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THIS OPINION WAS NOT WRITTEN FOR PUBLICATION

The opinion in support of the decision being entered today (1) was not written for publication in a law journal and (2) is not binding precedent of the Board.

Paper No. 29

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

MAILED

Ex parte ATSUSHI INOUE,
NOBUYUKI KAKU, and TAKASHI SASAKI

MAR 14 1997

Appeal No. 95-4739
Application 07/893,072¹

PAT & TM OFFICE
BOARD OF PATENT APPEALS
AND INTERFERENCES

HEARD: MARCH 4, 1997

Before BARRETT, FLEMING, and CARMICHAEL, *Administrative Patent Judges.*

CARMICHAEL, *Administrative Patent Judge.*

DECISION ON APPEAL

This is an appeal from the final rejection of claims 1 and 4-6, which constitute all the claims remaining in the application. We reverse.

The appellant has argued the appealed claims separately.

Claim 1 reads as follows:

¹ Application for patent filed June 3, 1992.

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1. A tape loading device for a magnetic recording/playback apparatus, said apparatus adapted " for insertion therinto of a tape cassette containing a magnetic tape, said tape loading device comprising:

tape guides for defining a tape travel path,

a tape loading mechanism for controlling said tape guides to move a tape out of a tape cassette which has been inserted into the magnetic recording/playback apparatus, to the tape travel path, and back from the tape travel path into the tape cassette,

a loading motor for driving said tape loading mechanism,

a phase detector for detecting the operational phase of said tape loading mechanism,

a reel motor for applying back tension to the tape,

detection means for detecting the rotating direction and the rotation speed of each tape reel of the tape cassette,

first calculation means responsive to the values of rotating direction and rotation speed detected by said detection means and the operational phase detected by said phase detector, for calculating a value of inertia for each tape reel,

second calculation means responsive to the operational phase detected by said phase detector, for calculating the speed and acceleration of drawing-out or taking up of the tape, and

control means responsive to the calculated inertia, the operational phase, and the calculated speed and acceleration, for controlling said reel motor to control tension on the tape.

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The Examiner's Answer relies on the following prior art:

Sorihashi et al.	5,220,477	Jun. 15, 1993
Yoshihiro	4,868,923	Sep. 19, 1989

BACKGROUND

The claimed invention relates to a device for loading tape from a cassette into a magnetic recording/playback apparatus, such as a video cassette recorder. The device detects the operational phase of a tape loading mechanism and the rotational speed and direction of each tape reel. Means responsive to that information calculates a value of inertia for each tape reel. Means responsive to the operational phase calculates the speed and acceleration of drawing out or taking up of the tape. Finally, means responsive to the calculated inertia, the operational phase, and the calculated speed and acceleration controls the reel motor to control tension on the tape.

U.S. Patent No. 5,220,477 to Sorihashi et al. (Sorihashi) discloses a tape loading device. The reel motor controller is responsive to the ratio of winding diameters between the two reels and to the amount of tape drawn out of the cassette. As a result, tape of equal length is drawn out of each of the two reels without abnormal tension. Column 2, lines 22-68; column 3,

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lines 46-63. While the tape is being loaded, the rotational angle of loading gear is detected. Column 4, lines 8-17.

Sorihashi also describes prior art in which the rotational speed of each reel motor is detected and the torques applied to the reel motors are controlled in accordance with variations in rotational speed compared to a reference speed. Column 1, line 13 through column 2, line 18.

U.S. Patent No. 4,868,923 to Yoshihiro teaches that certain prior art tape loaders suffered from unequal deceleration between tape withdrawal speed and reel speed. Column 1, line 40, through column 2, line 22. Yoshihiro suggests two solutions to that problem. Yoshihiro's first solution is to control the rotating speed of the loading ring to change in accordance with the loading position. The speed is adjusted until it matches a reference speed for each loading position. Column 3, line 31, through column 4, line 42. The optimum reference speeds may be determined by various experiments or simulations and stored in a read only memory. Column 5, line 62, through column 6, line 3. Yoshihiro's second solution is to vary the back torque applied to a reel in accordance with the amount of tape wound on the reel. Column 3, lines 34-40. A larger amount of tape has greater inertia and thus decelerates more slowly than a lesser amount of

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tape subject to the same back torque. Column 1, line 60, through column 2, line 22.

