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D E C I S I O N
of 20 October 1993

Case Number: T 0205/93 - 3.5.2

Application Number: 87307328.2

Publication Number: 0257974

IPC: G11B 5/588

Language of the proceedings: EN

Title of invention:
Video signal recording and/or reproducing apparatus

Applicant:
Sony Corporation

Opponent:
-

Headword:
-

Relevant legal norms:
EPC Art. 56, 111(1)

Keyword:
"Inventive step (yes, after amendment)"
"Remittal to Examining Division for search under Art. 54(3) EPC"

Decisions cited:
-

Catchword:
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Case Number: T 0205/93 - 3.5.2

D E C I S I O N
of the Technical Board of Appeal 3.5.2
of 20 October 1993

Appellant: Sony Corporation
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Decision under appeal: **Decision of the Examining Division of the European Patent Office dated 3 November 1992 refusing European patent application No. 87307328.2 pursuant to Article 97(1) EPC.**

Composition of the Board:

Chairman: W.J.L. Wheeler
Members: A.G. Hagenbucher
E.M.C. Holtz

Summary of Facts and Submissions

I. The present appeal contests the decision of the Examining Division refusing the Appellant's European patent application No. 87 307 328.2. The reason given for the refusal was that the subject-matter of Claim 1 then on file did not involve an inventive step having regard to the following prior art documents:

D1: US-A-4 358 799
D2: FR-A-2 536 619
D3: EP-A-0 089 816 and
D4: GB-A-2 097 968.

II. Oral proceedings were held before the Board on 20 October 1993 during which the Appellant filed new Claims 1 to 6 and description pages 1, 3, 4, 5, 5a, 8, 11 and 15 in response to objections raised by the Board. He requested that the decision under appeal be set aside and that a patent be granted on the basis of these new application documents together with the other application documents remaining as originally filed.

III. Claim 1 is now worded as follows:

"1. A video recording and/or reproducing apparatus comprising:
first, second, third and fourth magnetic heads (HD1, HD2, HD3, HD4) of which said first and third heads (HD1, HD3) each have a first azimuth gap angle and said second and fourth heads (HD2, HD4) each have a second azimuth gap angle;
a rotary drum (2) on which said first, second, third and fourth heads (HD1, HD2, HD3, HD4) are mounted in the order stated with substantially equal angular spacings therebetween, said first, second, third and fourth heads

(HD1, HD2, HD3, HD4) being operative, in a recording mode of the apparatus, for recording information (VIDEO) on a magnetic tape (1) in first, second, third and fourth recording tracks (TA1, TA2, TA3, TA4), respectively, so as to change azimuth gap angles from track to track;
said magnetic heads (HD1, HD2, HD3, HD4) being operative, in a reproducing mode of the apparatus, for reproducing said information (VIDEO) from said recording tracks (TA1, TA2, TA3, TA4);
first switching means (W1) operative in said reproducing mode for switching between outputs of said first and third magnetic heads (HD1, HD3);
second switching means (W2) operative in said reproducing mode for switching between outputs of said second and fourth magnetic heads (HD2, HD4);
third switching means (W3) for switching outputs from said first and second switching means (W1, W2) in synchronism with rotation of said rotary drum (2);
means (PG') for generating a phase indicating pulse (PG) at each revolution of said drum (2) and a pulse (1/3 PG) derived from said phase indicating pulse (PG) by dividing it by three to provide a pulse for each three revolutions of said drum; and
switching control means (21) for generating control signals (SW1, SW2, SWP) for said first, second and third switching means (W1, W2, W3) on the basis of a rotary phase of said rotary drum (2);
said magnetic tape being wrapped about said rotary drum (2) with a wrap angle of at least 270°;
characterized by:
means (22, 23) operative in said recording mode for superimposing first, second, third and fourth pilot signals (PL1, PL2, PL3, PL4) having respective different frequencies (f1, f2, f3, f4) on said information (VIDEO) recorded by said first, second, third and fourth heads (HD1, HD2, HD3, HD4), respectively;

means (24) for extracting said tracking pilot signals (PL1, PL2, PL3, PL4) from reproduced signals obtained from said magnetic heads (HD1, HD2, HD3, HD4) through said third switching means (W3);
selector means (22) for selecting, in dependence on control signals from said switching control means (21), a reference pilot signal (RPL) from among four reference pilot signals generated with frequencies the same as those of said first, second, third and fourth pilot signals (PL1, PL2, PL3, PL4), respectively;
tracking error detecting means (13) for producing a tracking error signal (SER) by comparing a pilot signal extracted from the reproduced signal obtained through said third switching means (W3) with the selected reference pilot signal (RPL);
means (25) responsive to said tracking error signal for causing said first, second, third and fourth magnetic heads (HD1, HD2, HD3, HD4), in said reproducing mode, to track the recording tracks (TA1, TA2, TA3, TA4) in which the information and superimposed pilot signals (PL1, PL2, PL3, PL4) were recorded by said first, second, third and fourth magnetic heads (HD1, HD2, HD3, HD4), respectively, in said recording mode; and
means (FG') for generating a plurality of clock pulses (FG) at respective angular displacements of said drum (2) during each revolution thereof;
said switching control means (21) generating control signals for controlling said means for superimposing said pilot signals in response to predetermined counts of said clock pulses with respect to the pulse (1/3 PG) derived from said phase indicating pulse (PG)."

Claims 2 to 6 are dependent on Claim 1.

