

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
Patent 8,215,440 B2

Before MICHAEL P. TIERNEY, JOSIAH C. COCKS, and
JAMES J. MAYBERRY, *Administrative Patent Judges*.

MAYBERRY, *Administrative Patent Judge*.

DECISION

Institution of *Inter Partes* Review
37 C.F.R. § 42.108

I. INTRODUCTION

Petitioner, JTEKT Corporation (“JTEKT”), filed a Petition (Paper 1, “Pet.”) requesting *inter partes* review of claims 1–7 of U.S. Patent No. 8,215,440 B2 (“the ’440 patent”). Patent Owner, GKN Automotive Ltd. (“GKN”), timely filed a Preliminary Response (Paper 6, “Prelim. Resp.”) to the Petition. We have jurisdiction under 35 U.S.C. § 314.

To institute an *inter partes* review, we must determine that the information presented in the Petition shows “a reasonable likelihood that the petitioner would prevail with respect to at least 1 of the claims challenged in the petition.” 35 U.S.C. § 314(a). For the reasons set forth below upon considering the Petition and the Preliminary Response, we conclude that the information presented in the Petition establishes a reasonable likelihood that JTEKT will prevail in challenging claims 1–7 of the ’440 patent. Pursuant to 35 U.S.C. § 314, we hereby authorize an *inter partes* review to be instituted as to those claims.

Our factual findings and conclusions at this stage of the proceeding are based on the evidentiary record developed thus far. This decision to institute trial is not a final decision as to patentability of claims for which *inter partes* review is instituted. Our final decision will be based on the full record developed during trial.

A. Related Matters

According to the Petition and Patent Owner's Mandatory Notices, the '440 patent is not the subject of litigation or administrative proceeding. Pet. 4; PO Man. Not. 1 (Paper 5).¹

B. The '440 Patent

The '440 patent, titled "Drive Train for a Vehicle with Connectable Secondary Axle," issued July 10, 2012 with twelve claims. Claims 1–7 of the '440 patent are directed to a vehicle drive train with primary and secondary drive trains. Ex. 1001, 12:10–67. Specifically, the claims are directed to a vehicle drive train with a switch-on mechanism and side shaft coupling, where a shutdown section of a secondary drive train is decoupled from the primary drive train when the vehicle is driven by the primary drive train only. *Id.*, Abstract.

Figures 3–5, reproduced below, depict an embodiment of the vehicle drive train of the '440 patent.

¹ The parties are reminded of their continuing obligation to update their mandatory notices within 21 days of any change of the information listed in 37 C.F.R. § 42.8(b) stated in an earlier paper, including, *inter alia*, changes in related matters. 37 C.F.R. §§ 42.8(a)(3), 42.8(b)(2).

