UNITED STATES PATENT AND TRADEMARK OFFICE

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UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE PATENT TRIAL AND APPEAL BOARD

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Ex parte DAVID CHARLES CHAUNCEY and
MICHAEL DAVID JOSEPH

_____

Appeal 2018-008024
Application 14/728,646[1]
Technology Center 3600

_____

Before LINDA E. HORNER, SUSAN L. C. MITCHELL, and
GEORGE R. HOSKINS, *Administrative Patent Judges*.

HORNER, *Administrative Patent Judge*.

DECISION ON APPEAL

STATEMENT OF THE CASE

Appellant seeks our review under 35 U.S.C. § 134(a) of the
Examiner's rejection of claims 8–11, 13–21, 28–40, and 45.[2] Final Office
Action (September 11, 2017, "Final Act."). We have jurisdiction under
35 U.S.C. § 6(b).

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[1] Vnomics Corporation ("Appellant") is the applicant as provided under
37 C.F.R. § 1.46 and the real party in interest. Appeal Brief 2 (February 9,
2018, "Appeal Br.").
[2] Claims 1–7, 12, 22–27, and 41–44 are canceled.

The Examiner rejected all of the claims as being directed to patent ineligible subject matter under 35 U.S.C. § 101 and as anticipated by the prior art. For the reasons set forth below, we agree with the Examiner that claims 8–11, 13–21, 28–35, and 45 are directed to an abstract idea and do not contain an inventive concept sufficient to transform the claimed abstract idea into a patent-eligible application. We disagree, however, with the Examiner's determination that claims 36–40 are directed to patent ineligible subject matter. Further, although we agree with the Examiner that the subject matter of claim 28 is anticipated by the prior art, we find that the Examiner failed to establish anticipation of claims 8–11, 13–21, 29–40, and 45. Therefore, we sustain no rejection for claims 36–40.

Thus, we AFFIRM-IN-PART.

CLAIMED SUBJECT MATTER

The claimed subject matter on appeal relates generally to "fuel efficiency of vehicles and to determining fuel-efficient travel routes." Specification 1 (June 2, 2015, "Spec."). Specifically, aspects of the claimed invention include: methods of and systems for determining fuel use of a vehicle for at least one segment of a route of travel; optimizing a traveling route of a vehicle between a departure and a destination based on fuel consumption; determining a fuel economy associated with a minimum amount of horsepower and torque to move a vehicle across at least one segment of a traveling route; selecting a vehicle for a particular route; and optimizing a vehicle having an engine control unit programmed with a first vehicle profile for a route of travel. *Id.* at 2–6.

Claims 8, 13, 16, 28, 29, 32, 36, and 45 are the independent claims.

Claim 8 is illustrative of the subject matter on appeal and is reproduced

below, with bracketed matter added for reference.

> 8.   A method of determining fuel use of a vehicle for
> at least one segment of a route of travel comprising:
>
> [A]   determining one or more vehicle characteristics of the
> vehicle, the vehicle characteristics including at least one of a
> vehicle profile or a vehicle load;
>
> [B]   determining one or more segment characteristics of the at
> least one segment, including at least one of a slope, government
> imposed traffic controls, volume of traffic, weather conditions,
> time of day, infrastructure condition, and real time reporting of
> route blockages;
>
> [C]   dividing the route of travel into a plurality of segments
> based on variation in one or more route of travel characteristics
> including at least one of a slope, government imposed traffic
> controls, volume of traffic, or weather conditions; and
>
> [D]   determining, with a processor, a fuel economy for the
> vehicle relating to the at least one segment, the fuel economy
> dependent upon the one or more vehicle characteristics and the
> one or more segment characteristics.

Appeal Br. 42 (Claims Appendix).

REJECTIONS

The Final Office Action includes the following rejections:

1. Claims 8–11, 13–21, 28–40, and 45 are rejected under 35 U.S.C.
   § 101 as being directed to patent ineligible subject matter.

