The "predetermined distance from the target track", to achieve the aim specified at the end of claim 1 and in view of the underlying problem, has to be construed as a distance which is fixed, dependent on the beam moving velocity, before the deceleration pulse is ("subsequently") supplied to bring the beam moving velocity to zero at the end of the deceleration time T.

3. *Prior art*

3.1 The appellant has not contested that the features of the preamble of present claim 1 were generally known in combination at the priority date of the contested patent. For the sake of argument, it will be assumed that a deceleration control system as specified in the preamble of the present claim 1 was generally known in the art. However, the "prior art" shown in Figures 1 to 3 of the contested patent discloses, in addition to these features, that the deceleration means provides a deceleration pulse (of constant duration; cf column 3, lines 12 to 15 of the contested patent) for reducing the beam moving velocity close to zero at the end of the deceleration pulse. It is not certain that this specific piece of prior art was available to the public at the priority date of the contested patent since, as the appellant argued, it may have been in-house state of the art.

3.2 The respondent referred to D1 as disclosing the combination of features of the preamble of present claim 1. D1, together with the other documents of the search report, was however merely cited by quoting its number in the notice of opposition. No indication of facts and arguments in support of the grounds for opposition was derived from D1 within the opposition period (cf Rule 55(c) EPC), nor later until the oral proceedings before the Board. Since the appellant has objected to the introduction of D1 into the appeal proceedings, the Board exercised its discretion, derived from Article 114(2) EPC, to disregard these late filed facts adduced from D1.

3.3 In the contested decision it was considered, in agreement with the opponent, that D4 represented the closest prior art. Novelty was not contested and the parties, in the appeal proceedings, have agreed that D4 does not disclose velocity control means as specified in the preamble of present claim 1. However, disclosure in D4 of the features of the characterising part of the claim is disputed.

3.3.1 The duration of the second braking pulse B2 in the system disclosed in D4 may be selected dependent on the time T measured from the start of pulse B1 to the predetermined position P. This time T, according to well known laws of motion, will depend on the velocity of the track actuator at the beginning of pulse B2 (cf D4, column 2, lines 29 to 40) as well as on the inertial mass of the track actuator system including the optical disk (cf D4, column 5, lines 17 to 31). The basis on which the deceleration time is derived in D4 is therefore a test deceleration, either each time

between the acceleration pulse (SI) and the final braking pulse B2 ("erste Lösung", cf D4, column 2, line 46 to column 3, line 12), or before a track jump is carried out over one or several tracks ("zweite Lösung", cf D4, column 3, lines 14 to 30; column 4, line 56 to column 5, line 34). The deceleration time derived in accordance with the teaching of D4 thus takes account of both unknown parameters, beam moving velocity and inertial mass, and does not make a definite distinction between them. According to claim 1 of the contested patent, the deceleration time is derived on the basis of the beam moving velocity which is known in this system (see first part of claim 1). The basis for deriving a deceleration time T is therefore different in D4.

3.3.2 D4 does not explicitly disclose that the beam moving velocity is zero at the end of the deceleration time. D4 rather emphasizes halting the track actuator when the light beam is in the middle (M2) of the target track (D4, column 4, lines 24 to 31). This is not necessarily at the end of the deceleration time because the tracking servo control may be closed within a specified range, and thus move the light beam to this position after the end of the deceleration time. The range indicated for closing the tracking servo control is indicated as not prior to the beginning of pulse B2 and no later than the middle of the target track (D4, column 3, lines 9 to 12; column 4, lines 28 to 31). The drawing of D4 is consistent with this teaching, but does not allow more precise information to be derived which is not supported by the description, because it is merely schematic as can be seen from the tracking error signal (TE) which does not reflect the

acceleration or deceleration movements of the light beam and (as shown) simply continues after the middle (M2) of the target track without further drive pulses. Therefore, D4 does not unambiguously disclose that the beam moving velocity is zero at the end of the deceleration time. It follows that, according to the disclosure of D4, the deceleration pulse is supplied at a predetermined position P of the target track but not necessarily at a predetermined distance which is determined so that the beam moving velocity is zero (at the target track) at the end of the deceleration time (cf point 2.3 above).

4. *Inventive step*

4.1 Starting from a deceleration system as specified in the preamble of present claim 1, the person skilled in the art would not have found any hint in D4 to solve a problem arising from varying velocity errors when the deceleration starts (see column 3, lines 27 to 35 and column 6, lines 20 to 29 of the contested patent) in the manner specified in present claim 1. Firstly, D4 does not deal with this problem because it concerns a substantially different track-by-track access and does not measure the beam moving velocity, neither during acceleration nor before a braking pulse is supplied. Secondly, the system disclosed in D4 is also different concerning the features of the characterising part of present claim 1. These differences are not simply alternative equivalents but reveal different concepts in that D4 (claim 1, steps (e) and (f)) aims at halting the light beam in the middle of the adjacent track by co-operation of a deceleration pulse and the tracking servo control, whereas the system of the contested

patent aims at bringing the beam moving velocity to zero, after a track jump at regulated velocity, somewhere at the target track before the tracking servo operation starts (cf column 6, lines 24 to 29 of the contested patent).

4.2 Alternatively, starting from the deceleration control system disclosed in D4, it was also not obvious for a person skilled in the art to arrive at the subject-matter of present claim 1. No plausible reason was presented why a person skilled in the art would have included velocity control means in a track-by-track access (D4, "erste Lösung"). Rather, such a combination would be unusual because, with acceleration and deceleration pulses of very short duration, the track actuator will be freely accelerated at the starting track (cf column 2, lines 47 to 51 and Figures 2B and 8 of the contested patent) and decelerated shortly thereafter at the adjacent target track. If the person skilled in the art included means for controlling the beam moving velocity in the accelerating phase at the starting track (eg by a ramping target velocity), he would then probably decelerate the track actuator in the same way at the adjacent track by decreasing the target velocity.

4.3 Concerning the alternative embodiments of D4 ("zweite Lösung") which execute a jump over one or more tracks, a velocity control means to regulate the beam moving velocity could in principle be envisaged by the person skilled in the art. However, D4 rather points in a different direction in that deceleration times are determined dependent on the results of test pulses over one or more tracks. These test pulses are applied and

the corresponding deceleration times are stored in advance for later use (D4, column 4, line 56 to column 5, line 34). Therefore, the deceleration times are not derived from a beam moving velocity at a track which precedes the target track during the jump.

4.4 The subject-matter of claim 1 of the contested patent is therefore not obvious to a person skilled in the art, having regard to the state of the art presented in support of the opposition, and shall thus be considered as involving an inventive step (Article 56 EPC).

4.5 The same applies to claims 2 to 17 of the contested patent as granted which are all dependent on claim 1.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.

2. The patent is maintained unamended.

The Registrar: The Chairman:

M. Hörnell W. J. L. Wheeler