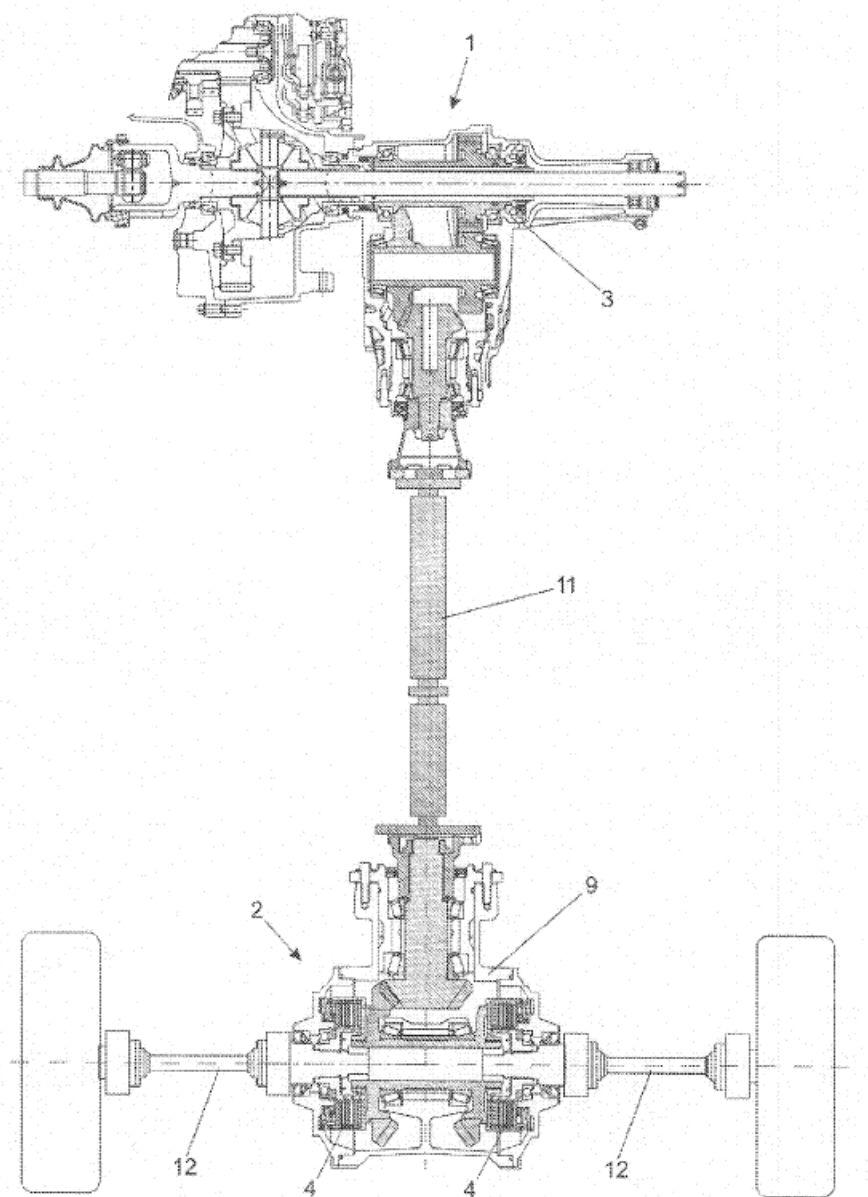


FIG. 3

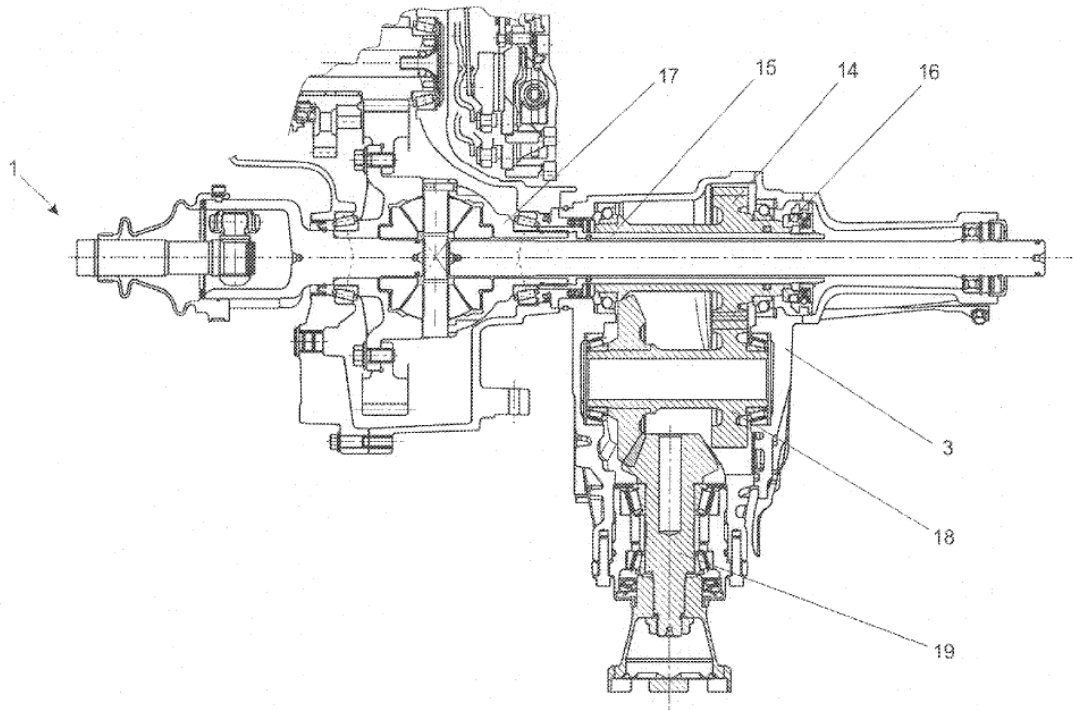


FIG. 4

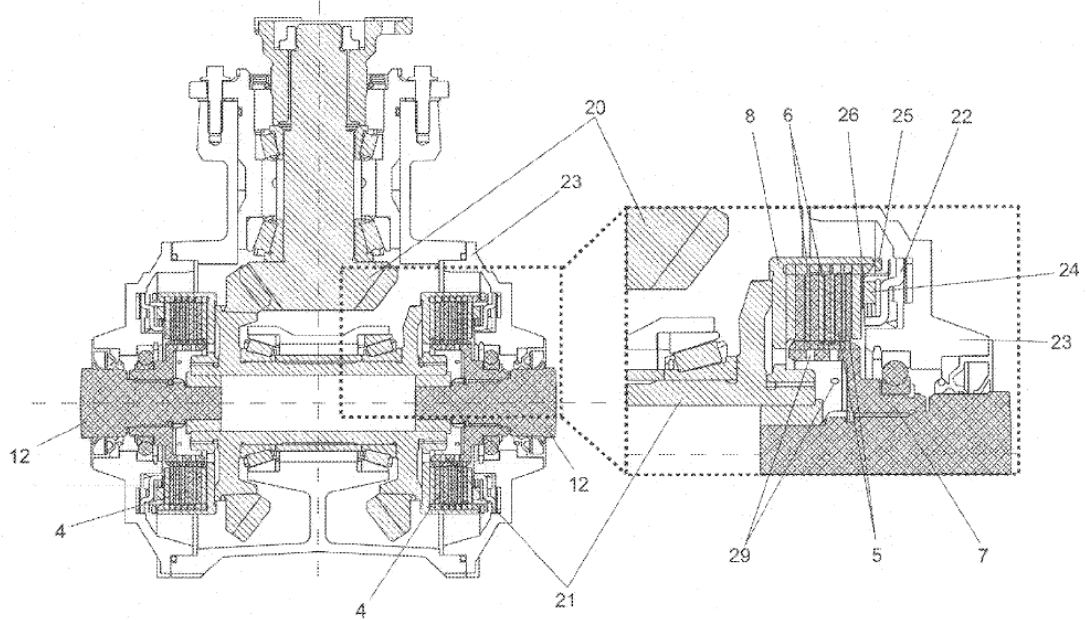


FIG. 5

“[Figure] 3 illustrates a drive train with permanently driven primary axle and connectable secondary axle, the section of the secondary drive train of which located between side shaft couplings and switch-on device is shut down.” Ex. 1001, 5:5–8. “[Figure] 4 illustrates a switch-on device of [Figure] 3 in detail” and “[Figure] 5 illustrates a secondary axle drive without differential of [Figure] 3 with loosened side shaft couplings in detail.” *Id.* at 5:9–11. Details of the invention are best understood by way of an explanation of how the drive train and associated components work.

Figure 3 depicts primary axle 1 and secondary axle 2, where primary axle 1 is permanently driven and secondary axle 2 is connectable, such that the vehicle may be switched between two-wheel drive (driving primary axle 1 only) and four-wheel drive (driving both primary axle 1 and secondary axle 2) modes. Ex. 1001, 6:34–35. Secondary axle 2 is uncoupled from primary axle 1 by opening side shaft couplings 4 and switch-on device 3. *Id.* at 6:49–52. Side shaft couplings 4, which are frictionally engaged, transmit the secondary drive output to side shafts 12 of secondary axle 2. *Id.* at 6:40–42. As depicted in the embodiment of Figure 3, when side shaft couplings 4 and switch-on device 3 are open, the secondary drive train between these components is inoperative. *Id.* at 6:35–37; *see also* Fig. 3 (depicting shutdown section as shaded region).

Primary axle 1 drives drive basket 17, which in turn drives connecting shaft 15. Ex. 1001, 7:6–11; *see also id.* Fig. 4 (depicting primary axle 1 and switch-on device 3). When synchronizing 16 engages spur gear step 14 (when switch-on device 3 is closed), power is transmitted through transverse shaft 18 to pinion shaft 19 and intermediate shaft 11, which directs power to secondary axle 2. *Id.* at 7:7–21. To synchronize spur gear step 14 and

connecting shaft 15 when switching to four-wheel drive mode from two-wheel drive mode, side shaft couplings 4 are closed to bring intermediate shaft 11 and spur gear step 14 to speed (that is, by being driven by the wheels of secondary axle 2) prior to engaging spur gear step 14 with connecting shaft 15. *Id.* at 7:28–32.

Intermediate shaft 11 drives drive sprocket 20 which drives a crown wheel with crown wheel carrier shaft 21. Ex. 1001, 7:50–53. Outer plate carrier 8 of each side shaft coupling 4 connects to crown wheel carrier shaft 21. *Id.* at 7:55–57. A clutch pack including outer plates 6 and inner plates 5 is positioned between outer plate carrier 8 and inner plate carrier 7. *Id.* at 7:57–59. When side shaft couplings 4 are closed (compressing the clutch pack), each inner plate carrier 7 connects inner plates 5 to each side shaft 12 to deliver drive power to the wheels. *Id.* at 7:59–61.

The secondary drive train detailed in the embodiment of Figure 5 has no differential—instead, the two side shaft couplings provide the functionality that a differential would provide. Ex. 1001, 6:42–47. Figure 5 depicts the secondary drive train in two-wheel-drive mode. *Id.* at 7:47–48. The singly-hatched components depicted in Figure 5 are inoperative and the cross-hatched components rotate in this mode. *Id.* at 8:15–21.

C. Illustrative Claims

Claim 1 of the challenged claims of the '440 patent is the sole independent claim and is reproduced below.