2. Claims 8–11, 13–21, 28–40, and 45 are rejected under 35 U.S.C.
   § 102(a)(1) as anticipated by McQuade (US 2013/0245880 A1,
   published September 19, 2013).

ANALYSIS

Rejection under 35 U.S.C. § 101

Legal Principles

An invention is patent-eligible if it claims a "new and useful process, machine, manufacture, or composition of matter." 35 U.S.C. § 101. However, the Supreme Court has long interpreted 35 U.S.C. § 101 to include implicit exceptions: "[l]aws of nature, natural phenomena, and abstract ideas" are not patentable. *E.g.*, *Alice Corp. v. CLS Bank Int'l*, 573 U.S. 208, 216 (2014).

In determining whether a claim falls within an excluded category, we are guided by the Supreme Court's two-step framework, described in *Mayo* and *Alice*. *Id.* at 217–18 (citing *Mayo Collaborative Servs. v. Prometheus Labs., Inc.*, 566 U.S. 66, 75–77 (2012)). In accordance with that framework, we first determine what concept the claim is "directed to." *See Alice*, 573 U.S. at 219 ("On their face, the claims before us are drawn to the concept of intermediated settlement, *i.e.,* the use of a third party to mitigate settlement risk."); *see also Bilski v. Kappos*, 561 U.S. 593, 611 (2010) ("Claims 1 and 4 in petitioners' application explain the basic concept of hedging, or protecting against risk.").

Concepts determined to be abstract ideas, and thus patent ineligible, include certain methods of organizing human activity, such as fundamental economic practices (*Alice*, 573 U.S. at 219–20; *Bilski*, 561 U.S. at 611); mathematical formulas (*Parker v. Flook*, 437 U.S. 584, 594–95 (1978)); and mental processes (*Gottschalk v. Benson*, 409 U.S. 63, 67 (1972)). Concepts determined to be patent eligible include physical and chemical processes, such as "molding rubber products" (*Diamond v. Diehr*, 450 U.S. 175, 191

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(1981)); "tanning, dyeing, making water-proof cloth, vulcanizing India rubber, smelting ores" (*id.* at 182 n.7 (quoting *Corning v. Burden*, 56 U.S. (15 How.) 252, 267–68 (1854))); and manufacturing flour (*Benson*, 409 U.S. at 69 (citing *Cochrane v. Deener*, 94 U.S. 780, 785 (1876))).

In *Diehr*, the claim at issue recited a mathematical formula, but the Supreme Court held that "a claim drawn to subject matter otherwise statutory does not become nonstatutory simply because it uses a mathematical formula." *Diehr*, 450 U.S. at 187; *see also id.* at 191 ("We view respondents' claims as nothing more than a process for molding rubber products and not as an attempt to patent a mathematical formula."). Having said that, the Supreme Court also indicated that a claim "seeking patent protection for that formula in the abstract . . . is not accorded the protection of our patent laws, . . . and this principle cannot be circumvented by attempting to limit the use of the formula to a particular technological environment." *Id.* (citing *Benson* and *Flook*); *see, e.g.*, *id.* at 187 ("It is now commonplace that an *application* of a law of nature or mathematical formula to a known structure or process may well be deserving of patent protection.").

If the claim is "directed to" an abstract idea, we turn to the second step of the *Alice* and *Mayo* framework, where "we must examine the elements of the claim to determine whether it contains an 'inventive concept' sufficient to 'transform' the claimed abstract idea into a patent-eligible application." *Alice*, 573 U.S. at 221 (quotation marks omitted). "A claim that recites an abstract idea must include 'additional features' to ensure 'that the [claim] is more than a drafting effort designed to monopolize the [abstract idea].'" *Id.* (alterations in original) (quoting *Mayo*,

566 U.S. at 77). "[M]erely requir[ing] generic computer implementation[] fail[s] to transform that abstract idea into a patent-eligible invention." *Id.*

