UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte KAZUHIKO KITANO and TETSUROU HAMADA

Appeal 2008-5670
Application 10/334,064
Technology Center 3600

Decided: December 30, 2008

Before: JENNIFER D. BAHR, JOHN C. KERINS, and MICHAEL W. O'NEILL, *Administrative Patent Judges*.

BAHR, *Administrative Patent Judge*.

DECISION ON APPEAL

STATEMENT OF THE CASE

Kazuhiko Kitano and Tetsurou Hamada (Appellants) appeal under 35 U.S.C. § 134 from the Examiner's decision rejecting claims 1 and 2. We have jurisdiction over this appeal under 35 U.S.C. § 6 (2002).

The Invention

Appellants' claimed invention is directed to a control device for a hybrid vehicle which controls the amount of regeneration during regenerative operation of the motor when the vehicle decelerates. Specification 1. When the vehicle is steered (turned) during deceleration, Appellants' controller adds a predetermined amount of regeneration, depending on the steered angle of the front wheels, to the amount of regeneration of the first motor connected to the front wheels while subtracting the same amount from the regeneration of the second motor connected to the rear wheels. Consequently, the braking force produced by the rear wheels, which support relatively lower loads than the front wheels when the vehicle turns, is reduced, thereby improving vehicle stability. Futhermore, by increasing the regeneration of the motor connected to the front wheels by the same amount that the regeneration of the motor connected to the rear wheels is reduced, Appellants' control device prevents a decrease in the regenerated energy for the entire vehicle, thereby permitting effective deceleration regeneration during turning. Specification 3-4 and 21.

Claim 1, reproduced below, is representative of the claimed invention.

> 1. A control device for a hybrid vehicle comprising:
>
> front wheels which are steerable, and which are connectable to at least one of an internal combustion engine and a first motor via a transmitting section;
>
> rear wheels which are connected to a second motor;

> a regenerative operation control section which enables regeneration of energy through the regenerative operation of said first motor and second motor when the vehicle decelerates; and
>
> a regeneration amount control section which operates so as to decrease the amount of regeneration energy to be regenerated by said second motor while increasing the amount of regeneration energy to be regenerated by said first motor so as to prevent decrease in the total amount of regenerated energy in the entire vehicle depending on the steered angle of said front wheels when said hybrid vehicle is in a deceleration and turning state.

The Rejection

Appellants seek review of the Examiner's rejection of claims 1 and 2 under 35 U.S.C. § 102(e) as being anticipated by Mikami (US 6,549,840 B1).

SUMMARY OF DECISION

We REVERSE.

OPINION

To establish anticipation, every element and limitation of the claimed invention must be found in a single prior art reference, arranged as in the claim. *Karsten Mfg. Corp. v. Cleveland Golf Co.*, 242 F.3d 1376, 1383 (Fed. Cir. 2001).

Claim 1 requires a regeneration amount control section which decreases the amount of regeneration energy to be regenerated by the second

(rear wheel) motor while increasing the amount of regeneration energy to be regenerated by the first (front wheel) motor to prevent decrease in the total regenerated energy for the vehicle depending on the steered angle of the front wheels. Appellants argue that while Mikami mentions "steering angle," control of regeneration energy depending on the steered angle of the front wheels as called for in claim 1 is not disclosed. Appeal Br. 14. To account for the balanced increase in regeneration energy regenerated by the front wheel motor and decrease in regeneration energy regenerated by the rear wheel motor to prevent decrease in total regenerated energy for the vehicle, as called for in claim 1, the Examiner relies on Mikami's disclosure at column 44, lines 30-48. Answer 7. The referenced text of Mikami reads as follows:

> The first-motor output increasing means **338** is operated when the operation of the RMG **70** is limited by the second-motor operation limiting means **336**. The first-motor output increasing means **338** is adapted to increase the drive torque or regenerative torque of the MG **16** by an amount corresponding to the amount of limitation of the operation of the RMG **70**, so that the total vehicle drive torque or regenerative braking torque remains unchanged irrespective of the limited operation of the RMG **70**. The second-motor output reducing means **340** is operated when the operation of the MG **16** is limited by the first-motor operation limiting means **334**. The second-motor output reducing means **340** is adapted to reduce the drive torque or regenerative torque of the RMG **70** by an amount corresponding to the amount of limitation of the operation of the MG **16**, in order to maintain the desired front-rear torque distribution ratio, that is, so that the front-rear drive force distribution ratio or the front-rear

> braking force distribution ratio is maintained at a desired value.

Mikami, col. 44, ll. 30-48. This text discusses maintaining total vehicle regenerative braking torque unchanged in the event that operation of the second (rear) motor is limited by second-motor operation limiting means 336, depending on motor operating temperature, to prevent motor overload, as discussed from column 43, line 47 to column 44, line 29. Mikami achieves this by increasing first (front) motor regeneration torque by an amount corresponding to the amount by which the second (rear) motor regeneration torque is limited by the second-motor operation limiting means 336. While the Examiner appears to be correct that such operation of the first-motor output increasing means 338 and second-motor operation limiting means 336 may be executed during vehicle driving states that include deceleration and turning states, in which both the first and second motors are operating (Mikami, col. 31, ll. 40-52), the discussed operation is performed in response to limitations on second (rear) motor operation to prevent overload, not in response to or depending on the steered angle of the front wheels, as called for in claim 1.

Mikami also broadly teaches controlling the front and rear motor drive torques so as to sum to the driver's desired drive torque, even in situations where the torque on one set of wheels is reduced to reduce slipping tendencies of those wheels, by increasing the torque on the other motor. Mikami, col. 2, ll. 35-47, col. 6, ll. 17-25. Mikami further teaches operating vehicle stability control to control the drive or braking force of one or more wheels to prevent tendency for oversteering or understeering. Mikami, col. 19, ll. 57-67. Additionally, Mikami describes a brake control device that

determines, on the basis of the steering angle of the vehicle, whether the vehicle has an excessive oversteering or understeering tendency during steering. If excessive oversteering or understeering tendency is detected, Mikami's vehicle stability control is effected to eliminate such tendency by activating appropriate one or ones of the wheel brakes and controlling the throttle actuator 21. Mikami, col. 29, ll. 50-61. Mikami does not, however, specifically teach decreasing the amount of regeneration of the second (rear) motor and increasing the amount of regeneration of the first (front) motor depending on steering angle, as called for in claim 1.

CONCLUSION OF LAW

For the above reasons, Appellants' argument demonstrates that Mikami does not disclose control of regeneration energy as called for in claim 1 and thus does not anticipate claim 1 or claim 2, which depends from claim 1.

DECISION

The Examiner's decision is:

<u>REVERSED</u>

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