1. A drive train of a vehicle, comprising a primary drive train and a secondary drive train, further comprising:
a primary axle which is permanently driven via the primary drive train; and
a secondary axle as part of the secondary drive train;
wherein the secondary axle is connectable to the primary axle via a switch-on mechanism of a switch-on device in order to allow the integration of the secondary drive train into the drive train so that the overall drive train power is transferred over both the primary axle and the secondary axle, and
wherein when the secondary axle is connected to the primary axle, the secondary drive train power is conveyed via at least one side shaft couplings into side shafts of the secondary axle and is transmitted to wheels of the secondary axle the secondary drive train having a shutdown section located between the switch-on device and the at least one side shaft coupling,
whereby: the switch-on mechanism and/or the side shaft couplings comprise at least one frictionally engaged coupling and when the secondary axle is disconnected from the primary axle in order to transfer the overall drive train power via the primary axle only, the shutdown section of the secondary drive train is decoupled from both the primary axle of the primary drive train and the wheels of the secondary axle.

Ex. 1001, 12:11–36.

D. The Prior Art

JTEKT's asserted grounds of unpatentability for the challenged claims of the '440 patent rely on the following references:

Teraoka	JP 2002–370557 A	Dec. 24, 2002	Ex. 1002 ²
Watanabe	JP H2–57725 A	Feb. 27, 1990	Ex. 1003 ³
Burrows	GB 2,407,804 A	May 11, 2005	Ex. 1004

² Exhibit 1002 provides a certified English translation of Teraoka.

³ Exhibit 1003 provides a certified English translation of Watanabe.

E. Asserted Grounds of Unpatentability

JTEKT asserts the follow grounds of unpatentability for the challenged claims of the '440 patent.

References	Basis	Claims Challenged
Teraoka	35 U.S.C. § 102(b)	1, 4, and 5
Teraoka and Watanabe	35 U.S.C. § 103(a)	2 and 3
Teraoka and Burrows	35 U.S.C. § 103(a)	6 and 7

II. ANALYSIS

A. Claim Construction

In an *inter partes* review, claim terms in an unexpired patent are given their broadest reasonable construction in light of the specification of the patent in which they appear. 37 C.F.R. § 42.100(b); *see also In re Cuozzo Speed Techs., LLC*, 793 F.3d 1268, 1278 (Fed. Cir. 2015) (“We conclude that Congress implicitly approved the broadest reasonable interpretation standard in enacting the AIA.”), *cert. granted sub nom. Cuozzo Speed Techs. LLC v. Lee*, 136 S. Ct. 890 (mem.) (2016). Under the broadest reasonable construction standard, claim terms are given their ordinary and customary meaning, as would be understood by one of ordinary skill in the art in the context of the entire disclosure. *In re Translogic Tech., Inc.*, 504 F.3d 1249, 1257 (Fed. Cir. 2007). Also, we are careful not to read a particular embodiment appearing in the written description into the claim if the claim language is broader than the embodiment. *See In re Van Geuns*, 988 F.2d 1181, 1184 (Fed. Cir. 1993) (“[L]imitations are not to be read into the claims from the specification.”) (citation omitted).

1. “*shutdown section*”

Independent claim 1 recites “the secondary drive train having a shutdown section located between the switch-on device and the at least one side shaft coupling.” Ex. 1001, 12:26–28. The claim further recites “when the secondary axle is disconnected from the primary axle . . . , the shutdown section of the secondary drive train is decoupled from both the primary axle of the primary drive train and the wheels of the secondary axle.” JTEKT contends that “‘**shutdown section**’ should be construed as any portion of a secondary drive train which can be decoupled from both the primary axle and the wheels of the secondary axle.” Pet. 12 (referencing Ex. 1005 ¶¶ 33–35). JTEKT’s expert, Mr. Becker, declares that the proffered construction is as a person of ordinary skill in the art would have understood the term “shutdown section” in light of the Specification of the ’440 patent and its prosecution history. Ex. 1005 ¶¶ 33–35 (referencing Ex. 1001, 6:34–56; Ex. 1006, 9–13).

GKN contends that JTEKT’s construction allowing the shutdown section to be *any portion* of the secondary drive train is improper. Prelim. Resp. 20–22. GKN argues that “[t]here is no support in the ’440 Patent for Petitioner’s proposed construction that any arbitrary location be considered a *shutdown section*.” *Id.* at 22. Indeed, GKN asserts that the term “shutdown section” requires no construction. *Id.* at 20.

GKN explains that the plain meaning of the term, as reflected in the express claim language of claim 1 and Specification, limits the shutdown section to a section of the secondary drive train located between the switch-on device and the side shaft coupling. Prelim. Resp. 20–22. We agree with

GKN that the express language of claim 1 limits the recited shutdown section location to between the switch-on device and side shaft coupling.

To be clear, we determine that claim 1 does not preclude other components of the secondary drive train that are not located between the switch-on device and side shaft coupling from being uncoupled from the primary axle and secondary drive wheels when the secondary axle is disconnected from the primary axle. Further, to the extent that GKN asserts that *all* components of the secondary drive train that are located between the switch-on device and side shaft coupling must be uncoupled from the primary axle and secondary drive wheels and, thus, form the “shutdown section,” we determine that we do not need to reach that question at this time, as will be evident from our analysis below. *See Vivid Techs., Inc. v. Am. Sci. & Eng’g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999) (construing *explicitly* only those claim terms in controversy and only to the extent necessary to resolve the controversy). Accordingly, we determine, based on the record before us, that the term “shutdown section” means the portion of a secondary drive train that is decoupled from both the primary axle and the wheels of the secondary axle located between the switch-on device and side shaft coupling.

2. “*side shaft coupling*”

GKN contends that the term “side shaft coupling” “requires no special construction,” but instead should be construed in accordance with the term’s plain meaning. Prelim. Resp. 22. GKN asserts that this plain meaning is “the connecting device that conveys power from the secondary drive train into side shafts of the secondary axle.” *Id.* at 22–23.

JTEKT does not offer a construction for the term side shaft coupling. GKN contends that JTEKT's application of the prior art to the claim limitation reciting the term reads the words "side shaft" out of the term. Prelim. Resp. 22. To the extent that GKN's construction requires a side shaft coupling to couple to, or contact with, a side shaft, we agree. *See Merck & Co. v. Teva Pharm. USA, Inc.*, 395 F.3d 1364, 1372 (Fed. Cir. 2005) ("A claim construction that gives meaning to all the terms of the claim is preferred over one that does not do so."). For the purposes of this Decision, we adopt GKN's construction.

3. "*switch-on device*" and "*switch-on mechanism*"

JTEKT provides constructions for the terms "switch-on device" and "switch-on mechanism," both of which are recited in claim 1. We determine that we need not construe these terms explicitly in reaching our Decision and, accordingly, we provide the terms their plain and ordinary meaning as understood by a person of ordinary skill in the art in light of the '440 patent's Specification. *See Vivid Techs., Inc.*, 200 F.3d at 803.