The PTO recently published revised guidance on the application of § 101. *See* 2019 *Revised Patent Subject Matter Eligibility Guidance*, 84 Fed. Reg. 50 (USPTO Jan. 7, 2019) ("Guidance"). Under that guidance, we first look to whether the claim recites:

> (1) any judicial exceptions, including certain groupings of abstract ideas (i.e., mathematical concepts, certain methods of organizing human activity such as a fundamental economic practice, or mental processes); and
>
> (2) additional elements that integrate the judicial exception into a practical application (*see* MPEP §§ 2106.05(a)–(c), (e)–(h) (9th ed. Rev. 08.2017, Jan. 2018)).

Only if a claim (1) recites a judicial exception and (2) does not integrate that exception into a practical application, do we then look to whether the claim:

> (3) adds a specific limitation beyond the judicial exception that are not "well-understood, routine, conventional" in the field (*see* MPEP § 2106.05(d)); or
>
> (4) simply appends well-understood, routine, conventional activities previously known to the industry, specified at a high level of generality, to the judicial exception.

See Guidance, 84 Fed. Reg. at 54–56.

Claim Grouping

With regard to step 1 (whether the claimed subject matter falls within the four statutory categories of patentable subject matter) and step 2A

(whether the claim recites a judicial exception) of the eligibility inquiry, Appellant argues claims 8–11, 13–21, 28–40, and 45 as a group. Appeal Br. 11–22. Appellant, however, separately addresses each independent claim in the step 2B analysis involving whether the claimed subject matter amounts to an "inventive concept."[3] *Id.* at 23–33. We address each independent claim below. Appellant does not present separate arguments for patentability of any of the dependent claims in rebutting the § 101 rejection. Thus, the dependent claims stand or fall with their respective independent claim. *See* 37 C.F.R. § 41.37(c)(1)(iv) (2017).

Independent Claim 8

Step One: Does Claim 8 Fall within a Statutory Category of § 101?

We first examine whether claim 8 recites one of the enumerated statutory classes of subject matter, i.e., process, machine, manufacture, or composition of matter, eligible for patenting under 35 U.S.C. § 101. Claim 8 is directed to a method, which is one of the statutory classes (i.e., a process) under 35 U.S.C. § 101.

Step 2A, Prong One: Does Claim 8 Recite a Judicial Exception?

We next look to whether the claim recites any judicial exceptions, including certain groupings of abstract ideas, i.e., mathematical concepts,

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[3] Appellant's arguments as to each independent claim are cursory at best. These arguments amount to reproduction in full of the language of each claim, a general assertion that the "claim features are not well-understood, routine, and conventional, nor has the Final Office Action set forth sufficient evidence of such" and a general assertion that each claim "present[s] a solution to a technological problem." Appeal Br. 27–33. We provide a thorough analysis of claim 8 in this decision, and briefly discuss each additional independent claim.

certain methods of organizing human activity such as a fundamental
economic practice, or mental processes.

Step A of claim 8 recites "determining one or more vehicle
characteristics of the vehicle, the vehicle characteristics including at least
one of a vehicle profile or a vehicle load." The Specification describes that
"data stored on the data storage device includes a vehicle profile." Spec. 15.
The Specification describes that "[t]he vehicle profile includes information
describing the configuration and predetermined limits of the vehicle" and
that it "may include a vehicle identifier, a vehicle type, a make, a model,
vehicle options, vehicle age, defects, maintenance history and predetermined
limitations (e.g., road speed limit)" and may also include information about
the engine and the drive train. *Id.* The Specification also describes that the
vehicle profile includes information about the vehicle load, which "refer[s]
broadly to both the laden and unladen weight of the vehicle." *Id.* The
Specification describes the method of determining fuel use of a vehicle for
segments between a departure and destination with reference to Figure 3. *Id.*
at 24. "In step 310, one or more vehicle characteristics[, such as a vehicle
profile or a vehicle load weight] of the vehicle are determined." *Id.* The
Specification describes that information regarding the vehicle profile and the
vehicle load may be acquired from the data storage device. *Id.*
Alternatively, vehicle load can be calculated. *Id.* Thus, in the computer-
implemented embodiment described in the Specification, step A is
performed by retrieving information about the vehicle stored in the data
storage device.

