

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

JTEKT CORPORATION

Petitioner,

v.

GKN AUTOMOTIVE LTD.

Patent Owner.

Case IPR2016-00046

U.S. Patent No. 8,215,440

**SECOND DECLARATION OF STEVEN J. BECKER IN SUPPORT
OF PETITIONER'S REPLY TO PATENT OWNER RESPONSE**

I, Steven J. Becker, declare as follows:

1. I am the same Steven J. Becker who provided a Declaration in support of JTEKT's Petition requesting *inter partes* review of U.S. Patent No. 8,215,440 ("the '440 patent"). I understand that Declaration has been designated Exhibit 1005. My qualifications are set forth in my prior Declaration.

2. Since submitting my Declaration, I have reviewed the following documents in this proceeding:

- Patent Owner's Preliminary Response and exhibits cited therein;
- Decision Granting Institution;
- Patent Owner's Response and exhibits cited therein;
- 2007 article entitled "Effect of the Right-and-left Torque Vectoring System in Various Types of Drivetrain";
- An Internet printout detailing the GKN Free Running Differential (<http://www.gkn.com/driveline/about-us/Documents/datasheets/FRRD-engl.pdf>); and
- An Internet printout from the Land Rover website (<http://www.jaguarlandrover.com/gl/en/about-us/our-history/>).

3. I previously opined that the drivetrains in claims 1–7 are

nothing more than the combination of familiar elements according to known methods, each performing the same function it had been known to perform, yielding predictable results. My opinion is unchanged, although I understand that GKN has disclaimed claims 1, 4, and 5 so that only claims 2–3 and 6–7 remain at issue in this proceeding.

4. As discussed in detail below, claims 2 and 3 of the '440 patent are at least rendered obvious by Teraoka (Ex. 1002) in view of Watanabe (Ex. 1003) under 35 U.S.C. § 103. Claims 6 and 7 of the '440 patent are at least rendered obvious by Teraoka (Ex. 1002) in view of Burrows (Ex. 1004) under 35 U.S.C. § 103.

**A. Claims 2 and 3 are Unpatentable Under 35 U.S.C. § 103
As Rendered Obvious by Teraoka in View of Watanabe**

5. As I opined previously, Teraoka does not disclose side shaft couplings for each side shaft of the secondary axle as recited in claims 2 and 3. However, it would have been obvious for a person of skill in the art (“POSITA”) to replace the clutch 71 and differential 25 of Teraoka with a side-shaft coupling on each side of the secondary axle without differential gearing in between, as doing so would eliminate the bevel gear differential, likely achieving the well-known goals of reducing the weight and fuel consumption of the vehicle.

6. Eliminating components and reducing the weight (and thus reducing cost and complexity) of components in automotive systems is a well-known goal in the industry. The prior art references support this fact.

7. For example, Teraoka states that using clutch mechanism 71 “has a simpler configuration and reduce[s] number of parts, weight and cost as compared to prior art.” (Ex. 1002, ¶ [0089].) This supports my opinion that it was a well-known goal for a POSITA to try to reduce the weight of an automotive system.

8. Watanabe makes similar statements. For example, Watanabe teaches that some of the modifications described therein result in “simplification of the mechanism, lighter weight, and lower costs.” (Ex. 1003, 4, lower right column.) Again, this supports my opinion that it was a well-known goal for a POSITA to try to reduce the weight of an automotive system.

9. Watanabe also explicitly states that using rear differential 11 (the multi-plate clutch module) means that no center differential is needed, “making it possible to simplify the vehicle’s power transmission system, and reduce cost and weight, which are significant effects.” (Ex.

1003, 5, lower right column.) As such, Watanabe specifically teaches a POSITA that using clutch-based differentials instead of a center bevel gear differential will reduce cost and weight. This would motivate a POSITA to implement a Watanabe system, and it would be predictable to a POSITA that the resulting modified system would reduce the weight of the system overall.

10. In practice, some implementations of this system could cause a slight weight increase rather than a weight reduction (as noted by GKN with respect to the Twinstar), but overall it is more likely that a system based on combining Teraoka and Watanabe would have a reduced weight, particularly based on the explicit teachings in Watanabe noted above.

11. Based on the above, it would have been a matter of simple substitution for a driveline design engineer to replace the differential of Teraoka with the rear, secondary drive train of Watanabe to yield the predictable result of reducing mass and rotating losses taught by the references.

12. I understand that GKN's position is that a POSITA would think Teraoka and Watanabe are directed to different problems to be solved and would not look to combine these references. I disagree.

13. As noted in my deposition, Teraoka and Watanabe actually worked at the same company and industry, and should have been familiar with each other's work.