B. Asserted Grounds of Unpatentability

JTEKT proposes three grounds of unpatentability for claims 1–7 of the '440 patent: 1) claims 1, 4, and 5 are unpatentable under 35 U.S.C. § 102(b) as anticipated by Teraoka; 2) claims 2 and 3 are unpatentable under 35 U.S.C. § 103(a) over Teraoka and Watanabe; and 3) claims 6 and 7 are unpatentable under 35 U.S.C. § 103(a) over Teraoka and Burrows. JTEKT presents a limitation-by-limitation analysis of the identified claims against the identified references, an analysis supported by Mr. Becker's declaration. *See* Pet. 13–25; Ex. 1005. GKN's Preliminary Response presents detailed

arguments countering positions taken in the Petition. *See* Prelim. Resp. 24–48.

We recognize that GKN has not yet had an opportunity to offer countervailing testimony to Mr. Becker’s testimony. Our findings and determinations are based on the limited record before us at this stage of the proceedings.

1. Claims 1, 4, and 5—Anticipation by Teraoka

a. Overview of Teraoka

Teraoka, titled “Four-Wheel Drive System,” “relates to a four-wheel drive system in which either the front or the rear wheels are disengaged when in two-wheel drive.” Ex. 1002 ¶ 1.

Figures 1 and 2 of Teraoka, reproduced below, illustrate an embodiment of its invention.

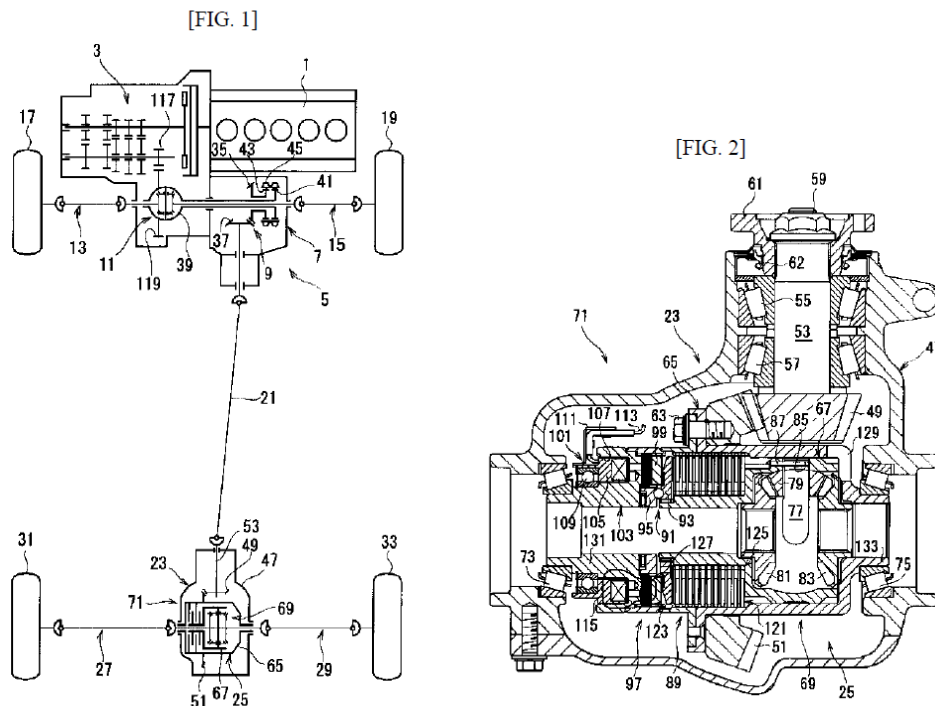


Figure 1 provides a schematic of the drive train of the embodiment, and Figure 2 provides a cross section of a section of the drive train for that embodiment. Ex. 1002, Brief Description of Drawings. Referring to Figure 1, engine 1 drives the primary drive train, which includes front axles 13, 15 and front wheels 17, 19. *Id.* at ¶ 40. Transfer case 5, which includes two-four switching mechanism 7 (a dog clutch) and direction changing gear set 9, engages with the primary drive train to drive the secondary drive train in four-wheel drive mode. *Id.* at ¶¶ 40–43. The secondary drive train includes rear wheel side propeller shaft 21, final speed reduction gear set 23, rear differential 25, rear axles 27, 29, and rear wheels 31, 33. *Id.* at ¶ 40.

Figure 2 provides details of a portion of the secondary drive train. Final speed reduction gear set 23 includes drive pinion shaft 53, which is driven by propeller shaft 21 and is integrally formed with drive pinion gear 49, which meshes with ring gear 51. Ex. 1002 ¶¶ 45–47. Engine driving force is transmitted to outer case 65 of rear differential 25 through final speed reduction gear set 23. *Id.* at ¶ 49.

Rear differential 25 includes “outer case 65, inner case 67, bevel gear type differential mechanism 69, [and] clutch mechanism 71,” which is a wet, multi-plate clutch. Ex. 1002 ¶ 50. Differential mechanism 69 includes pinion gear 79, pinion shaft 77, and output-side side gears 81, 83, which mesh with pinion gear 79. *Id.* at ¶ 52. Left and right rear axles 27, 29 are coupled to side gears 81, 83. *Id.* at ¶ 66.

Clutch mechanism 71 engages to transmit driving force from outer case 65 to inner case 67 in four-wheel-drive mode and disengages to decouple outer case 65 from inner case 67. Ex. 1002 ¶ 66. A controller simultaneously couples two-four switching mechanism 7 and clutch

mechanism 71 for four-wheel-drive operation and simultaneously decouples two-four switching mechanism 7 and clutch mechanism 71 for two-wheel drive operation. *Id.* at ¶ 72.

b. Claim 1

JTEKT contends that Teraoka anticipates claim 1 of the '440 patent. JTEKT asserts that Teraoka discloses a primary drive train that includes engine 1, transmission 3, differential 11, and front axles 13, 15 (the recited primary axle) and a secondary rear drive train that includes final gear set 23, rear differential 25, and rear axles 27, 29 (the recited secondary axle). Pet. 15. JTEKT further identifies transfer case 5 as the recited switch-on device and two-four switching mechanism 7 as the recited switch-on mechanism. *Id.* GKN does not dispute JTEKT's characterization of Teraoka with respect to these elements at this time. *See* Prelim. Resp. 24–30.

JTEKT contends that clutch mechanism 71 corresponds to the recited at least one side shaft coupling. Pet. 16. GKN disputes this contention. Prelim. Resp. 25–26. Specifically, GKN argues that, under a proper construction of the term “side shaft coupling,” clutch mechanism 71 does not satisfy the side shaft coupling limitation. *Id.* GKN explains that Teraoka's rear differential, and not clutch mechanism 71, connects and conveys power to the rear axle side shafts 27, 29. *Id.* As such, GKN contends that Teraoka fails to disclose the recited side shaft coupling. *Id.*

Although we are persuaded by GKN that JTEKT has not explained adequately how clutch mechanism 71 by itself corresponds to the recited side shaft coupling, we do not agree that Teraoka fails to disclose this claim element. We find, based on our review of the current record, including the Petition and Teraoka, that differential 25 corresponds to the recited side

shaft coupling. *See, e.g.*, Ex. 1002 ¶ 50 (defining rear differential 25 as including “outer case 65, inner case 67, bevel gear type differential mechanism 69, [and] clutch mechanism 71”); ¶ 52 (defining differential mechanism 69 as including pinion gear 79, pinion shaft 77, and output-side side gears 81, 83).⁴ Differential 25 is a connecting device (connecting final speed reduction gear set 23 with rear axle side shafts 27, 29 at side gears 81, 83) that conveys power from the secondary drive train into rear axles 27, 29, as claim 1 requires. *See* Pet. 16; *see also id.* at 15 (noting that power is “transmitted via clutch mechanism 71 to rear differential 25 and is further distributed through pinion shaft 77 and pinion gear 79 to side gears 81, 83 and is transmitted via rear axles 27, 29 to left and right rear wheels 31, 33.”) (quoting Ex. 1002 ¶ 74). Further, differential 25 comprises at least one frictionally engaged coupling—clutch mechanism 71—which decouples the secondary drive train wheels from a portion of the secondary drive train.⁵ *See id.* at 17.