Step A is recited broadly and does not limit how the vehicle
characteristics are determined. We understand step A to refer to the act of

discerning information about a vehicle, such as the make or model of the vehicle. This act can be performed in the human mind through observation. Acts that can be performed in the human mind fall within the abstract idea exception subgrouping of mental processes. *See* Guidance, 84 Fed. Reg. at 52. Thus, step A recites a mental process, which is a judicial exception.

Step B recites "determining one or more segment characteristics of the at least one segment, including at least one of a slope, government imposed traffic controls, volume of traffic, weather conditions, time of day, infrastructure condition, and real time reporting of route blockages." The Specification describes that "data stored on the data storage device includes . . . a sortie profile." Spec. 15. The Specification describes that "[t]he sortie profile stores information corresponding to the sortie" and that it "may include a sortie type, a sortie description and a load description." *Id.* at 16. The Specification also describes that "the sortie profile may include information describing the condition of each segment of the sortie, including, the environment (e.g., urban, suburban, rural, long-haul, combat, enforcement, patrol, or training) along with corresponding performance thresholds" and may also include, for a given segment of the route, information regarding the slope (e.g., grade), state and/or characteristics of relevant infrastructure, government traffic controls, volume of traffic, or weather conditions. *Id.* at 21–22. With reference to Figure 3, the Specification describes, "[i]n step 320, one or more segment characteristics of the segments between a departure and a destination are determined." *Id.* at 25. The Specification describes that this information may be included in the sortie profile. *Id.* Thus, in the computer-implemented embodiment described in the Specification, step B is performed by retrieving information

about the characteristics of a segment stored in the sortie profile in the data
storage device.

Step B is recited broadly and does not limit how the segment
characteristics are determined. We understand step B to refer to the act of
discerning information about a segment of a route, such as the slope of that
segment. This act can be performed in the human mind through observation.
Acts that can be performed in the human mind fall within the abstract idea
exception subgrouping of mental processes. *See* Guidance, 84 Fed. Reg. at
52. Thus, step B recites a mental process, which is a judicial exception.

Step C recites "dividing the route of travel into a plurality of segments
based on variation in one or more route of travel characteristics including at
least one of a slope, government imposed traffic controls, volume of traffic,
or weather conditions." The Specification describes one manner of dividing
a route into segments is "by reference to route of travel characteristics (e.g.,
at least one of road intersections, slope, government imposed traffic controls,
volume of traffic, or weather conditions)." Spec. 25–26. The Specification
provides, for example, that a flat, 1 mile length of terrain may be one
segment, and a 0.1 mile stretch of terrain having a 1% grade made be
another segment. *Id.* at 26.

We understand step C to refer to the act of separating a route into two
or more segments based on a characteristic of each segment. This act can be
performed through observation in the human mind or on paper. Acts that
can be performed in the human mind fall within the abstract idea exception
subgrouping of mental processes. *See* Guidance, 84 Fed. Reg. at 52. Thus,
step C recites a mental process, which is a judicial exception.

