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

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte THOMAS LENZ, BENNO MEYER, and GERHARD RUHNAU

Appeal 2007-0782
Application 10/683,453[1]
Technology Center 3600

Decided: May 30, 2007

Before: TERRY J. OWENS, STUART S. LEVY, and ANTON W. FETTING, *Administrative Patent Judges*.

LEVY, *Administrative Patent Judge*.

DECISION ON APPEAL

STATEMENT OF CASE

Appellants appeal under 35 U.S.C. § 134 (2002) from the final rejection of claims 1-5, 7-13, and 15. We have jurisdiction under 35 U.S.C. § 6(b) (2002).

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[1] Application filed October 10, 2003. The real party in interest is WABCO GmbH.

Appellants invented a method for controlling the brake system of a vehicle train. (Specification 1).

Claim 1 is representative of the invention and is reproduced as follows:

> 1. A method for controlling the brake system of a vehicle train, the vehicle train including a tractor vehicle and a trailer vehicle, a control device in the tractor vehicle arranged and constructed to initiate automatic braking of the trailer vehicle when a vehicle train rollover danger is presented, the method comprising the steps of detecting a coefficient of friction between the road on which the vehicle train travels and the vehicle train, determining whether the coefficient of friction is smaller than a predetermined minimum value when an anti-wheel-lock braking function is at least one of absent in said trailer vehicle and inoperative in said trailer vehicle, and reducing intensity of automatic braking of the trailer vehicle utilizing the control device in the tractor vehicle when the coefficient of friction is smaller than the predetermined minimum value.

The Examiner rejected claims 1-5, 7-13, and 15 under 35 U.S.C. § 103(a) (2004) as being unpatentable over Takao in view of Hunter.

The prior art relied upon by the Examiner in rejecting the claims on appeal is:

Hunter	US 3,967,862	Jul. 6, 1976
Takao	JP 2001-58563A	Mar. 6, 2001

Appellants contend that in combining Takao and Hunter, the Examiner has not established a prima facie case of obviousness (Br. 8). Appellants argue that in Takao, the vehicle combination is automatically braked when a threshold lateral acceleration is reached (i.e., when a rollover condition is detected). Specifically, a control device in the tractor automatically actuates the trailer brake intermittently to avoid wheel lock using a simple on/off trailer brake pressure actuation scheme, and removes

brake pressure when the rollover condition subsides. (Br. 10). Appellants contend that Hunter fails to overcome the severe deficiencies of Takao, because Hunter is not concerned with reducing the intensity of automatic trailer braking initiated by a vehicle rollover protection function based on the coefficient of friction between the road and the vehicle combination. (Br. 11).

The Examiner contends that Takao shows in Fig. 4 that when a rollover condition is detected, brake pressure on the trailer is reduced, and that in Takao, the trailer may not have the ABS function. The Examiner asserts that Takao lacks the use of a coefficient of friction to detect a rollover condition, and that Hunter teaches a method to monitor the stability of a vehicle train by detecting various conditions including detecting a coefficient of friction between the roadway and the vehicle train, such that when the coefficient of friction is smaller than a predetermined minimum value, the intensity of the braking is reduced. (Answer 3-4). The Examiner contends to the effect that it would have been obvious to have modified Takao's method of controlling the brake system of a vehicle train using the coefficient of friction as taught by Hunter instead of using lateral acceleration to monitor the dynamic stability of a vehicle train. (*Id.*).

We reverse.

ISSUE

Have Appellants shown that the Examiner erred in holding that the combined teachings and suggestions of Takao and Hunter would have suggested the claimed invention. The issue turns on whether it would have

been obvious to have replaced the detecting of lateral acceleration of Takao with the detecting of the coefficient of friction disclosed in Hunter. The issue further turns on whether the prior art, alone or in combination, would have suggested detecting the coefficient of friction (to reduce braking) upon detection of a rollover condition.

FINDINGS OF FACT

From our review of the record, we have determined that the following enumerated findings are supported by at least a preponderance of the evidence. *Ethicon, Inc. v. Quigg*, 849 F.2d 1422, 1427, 7 USPQ2d 1152, 1156 (Fed. Cir. 1988)(explaining the general evidentiary standard for proceedings before the Office).