Claim 1 further requires the secondary drive train to “hav[e] a shutdown section located between the switch-on device and the at least one side shaft coupling” and further requires that “when the secondary axle is

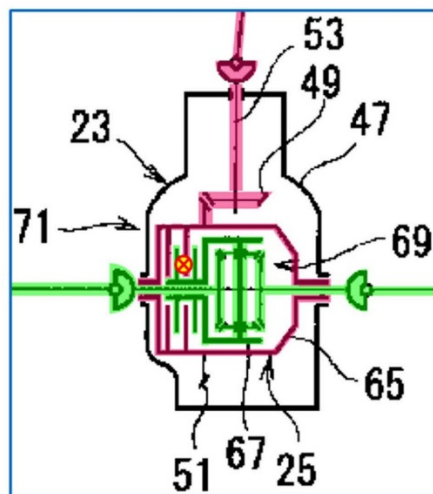
⁴ GKN also recognizes that the rear differential is a side shaft coupling. *See* Prelim. Resp. 27.

⁵ The language of claim 1 requiring “the [at least one] side shaft couplings [to] *comprise* at least one frictionally engaged coupling” encompasses a side shaft coupling that includes components in addition to a frictionally-engaged coupling. *Promega Corp. v. Life Techs. Corp.*, 773 F.3d 1338, 1350 (Fed. Cir. 2014) (determining that the use of “comprising” in a claim element expands the scope of the claim limitation beyond what is recited).

disconnected from the primary axle . . . , the shutdown section of the secondary drive train is decoupled from both the primary axle of the primary drive train and the wheels of the secondary axle.” Ex. 1001, 12:26–36.

JTEKT contends that Teraoka discloses the recited shutdown section. Pet. 14, 17. JTEKT explains that Teraoka’s secondary drive train spanning from two-four switching mechanism 7 to outer case 65 stops rotating when switching mechanism 7 and clutch mechanism 71 are decoupled. *Id.* at 17; *see also* Ex. 1002 ¶ 76 (“[D]ue to uncoupling of the two-four switching mechanism 7, rotation of the power transmission system . . . stops from the two-four switching mechanism 7 to outer case 65 . . . and to the outer plates 121, 123 of the main clutch 89 and pilot clutch 97 [of clutch mechanism 71].”).

GKN contends that Teraoka fails to disclose the recited shutdown section. Prelim. Resp. 26–29. As GKN explains, components of Teraoka’s rear differential continue to rotate when the drive train is in two-wheel drive mode. The annotated color image reproduced below is taken from GKN’s Preliminary Response. *See* Prelim. Resp. 28.



The image depicts an excerpt from Teraoka's Figure 1 and illustrates, through color, components of the secondary drive train that continue to move in two-wheel-drive mode (green) and components that stop (pink). Prelim. Resp. 27–28. The annotated image also indicates the “torque de-coupling location” with a red “X” within a circle (⊗). *Id.* GKN apparently argues that, because components of Teraoka's secondary drive train located between the rear axle side shafts and the “torque de-coupling location,” continue to rotate, Teraoka fails to disclose the shutdown section of claim 1. This argument appears to be predicated on the requirement that the entirety of the secondary drive train spanning between the side shafts of the secondary axle and the switch-on mechanism be decoupled from the primary axle and wheels of the secondary axle in two-wheel-drive mode. *See id.*

We are persuaded, based on the current record, that Teraoka discloses the recited shutdown section. Even if GKN's interpretation of claim 1 requiring the shutdown section to include all of the components of the secondary drive train located between the side shaft coupling and switch-on device is correct, Teraoka discloses such a shutdown section. As seen in GKN's annotated excerpt of Teraoka's Figure 1, all of the secondary drive train components between differential 25 (the side shaft coupling) leading to transfer case 5 (drive pinion gear 49 and pinion shaft 53) are stopped (colored in pink). The only components that continue to rotate are the rear axle side shafts and certain gears and plates *within* differential 25. GKN's argument attempts to limit claim 1 by requiring the secondary drive train to include a “torque de-coupling location” at the secondary axle side shaft. Claim 1, however, does not recite a “torque de-coupling location”—it recites a side shaft coupling.

GKN further argues that the configuration depicted in the embodiment of Figure 12 of the '440 patent maximizes the shutdown section and, thus, minimizes rotational losses in two-wheel-drive mode in contrast to the embodiment of Teraoka's Figure 1. Prelim. Resp. 27–28. GKN explains that it is well known that a differential contributes a major part of drag losses in an all-wheel-drive vehicle and this loss is why “the '440 Patent claims require that the clutch or coupling” be located at the side shaft. *Id.* at 28–29. This argument fails to demonstrate a deficiency in the position that Teraoka discloses the recited shutdown section, as this argument is not commensurate with the scope of claim 1. Claim 1 does not require the shutdown section to be maximized or a clutch be located at the axle side shaft. Further, claim 1 does not preclude a differential in the secondary drive train, as the claim scope encompasses a drive train with only one side shaft coupling. *Cf.* Ex. 1001 Fig. 16 (depicting a secondary drive train with secondary axle differential 35 and single side shaft coupling 4); *id.* at 12:37–48 (providing dependent claims 2 and 3, which expressly require no differential).

GKN further contends that Teraoka's side shaft coupling and shutdown section are not “arranged as in claim 1,” and, as such, Teraoka cannot anticipate claim 1. Prelim. Resp. 29. This argument reframes the previous contentions—that Teraoka fails to disclose a shutdown section located between the switch-on device and the at least one side shaft coupling. As discussed above, this argument does not demonstrate deficiency in the position that Teraoka anticipates claim 1.

On the record before us, we are persuaded that JTEKT has shown a reasonable likelihood of prevailing in its assertion that claim 1 is anticipated by Teraoka.

c. Claims 4 and 5

Claim 4 depends from claim 1 and further recites “wherein the switch-on device comprises a positively working power transmission gearing having an angular gear working via cogged wheels.” Ex. 1001, 12:49–51. Claim 5 depends from claim 4 and further recites “wherein the switch-on device is arranged on the primary axle and the secondary drive train output is, when the secondary drive train is connected to the primary axle, engaged to the primary drive train by the switch-on mechanism.” *Id.* at 12:52–56. JTEKT contends that Teraoka anticipates both claims 4 and 5. Pet. 14.