Step D recites "determining . . . a fuel economy for the vehicle relating to the at least one segment, the fuel economy dependent upon the one or more vehicle characteristics and the one or more segment characteristics." The Specification describes, with reference to Figure 3, that "[i]n step 330, anticipated fuel use for each segment that may be traversed by the vehicle is determined." *Id.* at 25. The Specification describes that "[i]n one embodiment, the fuel use is a variable which is dependent upon both the vehicle characteristic(s) and the segment characteristic(s), which may be determined using a lookup table." *Id.* The Specification further describes that the lookup table "preferably includes a range of fuel economies which may be achieved by vehicles having certain characteristics traversing segments having certain characteristics" and that the values "may be adjusted for, e.g., load and weather characteristics." *Id.*

We understand step D to refer to the act of choosing a value from a lookup table that matches the vehicle characteristic determined in step A and the segment characteristic determined in step B. This act can be performed in the human mind through observation of a lookup table for a matching entry. Acts that can be performed in the human mind fall within the abstract idea exception subgrouping of mental processes. *See* Guidance, 84 Fed. Reg. at 52. Thus, step D recites a mental process, which is a judicial exception.

Considered as a whole, steps A through D, discussed above, under their broadest reasonable interpretation, contribute to the process of determining fuel use of a vehicle for a segment of a route and recite processes that people can perform mentally or by hand. These steps are similar to other processes that courts have determined are mental processes.

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See, *e.g.*, *CyberSource Corp. v. Retail Decisions, Inc.*, 654 F.3d 1366, 1373 (Fed. Cir. 2011) (determining that a claim whose "steps can [all] be performed in the human mind" is directed to an unpatentable mental process). This is true even though claim 8 recites that step D is performed "with a processor." *Id.* at 1370 (holding a method for verifying the validity of a credit card transaction over the Internet is an abstract idea capable of being performed in the human mind or by a human using pen and paper); *see also id.* at 1375 ("That purely mental processes can be unpatentable, even when performed by a computer, was precisely the holding of the Supreme Court in *Gottschalk v. Benson*."). "Courts have examined claims that required the use of a computer and still found that the underlying, patent-ineligible invention could be performed via pen and paper or in a person's mind." *Versata Dev. Grp., Inc. v. SAP Am., Inc.*, 793 F.3d 1306, 1335 (Fed. Cir. 2015). *See also* Guidance, 84 Fed. Reg. at 52 n.14 ("If a claim, under its broadest reasonable interpretation, covers performance in the mind but for the recitation of generic computer components, then it is still in the mental processes category unless the claim cannot practically be performed in the mind."). We therefore determine that claim 8 recites the abstract idea of mental processes, which is a judicial exception to patent-eligible subject matter.

> *Step 2A, Prong Two: Does Claim 8 Recite Additional Elements that Integrate the Judicial Exceptions into a Practical Application?*

Following our Office guidance, having found that claim 8 recites a judicial exception, we next determine whether the claim recites "additional elements that integrate the exception into a practical application" (*see* MPEP §§ 2106.05(a)–(c), (e)–(h)). *See* Guidance, 84 Fed. Reg. at 54.

Step D recites that the fuel economy for the vehicle relating to the segment is determined "with a processor." The Specification describes a controller that exchanges information with a data storage device and that includes a processor, which "may be a general-purpose processor." Spec. 13. Based on this description in Appellant's Specification, the claimed "processor" encompasses a generic processor for performing the function of determining a value by reference to a look-up table stored in memory. The processor is recited in claim 8 at a high level of generality, i.e., as a generic processor performing the recited function of determining a fuel economy for the vehicle relating to the segment.

Thus, the mental process step of claim 8 is recited as being performed with a generic component, i.e., a processor, of a computer system that does not result in an improvement in the functioning of a computer or other technology or technical field. The recitation of the generic structure with which the recited step is performed is merely instructions to use a computer system as a tool to perform the abstract idea. Thus, claim 8 does not apply, rely on, or use the mathematical algorithm or mental process steps in a manner that imposes a meaningful limit on those steps. Instead, the additional element amounts to no more than instructions to apply the judicial exception (i.e., a mental process) using generic computer elements. *See* MPEP § 2106.05(f) ("Use of a computer or other machinery in its ordinary capacity for . . . tasks (*e.g.,* to receive, store, or transmit data) or simply adding a general purpose computer or computer components after the fact to an abstract idea . . . does not provide significantly more."). Thus, the additional element does not add meaningful limits to the mental process steps recited in claim 8.