1. Appellants invented a method for controlling the brake system of a vehicle train. (Specification 1).
2. Commonly, a tractor vehicle equipped with ABS is coupled with a trailer vehicle that lacks an ABS system. (*Id.*).
3. In the Appellants' invention, a coefficient of friction is detected between the roadway and the vehicle train. If the coefficient of friction is smaller than a predetermined minimum value, the intensity of braking of the trailer vehicle is reduced. (Specification 2).
4. We find from Appellants' Fig. 2 that when a rollover danger is detected, the trailer vehicle is braked. If the wheel lock protection function is inoperative (i.e., no ABS or ABS not functioning) the coefficient of friction is detected. If the

coefficient of friction is low, a signal pulse train is selected and outputted to the trailer control valve.

5. Takao solves the problem of when a lateral-direction acceleration is detected, the braking pressure force of the tug (tractor of a tractor-trailer) is automatically increased. (Takao 3).

6. The invention of Takao relates to lateral-direction acceleration detecting means, and in particular to attitude control of vehicles for preventing rollover (Takao, 4, 7).

7. The tug can be used with a towed vehicle from a different manufacturer, or a towed vehicle that is quite old compared to the tug. (Takao 9).

8. In controlling the attitude of a combination vehicle (tractor-trailer) the system quickly detects the trailer becoming out of control by estimating the occurrence of lateral-turning occurrence (rollover) and automatically generating a damping force for the towed vehicle. (Takao para. [0009]).

9. When a lateral-direction acceleration which exceeds certain conditions is detected, the control system automatically changes the towed vehicle into a braking state. (Takao, para. [0010]).

10. When there is no possibility of rollover, the towed vehicle can still be automatically braked. (Takao, para. [0011]).

11. The invention provides lateral turning prevention for the combination vehicle without providing new equipment to the towed vehicle. (Takao, para. [0012]).

12. The invention is for towed vehicles that have, or do not have, ABS systems. The invention promptly releases the braking when the towed vehicle is no longer in danger of rollover. (*Id.*).

13. The invention provides lateral-direction acceleration detection in the tractor. When lateral acceleration exceeds a prescribed value, damping force is automatically provided to the trailer. (Takao, para. [0013]).

14. Takao further discloses that "[w]hen it is in the state where it is examining and exceeding whether it exceeded, it opens and closes intermittently relay valve 23 which sends braking-pressure force pressure to towed vehicle 2. When towed vehicle 2 is equipped with ABS, it is not necessary to carry out intermittence control of the braking-pressure force." (Takao, para. [0031]).

15. We find the above fact to imply that if the towed vehicle does not have ABS brakes, intermittent control of the braking is not carried out.

16. When the output of the lateral-direction acceleration sensor is less than limitation-value G_{y2} the system closes relay valve 23 and reduces braking pressure of the towed vehicle. (Takao, para. [0033]).

17. Operation of Takao can be found in the flow diagrams on Takao, pages 35-37.

18. Hunter is directed to an anti-skid control system for the braking of vehicles. (Hunter, col. 1l. 12-13).

19. The apparatus of Hunter maintains wheel slip of the vehicle in a region of values associated with a maximum coefficient of road friction. (Hunter, col. 2, ll. 17-20).

20. The sense of slope versus slip curve is determined, and in a braking application, a positive slope measurement causes increased brake pressure and a negative or zero slope measurement results in a reduction of brake pressure. (Hunter, col. 2, ll. 28-33).

21. An object of the invention is to provide an improved anti-skid control system employing only wheel acceleration input data. (Hunter, col. 2, ll. 39-41).

22. It is also an object of the invention to provide an anti-skid control system useful in preventing vehicle skidding under high performance acceleration conditions as well as under vehicle braking conditions. (Hunter, col. 2, ll, 42-46).

23. Lateral stability is inherently related to the stopping problem. The best that can be done to preserve lateral stability is to "keep the wheels rolling" (i.e., avoid lock-up). It is appreciated that if the system can seek and hold the peak of the μ-slip curve, the wheels will continue to rotate. Note that loss of lateral stability is not to be confused with pulling the vehicle in transverse direction as a result of unbalanced road-tire forces. However, steerability, similarly

as lateral stability, requires that the wheels keep rolling. (Hunter, col. 4, ll. 1-10).

24. As shown in figure 1 of Hunter, means 10 controls an alternative one of a brake control system and a vehicle prime mover, whereby wheeled acceleration of an associated wheeled vehicle may be controlled. (Hunter, col. 4, ll. 35-38).