JTEKT contends that changing gear set 9, which is part of transfer case 5 (the asserted switch-on device), corresponds to the “positively working power transmission gearing” of claim 4. Pet. 18; *see also* Ex. 1002 ¶ 41 (“The direction changing gear set 9 forms parts of the rear wheel side power transmission system and consists of intermeshing transverse and longitudinal bevel gears 35, 37, whereby the transmitted driving force of the engine is converted in direction . . . and transmitted toward the rear wheels.”). JTEKT contends that Teraoka’s transfer case 5 is arranged on Teraoka’s front axle—the primary axle—and, when two-four switching mechanism 7 (the asserted switch-on mechanism) is engaged, the secondary drive train is engaged to the primary drive train, as required by claim 5. Pet. 18. GKN does not dispute these contentions. *See* Prelim. Resp. 24–30 (limiting preliminary response to arguments associated with claim 1). After review of the record before us, we are persuaded that JTEKT has shown a reasonable likelihood of prevailing in its assertion that claims 4 and 5 are anticipated by Teraoka.

2. Claims 2 and 3—Obviousness over Teraoka and Watanabe

a. Overview of Watanabe

Watanabe discloses a vehicle power transmission device. Ex. 1003, 2, left col. (providing “Industrial Field of Use”).⁶ Watanabe’s Figure 3 is reproduced below.

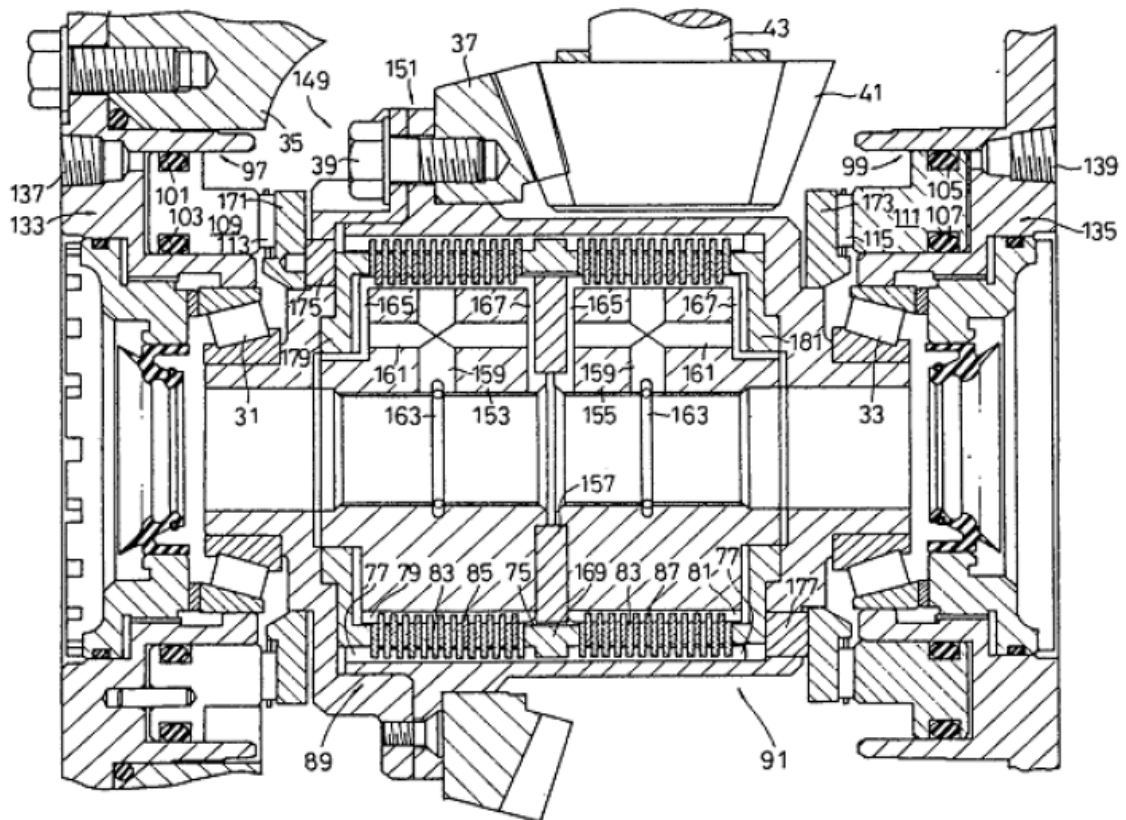


FIG 3

Figure 3 “is a cross-sectional view of a second embodiment” of the disclosed transmission device. Ex. 1003, 6, left col. Figure 3 depicts rear differential 149, which includes multi plate clutches 89, 91. “When the multiple plate clutches 89 and 91 are tightened, the rear wheels 25 and 27

⁶ Pagination for Ex. 1003 is to the exhibit page number supplied by JTEKT.

are driven and the vehicle enters 4WD mode.” *Id.* at 4, left col. Also, “[b]ecause the drive power is dispersed to all four wheels, the drive power distribution per wheel falls, reducing the likelihood of slipping as the gripping force is spread out. Accordingly, straight-line motion of the vehicle and driving stability are improved.” *Id.*

Watanabe further discloses that, “by increasing or decreasing the tightening force individually for the multiple plate clutches 89 and 91, the distribution ratio of the drive power between the right and left rear wheels 25 and 27 can be adjusted and the differential rotation can be controlled.” Ex. 1003, 4, right col. That is, the two multi-plate clutches replace the function of a traditional differential. Also, Watanabe discloses adjusting the drive power distribution ratio between wheels to improve steering characteristics. *See* Ex. 1003 4, right col.–5, left. col.

b. Claims 2 and 3

Claim 2 depends from claim 1 and further requires

having a side shaft coupling for each side shaft of the secondary axle and wherein when the secondary axle is connected to the primary axle, the side shaft couplings allow a driving power distribution without a differential gearing between the drive wheels of the secondary axle to ensure transverse compensation.

Ex. 1001, 12:37–42. Similarly, claim 3, which also depends from claim 1, further requires “having a side shaft coupling for each side shaft of the secondary axle and wherein when the secondary axle is connected to the primary axle, the side shaft couplings allow a drive power distribution without differential gearing between the primary axle and the secondary axle, to ensure longitudinal compensation.” *Id.* at 12:43–48.

JTEKT contends that Watanabe discloses the subject matter of claims 2 and 3. Pet. 19–21. Specifically, JTEKT contends that modifying Teraoka

to replace its differential 25, including clutch mechanism 71, with Watanabe's clutches 89, 91 arrives at the subject matter of claims 2 and 3. *Id.* JTEKT explains that "the multiple plate clutches 89 and 91 allow power distribution without differential gearing between the drive wheels." *Id.* at 20. JTEKT further explains that Watanabe discloses that its clutches 89, 91 ensure transverse and longitudinal compensation, as recited in claims 2 and 3. *Id.* at 20–21.

JTEKT contends that one of ordinary skill in the art would have had reason to modify Teraoka with Watanabe's clutches 89, 91 "as doing so would achieve the well-known goals of eliminating the relatively heavy bevel gear differential, therefore reducing the weight and fuel consumption of the vehicle." Pet. 19 (supporting this reasoning with Mr. Becker's Declaration, Ex. 1005 ¶ 45). JTEKT asserts that the proposed modification represents a simple substitution of well-known alternative components, with the substitution yielding the predictable result of reducing the mass of the secondary drive train and rotational losses when the secondary drive train is decoupled from the primary drive train. *Id.*; *see also* Ex. 1005 ¶ 46.