In short, the additional elements discussed above: (1) do not improve the functioning of a computer or other technology; (2) are not applied with any particular machine; (3) do not effect a transformation of a particular article to a different state; and (4) are not applied in any meaningful way beyond generally linking the use of the judicial exception to a particular technological environment. *See* MPEP §§ 2106.05(a)–(c), (e)–(h). Consequently, the claimed invention does not integrate the abstract idea into a "practical application."

Appellant contends that claim 8 is not directed to an abstract idea because it is "directed towards improving vehicular efficiency, specifically vehicle performance-improving systems and computer-implemented methods of such." Appeal Br. 14. Appellant contends that this computer-implemented method is "inextricably tied to vehicular computer technology and [is] distinct from the types of concepts typically found as abstract." *Id.* Appellant's argument is not commensurate with the scope of claim 8. For instance, claim 8 does not recite any steps that tie the determination of fuel use of a vehicle for a segment of a route to any implemented improvement in vehicular efficiency. In other words, the claim does not contain any steps that use the determined fuel efficiency to improve vehicle performance or efficiency. In fact, the claim does not even require that the processor that performs step D is a vehicular computer. Thus, Appellant's argument that the method is tied to vehicular computer technology is not commensurate with the scope of claim 8.

Appellant further argues that "[a]nalogous to the reasoning applied by the Federal Circuit in *Finjan*, Appellant's 'claims recite more than a mere result. Instead they recite **specific steps** . . . that accomplish the desired

result.'" Appeal Br. 15 (quoting *Finjan, Inc. v. Blue Coat Sys., Inc.*, 879 F.3d 1299, 1306 (Fed. Cir. 2018)). Appellant goes on to analogize the claimed method to the computer-implemented subject matter found to be patent eligible in *Enfish, LLC v. Microsoft Corp.*, 822 F.3d 1327 (Fed. Cir. 2016). Appeal Br. 15. Appellant argues:

> Similar to the claims at issue in *Enfish*, which are directed to steps of configuring a computer memory in accordance with a self-referential table, . . . the claims of the present application solve a problem in the vehicular efficiency arts (existing programs do not focus on preventing fuel waste attributable to operator actions that affect a real world result (conserving vehicle fuel)).

Id. at 16 (citing Spec. 9). Again, Appellant's arguments are not commensurate with the scope of claim 8, which does not recite any steps to prevent fuel waste and conserve vehicle fuel. Rather, the method of claim 8 ends at the determination of fuel use of a vehicle for a single segment of a route and does not recite any steps that employ the information in any manner, much less in a manner to conserve fuel.

Appellant asserts that the Examiner misapplied the Federal Circuit's decision in *Electric Power Group, LLC v. Alstom S.A.*, 830 F.3d 1350 (Fed. Cir. 2016), arguing that this case supports the patentability of the claims, which are "specifically directed toward components and methods, such as **measurement devices and techniques**, which generate new data." Appeal Br. 17. Again, Appellant's arguments are not commensurate in scope with claim 8, which does not recite any measurement devices, and does not recite techniques that generate new data. Instead, as explained above, claim 8 recites simply observing information about a vehicle and a segment of a

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route and then retrieving data from a look-up table based on the observed information.

Appellant further asserts that "the claims **recite numerous process steps to achieve** an outcome." *Id.* at 17–18 (citing *Rapid Litig. Mgmt. Ltd. v. CellzDirect, Inc.*, 827 F.3d 1042 (Fed. Cir. 2016)). Appellant analogizes the claimed method to the claims found patent eligible in *McRO, Inc. v. Bandai Namco Games America, Inc.*, 837 F.3d 1299 (Fed. Cir. 2016). Appeal Br. 18. Specifically, Appellant argues that "the fact that the claims of the present application do not unduly monopolize basic tools of scientific and technological [work] further supports patent eligibility." *Id.* at 20–21 (arguing that the pending claims "recite specific applications of computer-implemented vehicular efficiency systems and computer-implemented methods").