IV. The Appellant argued substantially as follows:

D2 disclosed a video recording and/or reproducing apparatus with the features in the preamble of Claim 1. If such an apparatus was adapted for use in an 8 mm VTR (video tape recorder) a control pulse could not be recorded in a longitudinal track along the edge of the tape as in D2. If a recording pattern of a 2-head standard format were produced and reproduced by a 4-head reproducing apparatus the recorded tracks might be reproduced by heads different from those used to record the respective tracks. This might lead to skewing of the reproduced picture and a flicker may appear on the picture due to uneven rotation in each revolution of the motor, uneven amplitude of the head output and scattering or variations of the frequency characteristics of the several heads.

The present invention, as defined in the present Claim 1, solved this problem by superimposing the four pilot signals on the recorded information and generating a plurality of clock pulses at respective angular displacements of the drum during each revolution thereof. The switching control means generated control signals for controlling the means for superimposing the pilot signals in response to predetermined counts of said clock pulses with respect to a pulse derived from the phase indicating pulse (PG) by frequency dividing by three to provide a pulse (1/3 PG) for each three revolutions of said drum. The additional use of the clock pulses helped to synchronise in the presence of uneven rotation in a revolution of the head-driving motor. Although D3 and D4 showed the use of pilot signals, these signals were used there in connection with a 2-head recording and/or reproducing apparatus. None of the prior art documents disclosed the use of control signals for controlling means for superimposing

four pilot signals in response to predetermined counts of clock pulses with respect to a pulse occurring once every three revolutions of said drum.

Reasons for the Decision

1. The appeal is admissible.

2. There is no objection under Article 123(2) EPC to the current version of the claims, description and drawings. In particular, present Claim 1 is based on original Claims 1 and 5 and Figures 5 and 9.

3. It is not in dispute that the subject-matter of Claim 1 is new in respect of the cited prior art. Hence, it remains to be decided by the Board whether this subject-matter involves an inventive step.

4. The Board agrees with the Examining Division and the Appellant that D2 represents the closest prior art, showing all the features in the preamble of Claim 1. Frequency divider 52 according to Figure 8 of D2 derives a pulse j from the phase indicating pulse a by dividing it by three to provide a pulse for each three revolutions of the drum (cf. j in Figure 9 and page 40, lines 28 to 34 of D2). Control pulses for synchronisation are recorded in a longitudinal track along the edge of the tape. D2 implements a periodicity of 4-tracks. The present invention concerns a 4-head apparatus, which should also be applicable to implement a periodicity of 2 tracks in accordance with the 2-head standard format as shown in Figure 1 of the application. It should be appropriate for a 8 mm VTR where it is difficult to record control pulses in a longitudinal track along the edge of the tape.

In these circumstances the tracks may easily be reproduced by different heads from the ones which were used to record them, resulting in skewing of the reproduced picture. Moreover, a flicker may appear on the reproduced picture due to uneven rotation in each revolution of the driving means.

4.1 In order to overcome the above-mentioned disadvantages the present invention as claimed provides

(a) means for superimposing and extracting four different reference pilot signals (one for each head)
(b) means for generating a plurality of clock pulses at respective angular displacements of the drum during each revolution thereof
(c) switching control means generating control signals for controlling the means for superimposing the pilot signals in response to predetermined counts of said clock pulses with respect to the pulse (1/3 PG) derived from the phase indicating pulse (PG).

Feature (a) makes it possible to reproduce signals by the same heads of the claimed 4-head VTR which were used to record them. It also makes it possible to reproduce signals by the claimed 4-head VTR which were recorded by a 8 mm VTR of the 2-head type. Features (b) and (c) permit the compensation of small fluctuations in the rotational speed of the drum.

4.2 Although the Board agrees with the Examining Division that the application of the tracking principle known from D3, which makes use of stored reference pilot signals (feature (a) cited above), in a recorder according to D2 is obvious especially when the 8 mm standard (D4) is also taken into account, the prior art

does not give any hint to provide the above-mentioned features (b) and (c). According to D2 the switching control circuit of Figure 8 is responsive solely to the signal input 41 which is synchronised with a phase of rotation of the drum. There is no suggestion that the switching control means should additionally be responsive to clock pulses generated at respective angular displacements of the drum for generating the control signals. Document D3 does not explain how the timing signal RF-SW shown in Figure 4 is generated. Documents D1 and D4 do not show the generation of such additional clock pulses for correct timing, either. Apart from that, D3 and D4 concern only 2-head recording/reproducing apparatus.

4.3 Hence, in the Board's judgment, the subject-matter of Claim 1 involves an inventive step in the sense of Article 56 EPC.

4.4 This applies also to dependent Claims 2 to 6.

5. The Board notes that the Examining Division has indicated in the application file that the search for the purposes of Article 54(3) EPC has not been carried out. Since the Board cannot carry out this search itself, it makes use of its powers under Article 111(1) EPC to remit the case to the first instance to complete the examination with regard to Article 54(3) EPC and, depending on the outcome of such examination, to take any further action that may be necessary. Having regard to Article 111(2) EPC, it should be mentioned that the Board's findings on the question of inventive step are *ratio decidendi* for its decision.

Order

For these reasons, it is decided that:

1. The decision under appeal is set aside.

2. The case is remitted to the Examining Division with the order to complete the examination with regard to Article 54(3) EPC on the basis of the application documents as they now stand (see paragraph 5 above).

The Registrar: The Chairman:

M. Kiehl W.J.L. Wheeler