14. But, more importantly, Watanabe specifically explains that its multi-plate clutch system can stop components from rotating when in 2WD mode if used with a 2-4 switching mechanism:

If a 2-4 switching mechanism is provided and 2WD mode is switched to, releasing the multiple plate clutches 89 and 91 causes rotation of the drive system for the rear wheels 25 and 27 to stop. Accordingly, useless rotation and the wear, vibration, and noise caused thereby can be prevented, as can a concomitant fall in mileage.

(Ex. 1003, 5, lower left column.)

15. In other words, Watanabe is teaching a POSITA that its system would have benefits in reducing driveline drag and energy losses associated with components rotating unnecessarily when in 2WD mode. Therefore, a POSITA looking to solve the problem of Teraoka, *i.e.*,

reducing energy loss by stopping rotation of components when in 2WD mode, would be motivated to use Watanabe's system in order to shut down additional components in the drivetrain.

16. Furthermore, because Watanabe clearly states that it can stop rotation of additional components, a POSITA could easily predict that using a multi-plate clutch system would stop rotation of some components, leading to the predictable results of reducing drag and wear and improving fuel efficiency.

17. It is also my opinion that a POSITA reading Watanabe would recognize that additional benefits could be achieved by implementing a multi-plate clutch system. For example, Watanabe describes improvements in steering and handling resulting from the torque vectoring capability conferred through the use of the multi-plate clutch system. (Ex. 1003, 5, top left column, top right column.) These benefits would encourage a POSITA to apply Watanabe's teachings to AWD vehicles in order to achieve the benefits associated with torque vectoring, because torque vectoring was well-known by that time and generally a desired concept that had been implemented in some vehicles already in the stream of commerce, such as the Acura RL. (Ex. 2005.)

18. As shown in the 2007 article “Effect of the Right-and-left Torque Vectoring System in Various Types of Drivetrain” (Ex. 1009), torque vectoring was first applied to AWD vehicles in 1996, and was widely considered a desirable feature in cars, though not often implemented due to high cost. Because torque vectoring was a recognized benefit associated with a multi-plate clutch system, a POSITA reading Watanabe would understand that this benefit could be achieved by implementing Watanabe’s system and would be motivated to do so.

19. Furthermore, because the benefits of torque vectoring and ways of achieving these benefits were well-known (as proven by the Accura RL discussed in Ex. 2005), the results of implementing Watanabe’s system would be readily predictable to a POSITA.

20. It is also my opinion that a POSITA would be able to implement the Watanabe system in combination with Teraoka even without explicit teaching of the particular sensors, controllers, and algorithms to be used. A POSITA would understand that all clutch pack on-demand systems would need controller elements to be functional, and implementing these controller elements was easily

within the skill set of a POSITA. Implementing the appropriate controller would simply be part of the routine automotive driveline industry optimization of the system.

21. I understand that GKN argues that incorporating Watanabe into Teraoka would render Teraoka “inoperable” for its intended purpose. I disagree. Teraoka’s principle of operation allows for selective 2WD and 4WD operation while reducing drag in 2WD mode, and if it was combined with Watanabe, would still operate under this principle.

**B. Claims 6 and 7 are Unpatentable Under 35 U.S.C. § 103
As Obvious Over Teraoka in View of Burrows**

22. As stated in my first Declaration, Teraoka discloses a switch-on mechanism including a dog clutch 7 which provides a mechanical engagement and a clutch 71 (a wet multiple disc clutch) which provides friction engagement and possibly provides speed synchronization. The ’440 patent itself explicitly states that frictionally engaged clutch could be substituted for the synchronizing 17 in the switch-on mechanism. (Ex. 1001, 7:36-41.) The ’440 patent also acknowledges that speed synchronization mechanisms were well-known in the art. (Ex. 1001, 4:17-23.)

23. Although Teraoka does not expressly claim that speed synchronization is provided, it would have been obvious to provide rear axle speed synchronization in light of the structure disclosed by Teraoka. It was well known in the art that positively connected gearing (e.g. a dog clutch) requires speed synchronization of the input and output sides to reduce wear and prevent failure. One such way to provide speed synchronization is by use of a friction clutch which allows a speed transition by slipping the clutch.

24. Burrows discloses an example of this principle in which a multi-plate wet clutch is connected remotely via a drive shaft, and is used to speed synchronize a dog clutch. Similarly, Teraoka discloses how the “clutch mechanism 71, constructed using pilot clutch 97 and main clutch 89, which is a wet multi-plate clutch, does not require a synchronizer mechanism and eliminates the need to allow for the volume of the synchronizer mechanism,” (Ex. 1002, [0091]), as the multi-plate clutch provides the synchronization.

