

The opinion in support of the decision being entered today was not written for publication and is not binding precedent of the Board.

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Paper No. 22

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES

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Ex parte ATSUSHI MATSUBARA,  
ATSUSHI IZUMIURA, HIDEYUKI TAKAHASHI,  
TAKASHI KIYOMIYA, HIRONAO FUKUCHI,  
and KATSUHIRO KUMAGAI

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Appeal No. 2003-0725  
Application 09/629,978<sup>1</sup>

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HEARD: October 21, 2003

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Before BARRETT, FLEMING, and BLANKENSHIP, Administrative Patent Judges.

BARRETT, Administrative Patent Judge.

DECISION ON APPEAL

This is a decision on appeal under 35 U.S.C. § 134(a) from the final rejection of claims 1-27.

We reverse.

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<sup>1</sup> Application for patent filed July 31, 2000, entitled "Assistance Controlling Apparatus For Hybrid Vehicle," which claims the foreign priority benefits under 35 U.S.C. § 119 of Japanese patent application 11-223135, filed May 8, 1999.

BACKGROUND

The invention relates to an assistance controlling apparatus for a hybrid vehicle which is propelled by an internal combustion engine assisted by an auxiliary electric motor. Such a vehicle has the problem that when the fuel is running out and the ratio of the fuel in the fuel-air mixture is low, the fuel-air mixture does not burn in the engine. In this condition, when the motor assists the output of the engine and the engine is rotated by the force of the motor, the fuel-air mixture which is not burnt is sent to the exhaust system and the catalyst in the exhaust system may be damaged. Specification, p. 1. The invention determines when the remaining quantity of fuel is under a fixed value and, when it is, restricts the assistance of the engine by the motor, which reliably informs the driver that the fuel for the engine is running out to prevent damage to the catalytic converter and to prevent over-discharge of the battery.

Claim 1 is reproduced below.

1. An assistance controlling apparatus for a hybrid vehicle, comprising:

an engine which outputs propulsive power for the vehicle;

a motor which assists the output of the engine;

a remaining quantity detector which detects whether the remaining quantity of fuel is under a fixed value or not;  
and

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an assistance-restricting unit which restricts the assistance of the output of the engine by said motor when the remaining quantity detector detects that the remaining quantity of the fuel is under the fixed value.

The examiner relies on the following references:

Koga et al. (Koga)	5,670,830	September 23, 1997
Yano et al. (Yano)	5,978,719	November 2, 1999 (filed March 27, 1997)
Lipinski et al. (Lipinski)	6,125,625	October 3, 2000 (filed December 20, 1997)

Claims 1-6, 13-18, and 23-26 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Koga.

Claims 7-12 and 19-22 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Koga and Yano.

Claim 27 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Koga and Lipinski.

The rejections under 35 U.S.C. § 112, first and second paragraphs, in the first final rejection (Paper No. 7) have apparently been withdrawn because they are not repeated in the second final rejection (Paper No. 13) or the examiner's answer (Paper No. 15).

We refer to the examiner's answer (Paper No. 15) (pages referred to as "EA\_\_") for a statement of the examiner's rejection, and to the appeal brief (Paper No. 12) (pages referred to as "Br\_\_"), supplemental appeal brief (Paper No. 14) (filed after the examiner's second final rejection), and reply brief

(Paper No. 16) (pages referred to as "RBr\_\_") for a statement of appellants' arguments thereagainst.

OPINION

Appellants argue claims 1 and 19 as representative of two groups. Since claim 19 contains the limitations of claim 1 plus additional limitations, it is sufficient to discuss claim 1.

Koga describes a hybrid electric car propelled by a battery-powered motor. Most of Koga describes a series hybrid electric car (Fig. 1) where the electric motor drives the wheels (i.e., provides propulsive power for the vehicle) and the engine charges the battery and assists the motor by driving a generator. This serial embodiment does not fit the claim recitation that the engine outputs propulsive power for the vehicle and is assisted by a motor. However, Koga states that the invention may be applied to a parallel hybrid electric car as shown in Fig. 11 with certain modifications (col. 19, lines 1-18). In a parallel hybrid electric car, although the motor is primarily responsible for providing the propulsive power and is assisted by the engine (col. 1, lines 20-34), it could be considered that the engine is assisted by the motor, so our analysis must go further. In either the serial or parallel vehicle, the engine is operated only as an auxiliary, so that the hybrid electric cars in Koga are supposed to be driven only by operating their electric motor without relying on the internal combustion engine, in order to

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reduce pollution (col. 2, lines 40-45). Koga calculates the quantity of supplied consumable fuel (gasoline) and when the value of total quantity of fuel supplied since the external charging of the battery exceeds a predetermined value, the drive management controller limits an output torque of the electric drive motor (col. 9, lines 58-61). Owing to this torque limitation, the driver perceives an insufficient output from the car so that the driver is urged to perform external recharging (col. 10, lines 21-25). Note that this serial version limits the torque of the motor, not of the engine assisting the motor. The torque limitation is removed following battery recharge. In the parallel situation, which is what must be considered here, the controller limits the internal combustion engine output rather than the motor output (col. 19, lines 1-18), i.e., it limits the assistance that the engine provides to the motor, not the assistance that the motor provides to the engine, as claimed.

