UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte YOJI SETO, YOSHINORI YAMAMURA, YOSUKE KOBAYASHI, and MINORU TAMURA

Appeal 2007-4271
Application 10/237,613
Technology Center 3600

Decided: June 27, 2008

Before WILLIAM F. PATE, III, JENNIFER D. BAHR, and STEVEN D.A. McCARTHY, *Administrative Patent Judges*.

BAHR, *Administrative Patent Judge*.

DECISION ON APPEAL

STATEMENT OF THE CASE

Yoji Seto et al. (Appellants) appeal under 35 U.S.C. § 134 from the Examiner's decision rejecting claims 1-12. We have jurisdiction over this appeal under 35 U.S.C. § 6 (2002).

The Invention

Appellants' claimed invention is directed to a vehicle automatic brake system that automatically brakes the vehicle when a high probability of collision with another vehicle is estimated (Specification 1:5-9). Claim 1 is illustrative of the claimed invention and reads as follows:

> 1. An automatic brake system of a motor vehicle which has a brake pedal and a steering wheel installed therein, the system comprising:
>
> a first section that detects a relative connection between the vehicle and a preceding object ahead of the vehicle;
>
> a second section that, when actuated, produces a braking force applied to the vehicle, the braking force produced by the second section being isolated from a braking force produced by the brake pedal;
>
> a third section that, based on the relative connection detected by the first section, carries out a judgment as to whether or not a possible collision of the vehicle with the preceding object is avoidable by operation of at least one of the brake pedal and the steering wheel; and
>
> a fourth section that actuates and controls the second section in accordance with the judgment made by the third section, thereby to control the braking force applied to the vehicle,
>
> wherein the fourth section is configured to carry out:
>
> causing the second section to produce a first grade braking force when the third section judges that the possible collision would be avoidable by operation of the brake pedal and unavoidable by operation of the steering wheel and also when the third section judges that the possible collision

> would be avoidable by operation of the steering wheel and unavoidable by operation of the brake pedal; and
>
> causing the second section to produce a second grade braking force when the third section judges that the possible collision would be unavoidable by operation of the brake pedal and also by operation of the steering wheel, the second grade braking force being greater than the first grade braking force.

Claim 10, the only other independent claim pending in the application, differs from claim 1 only in that the term "section," in each occurrence, is replaced with "means."

The Rejection

The Examiner relies upon the following as evidence of unpatentability:

Urai	US 6,021,375	Feb. 1, 2000
Hashimoto[1]	JP 6-298022 A	Oct. 25, 1994

Appellants seek review of the Examiner's rejection of claims 1-12 under 35 U.S.C. § 103(a) as unpatentable over Urai in view of Hashimoto.

The Examiner provides reasoning in support of the rejection in the Answer, mailed April 11, 2006. Appellants present opposing arguments in the Appeal Brief, filed January 17, 2006, and Reply Brief, filed June 12, 2006. Appellants' representative presented oral argument on June 11, 2008.

[1] We derive our understanding of Hashimoto from the machine-assisted translation provided by the Examiner with the Final Rejection, mailed June 15, 2005, with the further assistance of the translation of paragraphs [20] – [22] provided by Appellants on pages 7 and 8 of the remarks in the Amendment filed October 14, 2005.

THE ISSUE

The Examiner and Appellants agree that Urai discloses an automatic braking system that produces a first grade braking force when the system judges that the possible collision would be avoidable by operation of the brake pedal and unavoidable by operation of the steering wheel and produces a second grade braking force when the system judges that the possible collision would be unavoidable by operation of the brake pedal and also by operation of the steering wheel, the second grade braking force being greater than the first grade braking force, as required in each of independent claims 1 and 10. Appellants argue that Urai does not teach a braking system that additionally produces a first grade braking force when the system judges that the possible collision would be avoidable by operation of the steering wheel and unavoidable by operation of the brake pedal, the second grade braking force being greater than the first grade braking force, as also required by each of claims 1 and 10. Appellants additionally argue that Hashimoto does not cure this deficiency in Urai. (Appeal Br. 5.) The Examiner agrees with Appellants on the first point, but determines that the teachings of Hashimoto, in combination with Urai's recognition of the need for a judging condition when vehicle speed exceeds 65 km/h, establishes that it would have been obvious to provide the claimed feature at issue in Urai (Answer 4-5). Accordingly, the issue involved in this appeal is whether Appellants demonstrate error in the Examiner's determination that the combined teachings of Urai and Hashimoto establish that it would have been obvious to modify Urai by adding the feature of producing a first grade braking force when the system determines that the possible collision would be avoidable by operation of the steering wheel and unavoidable by

operation of the brake pedal, the second grade braking force being greater than the first grade braking force, as required by each of claims 1 and 10.