GKN first argues that Teraoka fails to disclose the elements of claim 1 and JTEKT fails to explain how Watanabe remedies this deficiency. Prelim. Resp. 32. As discussed above in connection with our analysis of claim 1 against Teraoka, we do not find JTEKT's position that Teraoka anticipates claim 1 deficient at this time.

GKN next contends that JTEKT fails to adequately support its reasoning for modifying Teraoka with the teachings of Watanabe. Prelim. Resp. 33–34. GKN asserts that JTEKT's only support is Mr. Becker's declaration, which "provides an almost verbatim, conclusory explanation"

for modifying Teraoka with Watanabe. *Id.* at 34. GKN urges that we routinely deny obviousness grounds that “rel[y] on conclusory, boilerplate language without much in the way of details,” as GKN characterizes JTEKT’s position. *Id.*

We recognize that “rejections on obviousness grounds cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness.” *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 418 (2007) (citing *In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006)). GKN’s argument fails to persuade us that JTEKT’s reasoning lacks the requisite rational underpinning, based on the current record before us. JTEKT relies on the declaration of an industry expert to support its reasoning, which includes a specific factual basis for modifying Teraoka with the teachings of Watanabe—eliminating the weight of a rear differential.

GKN next argues that JTEKT fails to provide any basis for why one of ordinary skill in the art would have looked to Watanabe to solve the problems addressed by the ’440 patent. Prelim. Resp. 35. GKN asserts that Watanabe is not concerned with power loss and torque drag. *Id.* This argument fails to persuade us of a deficiency in JTEKT’s reasoning as well. “One of ordinary skill in the art need not see the identical problem addressed in a prior art reference to be motivated to apply its teachings.” *Cross Med. Prods., Inc. v. Medtronic Sofamor Danek, Inc.*, 424 F.3d 1293, 1323 (Fed. Cir. 2005). JTEKT’s obvious analysis turns on substituting one known secondary drive train configuration that uses a differential with another known configuration, which replaces the differential with two multi-disk clutches. JTEKT further reasons that substituting Watanabe’s two multi-

disk clutches for Teraoka's differential 25 would yield a predictable result. The fact that Watanabe solves the problem of keeping these multi-disk clutches lubricated is inapposite. *See KSR*, 550 U.S. at 416 ("The combination of familiar elements according to known methods is likely to be obvious when it does no more than yield predictable results.").

GKN also argues that JTEKT fails to substantiate its position that eliminating the weight associated with a differential is a "well-known goal." Prelim. Resp. 36 (referencing MPEP § 2144.03(A)). GKN's reliance on the Manual of Patent Examining Procedure is misplaced, as it applies to patent application examination. Here, in this *inter partes* review, JTEKT relies on statements provided by its expert, Mr. Becker, in supporting its obviousness position.

GKN also argues that "it is unclear whether" replacing Teraoka's differential 25, including clutch mechanism 71, with two of Watanabe's multi-plate clutches would achieve the desired weight savings. Prelim. Resp. 36. Again, JTEKT relies on its industry expert in supporting its reasoning to modify Teraoka with the teachings of Watanabe, including that the modification would achieve a weight savings. *See Pet. 19*.

On the current record, we determine that JTEKT has shown a reasonable likelihood of prevailing in its assertion that claims 2 and 3 are obvious over Teraoka and Watanabe.

Further, we determine that JTEKT's proposed modification of Teraoka by Watanabe as to claims 2 and 3 also renders obvious claim 1. Teraoka, as modified, includes two side-shaft couplings (Watanabe's multi-plate clutches 89, 91), which replace Teraoka's rear differential 25, including clutch mechanism 71. In operation when these two side shaft

couplings are disengaged, along with 2-4 switching mechanism 7, a shutdown section of the secondary drive train spans from the side shaft couplings to 2-4 switching mechanism 7. Our obviousness analysis of claim 1 further relies on JTEKT's reasoning for modifying Teraoka with the teachings of Watanabe.

Accordingly, on the current record, we further determine that information in the Petition shows that there is a reasonable likelihood that claim 1 is obvious over Teraoka and Watanabe.

3. Claims 6 and 7—Obviousness over Teraoka and Burrows

a. Overview of Burrows

Burrows discloses a four-wheel drive system that switches between two-wheel-drive mode and four-wheel-drive mode while the vehicle is moving and also seeks to minimize acceleration forces during the switching. Ex. 1004, 1:23–2:2. Burrows's Figure 2 is reproduced below:

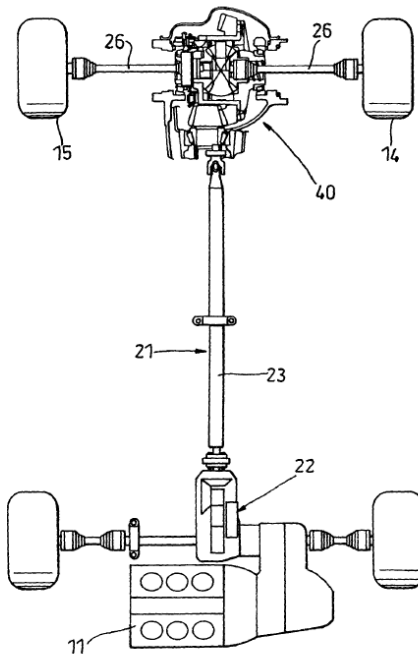


Fig. 2

Figure 2 illustrates “a schematic drawing of the driveline of a second example.” Ex. 1004, 4:12. Power Take-off clutch 22 is connected to main drive shaft 23 and couples the driving force of engine 11 to auxiliary driveline 21. *Id.* at 4:14–5:2. Auxiliary driveline 21 transmits power to rear wheels 14, 15 through main drive shaft 23 and free running differential 40. *Id.* at 7:23–25. “[D]ifferential 40 may include a dog clutch or a one-way (e.g. roller sprag type) clutch.” *Id.* at 8:2–3.

Burrows discloses three methods for transitioning between two-wheel-drive mode and four-wheel-drive mode. *See* Prelim. Resp. 39. In the method associated with Figure 2, Burrows discloses “caus[ing] the clutch 22 to spin-up the auxiliary driveline 21 to the best estimated [synchronization] speed for connection to the rear wheels 14, 15. The clutch 22 would then disengage quickly whilst simultaneously the [synchronizer] device would smoothly engage the dog clutch. The clutch 22 then re-engages quickly.” Ex. 1004, 8:7–11.

b. Claims 6 and 7

Claim 6 depends from claim 4 and further recites “wherein a speed synchronization in the switch-on mechanism of the power transmission gearbox for the establishment of a positive lock is supported by the at least one side shaft couplings.” Ex. 1001, 12:57–60. Claim 7 depends from claim 6 and further recites:

wherein the at least one side shaft couplings is formed by a frictionally engaged multiple disc clutch, whereby the friction plates connected in a torque-proof way to the secondary drive wheels cooperate as inner plates with an inner plate carrier and whereby the friction plates located on the drive train-side of the vehicle cooperate with an outer plate carrier as outer plates.