U.S. Patent No. 5,222,684 to Yoneda et al. (Yoneda) is related to a tape driving means and teaches calculation of inertia for a measured amount of tape on a reel. That information is used for setting the appropriate back torque on the reel to reduce fluctuations in tape tension. Column 2, line 42, through column 3, line 12.

DISCUSSION

The examiner has rejected all the claims under 35 U.S.C. § 103 as unpatentable over Sorihashi in view of Yoshihiro and Yoneda. The Examiner's Answer refers to the final Office action (paper No. 9) for an explanation of the rejection. The final Office action in turn states that for the reasons given in an even earlier Office action (paper No. 7) Sorihashi meets all the limitations except for calculation means responsive to the operational phase for calculating a speed and acceleration of the tape during loading.

Appellants argue that none of the references teach or suggest a device having the claimed calculation means and control means. Appeal Brief at 8. The examiner argues that the prior art suggested the control means and the calculation means because

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Yoshihiro teaches the desirability of limiting sudden changes in tape tension to avoid damaging the tape, achieving this in part through Figure 4A's profile of rotating speed versus loading position, which inherently includes corresponding acceleration values. Examiner's Answer at 4-5.

Apparently, the examiner interprets the claims as being satisfied by a one-time approximation of acceleration as in Yoshihiro's Figures 2B and 4B, from which a fixed look-up table is generated and stored in a read only memory. According to appellants, on the other hand, their claims require that the acceleration be calculated based on sensed characteristics of the particular tape being inserted into the magnetic recording/playback apparatus. Appeal Brief at 7.

We agree with appellants. All the claims recite a calculation means responsive to the operational phase detected by the phase detector for calculating the acceleration of drawing out or taking up of the tape. Responsiveness to the operational phase requires real-time operation of the calculation means. The cited prior art does not teach or suggest such real-time calculation of acceleration as required by the claims.

In addition, with respect to claim 1, appellants point out that Yoshihiro's Figure 4A relates to the rotating speed of the

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loading ring. Reply Brief at 2; Letter, paper No. 28. The control means recited in claim 1 is for controlling a reel motor, not for controlling the loading ring motor. None of the cited systems control the reel motor in a manner responsive to the operational phase. We find no suggestion in the cited references of the claimed device having control means responsive to the calculated inertia, the operational phase, and the calculated speed and acceleration, for controlling the reel motor to control tension on the tape as recited.

Claim 5's control means is for controlling the loading motor in response to the calculated inertia, the operational phase, and calculated acceleration. Although Yoshihiro turns the loading motor at different speeds to withdraw the tape at less sharply changing speeds, there is no suggestion to control the loading motor in response to a real-time calculated acceleration as well as the operational phase and calculated inertia as recited.

The control means of claim 6 is for controlling the loading motor in response to the calculated acceleration and a calculated allowable range of values of acceleration of drawing out or taking up of tape for each tape reel. The examiner states that calculating the desired range of accelerations would have been obvious to one of ordinary skill in the art seeking to limit

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tension changes because the calculation uses the known relationship of acceleration to tape tension. The fact that that physical relationship was understood does not provide a suggestion or motivation for controlling a loading motor in a manner responsive to a real-time calculated acceleration and a calculated allowable range. Nowhere does any reference even mention calculating an allowable range of acceleration.

When viewed as a whole, the cited prior art did not teach or suggest the invention recited in any of the appealed claims. Therefore, we reverse the examiner's rejection.

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