FINDINGS OF FACT

Urai teaches a vehicle braking system that calculates a threshold distance value Ls necessary for avoiding contact with an obstacle 100, such as another vehicle, by steering the subject vehicle (col. 5, ll. 17-30). Urai's system also calculates a threshold distance value Lb necessary for avoiding contact by operation of the braking system 22 (col. 5, ll. 31-62).

At step S14, Urai's system determines whether the detected actual relative distance X between the subject vehicle and the obstacle 100 is not less than Ls, in other words, whether it is possible to avoid collision by steering. If the result is affirmative, the automatic braking system is made inoperative at step S16. (Col. 6, ll. 19-26.) According to Urai, when the detected actual relative distance X is not less than Ls, it can be anticipated that the vehicle operator will avoid collision by steering, thus obviating the need for automatic braking (col. 6, ll. 27-31). If, on the other hand, the result in S14 is negative, that is, collision cannot be avoided by steering, Urai's program proceeds to step S18 and determines whether the detected actual distance X is greater than Lb, in other words, collision can be avoided by braking. If Urai's system determines that X is greater than Lb, the system immediately initiates automatic braking to generate a deceleration of 0.2G (a first grade braking force). (Col. 6, ll. 32-51.) If, on the other hand, Urai's system determines that X is not greater than Lb, meaning that contact will be unavoidable, the program proceeds to step S22 in which the automatic braking is actuated to generate the maximum deceleration of, for

example, 0.8G (a second grade braking force greater than the first grade braking force). (Col. 6, ll. 52-55.)

Urai's system operates with the understanding that Ls is greater than Lb when the relative speed is less than 65 km/h (col. 6, ll. 5-6). Urai explains operation of the system in the region wherein the relative speed is less than 65 km/h but adds that "the explanation will similarly be applied to the region where the relative speed is not less than 65 km/h when the algorithm is changed slightly" (col. 6, ll. 9-14). We find this statement to mean that Urai's system operates under a slightly different algorithm in the region wherein the relative speed is 65 km/h or greater. Urai, however, does not specify how the algorithm changes in that region.

Urai discusses Hashimoto's system in the "BACKBROUND OF THE INVENTION." Urai explains that Hashimoto operates automatic braking only when the detected relative distance falls below both Ls and Lb, so that the braking system is not operated at times which are not anticipated by the operator. Consequently, the operator does not experience the annoyance caused by automatic braking when he intends to steer to avoid collision. (Col. 1, ll. 31-39.) Urai notes that in systems such as that of Hashimoto, even when Lb is shorter than Ls, automatic braking may sometimes be initiated late, thereby necessitating a large braking force (col. 1, ll. 45-51). In such cases, Urai considers it better to initiate automatic braking earlier whenever it is found that the obstacle avoidance by steering is impossible, since this will not interfere with the operator's steering and will permit obstacle avoidance to be conducted more securely and effectively (col. 1, ll. 52-57).

Urai does not provide any hint that automatic braking should be initiated when it is determined that collision can be avoided by steering. In fact, Urai's teachings at column 1, lines 31-59 strongly imply that automatic braking is undesirable in situations wherein the operator can avoid collision by steering, regardless of whether collision can be avoided by braking.

Hashimoto teaches an automatic braking system wherein automatic braking is initiated when the detected relative distance is less than both the minimum distance required for collision avoidance by braking (X_B) and the minimum distance required for collision avoidance by steering (X_S) (¶¶ [0008], [0009], [0010], and [0020]). If the detected relative distance is larger than the smaller of X_B and X_S, Hashimoto does not initiate automatic braking (¶ [0020]). However, when the detected relative distance becomes smaller than the larger of X_B and X_S, Hashimoto's system operates an alarm device to caution the driver (¶ [0020]). Hashimoto emphasizes that because automatic braking is not operated when collision can be prevented by steering, the driver does not experience braking shock unexpectedly so as to deteriorate the driving feeling (¶ [0022]).