Id. at 12:61–67.

JTEKT acknowledges that Teraoka does not mention synchronization. Pet. 22. JTEKT contends that “[i]t would have been obvious to provide rear axle speed synchronization in light of the structure disclosed by Teraoka as 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.” *Id.* at 22–23 (referencing Mr. Becker’s declaration, Ex. 1005 ¶ 49). JTEKT asserts that “[o]ne such way to provide speed synchronization is by use of a friction clutch which allows a speed transition by slipping the clutch.” *Id.* at 23.

JTEKT further contends that Burrows discloses a technique for using a multi-plate wet clutch in conjunction with a dog clutch for speed synchronization and specifically the technique associated with Burrows’s Figure 2. *See* Pet. 23; *id.* at 24 (quoting Burrows’s synchronization method for the embodiment of Figure 2). JTEKT explains that Teraoka discloses a secondary drive system with two-four switching mechanism 7 and clutch mechanism 71 including multi-plate wet clutch 89. *Id.*; *see also* Ex. 1002 ¶ 40 (identifying two-four switching mechanism 7 as a dog clutch). JTEKT concludes that “[i]t 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.” Pet. 23. JTEKT further contends that employing Burrows’s technique with Teraoka’s system represents the application of a known technique to improve a similar device in the same way it improves Burrows’s drive train. *Id.*; *see also* KSR, 550 U.S. at 417 (“[I]f a technique has been used to improve one device, and a person of ordinary skill in the art would recognize that it would improve

similar devices in the same way, using the technique is obvious unless its actual application is beyond his or her skill.”).

GKN initially contends that Teraoka fails to disclose the elements of claim 1 and JTEKT fails to explain how Burrows remedies this deficiency. Prelim. Resp. 42. As discussed above in connection with our analysis of claim 1 against Teraoka, we do not find JTEKT’s position that Teraoka anticipates claim 1 deficient at this time.

Next, GKN contends that JTEKT fails to provide an adequate basis for combining Teraoka and Burrows. Prelim. Resp. 42. Specifically, GKN argues that JTEKT “fails to advance any reasonable basis for why a [person of ordinary skill in the art] would have looked to Burrows to solve the problems identified in the ‘440 Patent.” This argument does not persuade us of a deficiency in JTEKT’s reasoning, as an obviousness inquiry does not require an artisan of ordinary skill to seek a solution to the same problem in the prior art as addressed in the claimed invention. *See Cross Med. Prods, Inc.*, 424 F.3d at 1323 (“One of ordinary skill in the art need not see the identical problem addressed in a prior art reference to be motivated to apply its teachings.”).

Next, GKN contends that JTEKT fails to explain why one of ordinary skill in the art would look to Burrows, a patent regarding all-terrain vehicles (ATVs), in addressing speed synchronization, when the problem solved by the ‘440 patent is directed to conventional four-wheel drive systems. Prelim. Resp. 43. To the extent that GKN argues that Burrows is not analogous art, this argument does not persuade us of a deficiency in JTEKT’s obviousness combination at this time. To qualify as analogous art for § 103 purposes, a reference “must satisfy one of the following conditions: (1) the reference

must be from the same field of endeavor; or (2) the reference must be reasonably pertinent to the particular problem with which the inventor is involved.” *K-TEC, Inc. v. Vita-Mix Corp.*, 696 F.3d 1364, 1375 (Fed. Cir. 2012) (citation omitted). Burrows is at least in the same field of endeavor—four-wheel-drive drivelines—as Teraoka and the ’440 patent. *See, e.g.*, Ex. 1004, 1:1–3 (providing that the “invention relates to drivelines for motor vehicles” having “selective two wheel drive or four wheel drive,” with an ATV being an exemplary vehicle).

GKN further argues that JTEKT and its expert, Mr. Becker, fail to support the reasoning that it was well known at the time of the invention of claims 6 and 7 that a dog clutch requires speed synchronization. Prelim. Resp. 44. JTEKT supports its underlying reasoning in its obviousness position with statements provided by Mr. Becker and, based on the current record, GKN’s argument fails to persuade us of a deficiency in that reasoning.

GKN also argues that JTEKT fails to identify which of the three methods identified in Burrows for speed synchronization would be used to modify the operation of Teraoka. Prelim. Resp. 45. This argument is misplaced. JTEKT quotes the method associated with the embodiment of Burrows’s Figure 2 in presenting how the combination of Teraoka and Burrows renders claims 6 and 7 obvious. *See* Pet. 24 (quoting Ex. 1004, 8:7–11).

GKN next argues that JTEKT’s proposed modification would change the principle of operation of Teraoka, such that the combination cannot render the claims obvious. Prelim. Resp. 47. GKN explains that Teraoka’s principle of operation is based on simultaneous coupling of 2-4 switching

mechanism 7 and clutch mechanism 71, and, as modified, the system would not include simultaneous coupling. *Id.* This argument does not persuade us of a deficiency in JTEKT's obviousness position at this time, as it too narrowly defines Teraoka's principle of operation. Teraoka's principle of operation allows for selective two-wheel-drive and four-wheel-drive operation while reducing drag in two-wheel-drive mode, and, as modified, would still operate under this principle. *See* Ex. 1002, Abstract.

Finally, GKN argues that the complexity and dynamics of four-wheel-drive vehicles cut against JTEKT's reasoning that employing the technique disclosed in Burrows to Teraoka's system is simply a matter of applying a known technique to a similar device. Prelim. Resp. 48. JTEKT's reasoning is supported by its industry expert, Mr. Becker, *see* Pet. 23; Ex. 1005 ¶ 51, and, based on the record before us, GKN's argument does not persuade us of a deficiency in JTEKT's reasoning.

On the current record, we determine that JTEKT has shown a reasonable likelihood of prevailing in its assertion that claims 6 and 7 are obvious over Teraoka and Burrows.

III. CONCLUSION

For the foregoing reasons, we determine that the information presented in the Petition establishes a reasonable likelihood that JTEKT would prevail in showing that claims 1–7 of the '440 patent are unpatentable. We have not made a final determination with respect to the patentability of those claims or the construction of any claim term.

IV. ORDER

After due consideration of the record before us, it is:

ORDERED that pursuant to 35 U.S.C. § 314(a), an *inter partes* review is instituted as to claims 1–7 of the '440 patent on the following grounds:

- A. Claims 1, 4, and 5 as unpatentable under 35 U.S.C. § 102(b) as anticipated by Teraoka;
- B. Claims 1, 2, and 3 as unpatentable under 35 U.S.C. § 103(a) over Teraoka and Watanabe; and
- C. Claims 6 and 7 as unpatentable under 35 U.S.C. § 103(a) over Teraoka and Burrows.

FURTHER ORDERED that no other ground of unpatentability other than those specified above is authorized for *inter partes* review; and

FURTHER ORDERED, pursuant to 35 U.S.C. § 314(c) and 37 C.F.R. § 42.4, notice is hereby given of the institution of a trial. The trial will commence on the entry date of this decision.

IPR2016-00046
Patent 8,215,440 B2

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