25. Hunter further provides means 12, responsive to means 11 for determining the variation of the coefficient of road friction from a maximum value. Control means 10 coupled to the output 11 for changing the applied torque on a road vehicle under control, for controlling the slip thereof such as to improve the value of the associated coefficient of road friction. (Hunter, col. 4, ll. 51-60).

PRINCIPLES OF LAW

On appeal, Appellants bear the burden of showing that the Examiner has not established a legally sufficient basis for combining the teachings of Lencoski with those of Waechter. Appellants may sustain this burden by showing that, where the Examiner relies on a combination of disclosures, the Examiner failed to provide sufficient evidence to show that one having ordinary skill in the art would have done what Appellants did. *United States v. Adams*, 383 U.S. 39, 51-52, 148 USPQ 479, 483-84 (1966); *In re Kahn*, 441 F.3d 977, 987-88, 78 USPQ2d 1329, 1336 (Fed. Cir. 2006); *DyStar*

Textilfarben GmbH & Co. Deutschland KG v. C.H. Patrick, Co., 464 F.3d 1356, 1360-61, 80 USPQ2d 1641, 1645 (Fed. Cir. 2006). The mere fact that all the claimed elements or steps appear in the prior art is not per se sufficient to establish that it would have been obvious to combine those elements. *United States v. Adams*, *id*; *Smith Indus. Med. Sys., Inc. v. Vital Signs, Inc.*, 183 F.3d 1347, 1356, 51 USPQ2d 1415, 1420 (Fed. Cir. 1999). The Supreme Court, in *KSR Int'l v. Teleflex Inc*., 127 S.Ct. 1727, 2007 WL 1237837, 82 USPQ2d 1385 (2007) stated that "[t]houghout this Court's engagement with the question of obviousness, our cases have set forth an expansive and flexible approach …." *KSR Int'l*, 2007 WL 1237837 at 12, 82 USPQ2d at 1395. The Court emphasized that "the principles laid down in *Graham* reaffirmed the '*functional approach*' of *Hotchkiss*, 11 How. 248." *KSR Int'l*, 2007 WL 1237837 at 12, 82 USPQ2d at 1395 (citing *Graham v. John Deere Co.*, 383 U.S. 1, 12, 148 USPQ 459, 464 (1966) (emphasis added)).

ANALYSIS

From facts 8, 9, and 13, we find that in Takao, when lateral acceleration is detected, which exceeds a prescribed value, the towed vehicle is put into a braked state, and that a damping force for the towed vehicle is generated. Since the braking of the towed vehicle occurs as a result of a rollover condition being determined, we find that in response to a rollover condition being detected, the towed vehicle is braked, and there is no provision in Takao for determining the coefficient of friction when the lateral acceleration beyond a prescribed value is detected. As a result, we

find that if we replaced the lateral acceleration detection of Takao with detection of the coefficient of friction, as in the ABS system of Hunter, the result would be a towed vehicle that was braked, but not based on a rollover danger being presented. In addition, because Hunter is directed to an ABS system, and does not detect coefficient of friction upon being presented with a rollover condition, we find that an artisan would not have been taught to detect the coefficient of friction between the road and the vehicle train upon being presented with a rollover condition. Thus, we find that an artisan would not have been motivated to provide Takao with the detection of coefficient of friction in addition to the detection of lateral acceleration above a prescribed amount. Accordingly, we find that since Takao brakes the towed vehicle in response to detection of a rollover condition, and Hunter is simply directed to an ABS system, we find that an artisan would not have arrived at the claimed invention other than through impermissible hindsight.

In addition, we note that although the components recited in the claims are known in the art, the combination of elements does not yield a predictable result, because there is no suggestion in the art for determining a coefficient when a rollover condition is detected. Nor do we find any evidence that the invention encompassed by the claims was an obvious solution to the known problem of braking tractor trailers.

On the record before us, it follows that the Examiner erred in rejecting claim 1 under § 103(a). Since claims 2-5 and 7-16 are narrower than claim 1, it also follows that those claims were not properly rejected under § 103(a) as being unpatentable over Takao in view of Hunter.

CONCLUSION OF LAW

On the record before us, Appellants have shown that the Examiner has not given any persuasive reason why one skilled in the art would have incorporated the coefficient of friction detection of Hunter into the system of Takao to arrive at the claimed invention.

DECISION

The Examiner's rejection of claims 1-5 and 7-16 is reversed.

REVERSED

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