Hashimoto mentions a known automatic braking system wherein braking is carried out automatically when the relative distance between vehicles becomes a severely short or dangerous distance, even when the relative distance is one at which collision could be avoided only by operating the steering wheel without the aid of a braking operation at such high vehicle speed (¶ [0020]).

DISCUSSION

Based on our findings, *supra*, Urai teaches operating the automatic braking at a first grade braking force (deceleration of 0.2G) when it is determined that collision can be avoided by braking but not by steering and operating the automatic braking at a second grade braking force (deceleration of 0.8G) when it is determined that collision cannot be avoided by braking and cannot be avoided by steering, the second grade braking force being greater than the first grade braking force. Urai does not teach applying automatic braking when it is determined that collision can be avoided by steering but not by braking. Moreover, both Urai and Hashimoto teach that it is undesirable to initiate automatic braking when collision can be avoided by steering, as this would result in braking at a time when the driver is not expecting braking, thereby annoying the driver. Urai touts as an advantage of Urai's braking system that it can initiate automatic braking earlier, where collision can be avoided by braking, without interfering with the operator's steering in situations where the driver can avoid collision by steering. We thus conclude that Urai and Hashimoto teach away[2] from modification of Urai's system to produce automatic braking when it is determined that collision is avoidable by operation of the steering wheel but unavoidable by operation of the brake pedal. "[W]hen the prior art teaches away from combining certain known elements, discovery of a successful means of combining them is more likely to be nonobvious." *KSR Int'l. Co.*

[2] "A reference may be said to teach away when a person of ordinary skill, upon reading the reference, would be discouraged from following the path set out in the reference, or would be led in a direction divergent from the path that was taken by the applicant." *In re Gurley*, 27 F.3d 551, 552-53 (Fed. Cir. 1994).

v. Teleflex Inc., 127 S.Ct. 1727, 1740 (2007) (citing *United States v. Adams*, 383 U.S. 39, 51-52 (1966)).

While Urai indicates that the algorithm for automatic braking changes slightly when the relative vehicle speed is 65 km/h or greater, in which case Ls is less than Lb, Urai does not indicate how the algorithm changes. Urai's expressed interest in avoiding interference with driver steering by initiating automatic braking when a driver is not expecting it and intends to avoid collision by steering certainly implies that any such algorithm changes would not result in production of automatic braking in any circumstance where collision can be avoided by steering.

Even assuming that a person of ordinary skill in the art would have been prompted to modify Urai's automatic braking system to provide automatic braking when the relative distance between vehicles becomes a severely short or dangerous distance, even when the relative distance is one at which collision could be avoided only by operating the steering wheel without the aid of a braking operation at such high vehicle speed, as in the known system discussed by Hashimoto, we agree with Appellants (Appeal Br. 5-6) that the reference to a severely short or dangerous distance would suggest a dire situation in which the highest grade braking force available would be applied. Absent hindsight gleaned from Appellants' disclosure, a person of ordinary skill in the art would not have been prompted by Hashimoto's discussion of this known system to apply a braking force that is lower than the higher grade braking force (deceleration of 0.8G) available in Urai when collision can be avoided by neither braking nor steering.

For the foregoing reasons, we conclude that Appellants' arguments demonstrate that the Examiner erred in determining that the combined

teachings of Urai and Hashimoto establish that it would have been obvious to modify Urai by adding the feature of producing a first grade braking force when the system determines that the possible collision would be avoidable by operation of the steering wheel and unavoidable by operation of the brake pedal, the second grade braking force being greater than the first grade braking force, as required by each of claims 1 and 10. The rejection of claims 1 and 10 and claims 2-9, 11, and 12, which depend either directly or indirectly from one of claims 1 and 10, cannot be sustained.

DECISION

The decision of the Examiner to reject claims 1-12 under 35 U.S.C. § 103(a) is reversed.

REVERSED

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