25. It would have been obvious to one of ordinary skill in the art to synchronize the switching mechanism 7 of Teraoka using the clutch

mechanism 71 connected by propeller shaft 21, as taught by Burrows, to perform synchronization without the use of additional equipment.

26. I understand that GKN's position is that a POSITA working on the problem of Teraoka would not have been led to using the Burrows reference because Burrows is (1) directed to a different problem to be solved and (2) limited to ATVs (in the small, straddled, off-road sense). I disagree.

27. The first page of Burrows discusses that some 4WD vehicles can have a 2WD mode, and "During two wheel drive conditions, the driveline components connected to the rear wheels may be caused to rotate due to frictional drag between the components in the driveline...a major contributor to fuel inefficiencies and ways have been sought to minimize the residual drag in four wheel drive systems operating in two wheel drive mode." (Ex. 1004, 5.)

28. Burrows also explains that methods known in the art to disconnect and reconnect the main shaft require switching when the vehicle is stationary, and improved methods of connection while the vehicle is driven are required. (*Id.*) In other words, Burrows discusses precisely the same issue as Teraoka: reducing driveline drag in a 4WD

vehicle when in 2WD mode, and is focused on improving a particular aspect of this situation (*i.e.*, connecting when the vehicle is moving). As such, a POSITA would have readily looked at Burrows if Teraoka is considered the starting point.

29. Specifically, a POSITA looking to solve the problem of reducing drag of a 4WD system while in 2WD mode would look to Burrows, because Burrows discusses drag of a 4WD system while in 2WD mode and teaches a system that allows connection while the vehicle is in motion without acceleration jerk, a benefit readily recognizable to a POSITA to vehicles including passenger cars.

30. I also understand that GKN argues that incorporating Burrow's synchronizers into Teraoka would render Teraoka "inoperable" for its intended purpose. Teraoka's principle of operation allows for selective 2WD and 4WD operation while reducing drag in 2WD mode, and if it was combined with Burrows, would still operate under this principle.

31. Also, Burrows is not limited to ATVs in the small, straddled, off-road sense. It appears that GKN and its expert are attempting to take this position, and are incorrect. It appears that Burrows used the

term “all-terrain vehicles” in the British sense, and I have reviewed an excerpt from the Land Rover website illustrating this British usage. (Ex. 1011.) The British usage of “all-terrain vehicle” covers what are generally referred to as sport utility vehicles or the like in the U.S. for at least the following reasons.

32. First, the figures in Burrows illustrate six-cylinder engines. Small, straddled ATVs with handlebars do not have six-cylinder engines. On the other hand, numerous AWD passenger cars/sport utility vehicles have this configuration.

33. Second, a POSITA reading Burrows would not understand it to be limited to “aggressive driving” scenarios as asserted by GKN. Acceleration jerk is not limited to aggressive driving scenarios, and a POSITA would understand the speed synchronization mechanisms disclosed in Burrows to have broad utility in most driving situations, not just “aggressive” driving situations. In fact, I note that Burrows never uses the word “aggressive.” The issue of acceleration jerk is problem that I have worked to solve in numerous sport-utility and pickup truck applications during my employment at Magna Powertrain and New Venture Gear.

34. Third, Burrows describes embodiments using a GKN free running differential. I have reviewed the specifications for what I believe to be the same part (Ex. 1010), and confirm it is a part to be used in passenger vehicles, not small, straddled ATVs.

35. Finally, on its last page Burrows explicitly states that its invention is applicable to vehicles with various engine configurations. Small, straddled ATVs are typically mid-engine vehicles, where (by design) the engine is positioned under the driver's seat. None are what a POSITA would call "front" or "rear" engines as stated by Burrows in this section. As such, Burrows clearly intends its invention to be applied to passenger vehicles, and a POSITA would have readily reviewed Burrows if Teraoka is considered the starting point.

36. In signing this declaration, I recognize that the declaration will be filed as evidence in a contested case before the Patent Trial and Appeal Board of the United States Patent and Trademark Office. I also recognize that I may be subject to cross examination in the case and that cross examination will take place within the United States. If cross examination is required of me, I will appear for cross examination within the United States during the time allotted for cross examination.

37. I reserve the right to supplement my observations in the future to respond to any arguments that the patent owner raises and to take into account new information as it becomes available to me.

38. I, Steven J. Becker, declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code.

39. I declare under penalty of perjury that the foregoing is true and correct.

Executed on September_8_, 2016



Steven J. Becker