The examiner points to portions of Koga which describe detecting the quantity of fuel in the tank and that the output of the electric motor is restricted based on the fuel use state (EA3-4; EA6-8). The examiner finds that Koga has an assistance restricting unit which restricts the assistance of the output of the engine when the remaining quantity detector detects that the remaining quantity of fuel is under a fixed value (EA3).

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Appellants argue that Koga limits the motor output based on the amount of fuel that has already been consumed by the engine and not by the amount of fuel remaining, as claimed (Br10). It is argued that column 3, lines 20-29, of Koga relied on by the examiner describes detecting a change corresponding to the amount of fuel which has been used since charging the battery, not the amount of fuel remaining (BR10-11). It is further argued that although Koga discloses a conventional fuel gauge showing the amount of fuel remaining, Koga does not use the output of the fuel gauge to directly control the vehicle drive (RBr3).

We find at least three reasons why Koga does not anticipate the subject matter of claim 1.

First, Koga is an electric hybrid vehicle propelled by a motor assisted by an engine (in both the serial and parallel versions) and is not a hybrid vehicle propelled by an engine whose output is assisted by a motor, as claimed. Koga is principally an electric motor driven car which tries to avoid operation of the engine to reduce air pollution (e.g., col. 2, lines 40-45; col. 3, lines 1-3). Thus, while Koga is a hybrid vehicle with an engine and a motor, the motor and engine are not operated as claimed, so we have a problem at the beginning with the anticipation rejection.

Second, while Koga describes limiting the output of the electric drive in response to a fuel related quantity in a series

vehicle, in the parallel vehicle it is the output of the engine that is limited (col. 19, lines 1-18). Thus, the assistance restricting unit in Koga restricts the assistance of the output of the motor by the engine, not vice versa, as claimed. In other words, the driver perceives insufficient output from the car because the motor is not being assisted as much by the engine.

Third, we agree with appellant that Koga does not disclose restricting the motor or engine output in response to detecting that the remaining quantity of fuel is under a fixed value. It is true that Koga has a conventional fuel gauge 12 for measuring the amount of fuel remaining which is displayed on fuel meter 15 (col. 8, lines 60-67) and which can be used to calculate the amount of fuel supplied (col. 4, lines 8-13), but the amount of fuel remaining is not used to control the assistance-restricting unit. Koga acts on the quantity of fuel supplied or fuel used after the charging of the battery (col. 3, line 66 to col. 4, line 7; Fig. 4) or on the distance travelled (col. 5, lines 38-47; Fig. 7) or both (Fig. 9), not on the fuel remaining. This is not surprising since Koga does not address the problem addressed by appellants. It is also noted that the condition for limiting the output of the motor (in a serial vehicle) or the engine (in a parallel vehicle) is that the fuel amount is greater than a preset value (Fig. 4, blocks A7 and A8). The examiner errs in finding that Koga "restrict[s] assistance of the

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output of the engine when the remaining quantity detector detects that the reaming [sic, remaining] quantity of the fuel is under the fixed value (column 3, lines 20-23, 26-29)" (EA3). As appellants note, this portion of Koga refers to a change in the amount of supplied fuel, not the remaining fuel. Further, in a parallel vehicle, it is the assistance of the output of the motor by the engine that is restricted not the assistance of the output of the engine by the motor, as claimed (col. 19, lines 1-18).

Appellants argue that the object of the invention, preventing the engine from running on the wrong fuel-air mixture and thereby avoiding damage to the catalytic converter, is not achieved by Koga since Koga does nothing when the fuel is running out (Br11).

We agree that Koga has nothing to do with appellants' problem of avoiding damage to the catalytic converter and does not teach a solution to the problem.

The examiner states that apparatus claims must be structurally distinguishable from the prior art and cites several cases (EA8-9).

Appellants respond that "the cited case law is not applied to the instant case in any way" (RBr5).

We agree with appellants that the examiner has not applied the case law in the form of a rejection and so has not raised any issue of patentability. It is not understood what problem the

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examiner sees in the claims. Claim 1 does define structurally over the prior art to Koga.

For the reasons stated above, we find that claim 1 is not anticipated by Koga. The anticipation rejection of claims 1-6, 13-18, and 23-26 is reversed. Lipinski does not cure the deficiencies of Koga with respect to claim 1 and, thus, the obviousness rejection of claim 27 is reversed. Claim 16 recites the limitations of claim 1 plus detecting the quantity of fuel remaining by the air-fuel ratio. The added reference to Yano does not cure the deficiencies of Koga as to the missing limitations of claims 1 and 16. Accordingly, the obviousness rejection of claims 7-12 and 19-22 is reversed.

CONCLUSION

The rejections of claims 1-27 are reversed.

REVERSED

LEE E. BARRETT	)	
Administrative Patent Judge	)	
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	)	BOARD OF PATENT
MICHAEL R. FLEMING	)	APPEALS
Administrative Patent Judge	)	AND
	)	INTERFERENCES
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HOWARD B. BLANKENSHIP            )  
Administrative Patent Judge        )

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