Claim 8, however, does not recite a specific application of a vehicular efficiency system. Rather, claim 8 recites a method of determining fuel use of a vehicle for one segment of a route. Further, even if the claim does not preempt basic tools, "[a] narrow claim directed to an abstract idea, however, is not necessarily patent-eligible, for '[w]hile preemption may signal patent ineligible subject matter, the absence of complete preemption does not demonstrate patent eligibility.'" *Intellectual Ventures I LLC v. Symantec Corp.*, 838 F.3d 1307, 1321 (Fed. Cir. 2016) (quoting *Ariosa Diagnostics, Inc. v. Sequenom, Inc.*, 788 F.3d 1371, 1379 (Fed. Cir. 2015)).

In sum, claim 8 before us on appeal is directed to a result, a determination of a fuel use, that itself is the abstract idea and merely invokes generic machinery, i.e., a processor, to achieve the result. The claim does not focus on a specific means or method that improves the relevant

technology and does not go beyond merely organizing existing information into a new form.

For these reasons, the additional "processor" element of claim 8 does not integrate the judicial exception into a practical application. Thus, claim 8 is directed to an abstract idea, which is a judicial exception to patent eligible subject matter under 35 U.S.C. § 101.

Step 2B: Does Claim 8 Recite an Inventive Concept?

We next consider whether claim 8 recites any elements, individually or as an ordered combination, that transform the abstract idea into a patent-eligible application, e.g., by providing an inventive concept. *Alice*, 573 U.S. at 217–18. The additional element recited in claim 8 is a generic processor. Ans. 3–4; *see also* Spec. 13 (describing that "[t]he processor may be a general-purpose processor (e.g., INTEL or IBM)"). This additional element does not provide improvement to another technology or technical field or the functioning of the computer itself.

Appellant argues "claim 8 constitutes significantly more than an abstract idea." Appeal Br. 26. Appellant then quotes the entire content of claim 8, and asserts that "[the] claim features are not well-understood, routine, and conventional, nor has the Final Office Action set forth sufficient evidence of such." *Id.* at 26–27.

According to the Guidance, under Step 2B, "examiners should . . . evaluate *the additional elements* individually and in combination . . . to determine whether they provide an inventive concept (*i.e.*, whether the additional elements amount to significantly more than the exception itself)." *See* Guidance, 84 Fed. Reg. at 56 (emphasis added). Thus, the second step of the inquiry (Step 2B) considers those elements within the claim other than

those drawn to the judicial exception. *See, e.g.*, Examples accompanying
Guidance (Example 37 (claim 3 analysis) and Example 40 (claim 2
analysis)). *See also BSG Tech LLC v. BuySeasons, Inc.*, 899 F.3d 1281,
1290 (Fed. Cir. 2018) ("It has been clear since *Alice* that a claimed
invention's use of the ineligible concept to which it is directed cannot supply
the inventive concept that renders the invention 'significantly more' than
that ineligible concept.").

The only additional element recited in claim 8 is the "processor"
employed in step D. The processor is invoked in claim 8 as a conventional
tool and is recited for its conventional function of being used to access,
manipulate, and output data. Apart from being used to perform the abstract
idea itself, this generic computer system component only serves to perform
well-understood functions (e.g., storing, selecting, analyzing, and outputting
data). *See FairWarning IP, LLC v. Iatric Sys., Inc.*, 839 F.3d 1089, 1096
(Fed. Cir. 2016) ("[T]he use of generic computer elements like a
microprocessor or user interface do not alone transform an otherwise
abstract idea into patent-eligible subject matter.").

Claim 8 fails to add a specific limitation beyond the judicial exception
that is not "well-understood, routine, conventional" in the field, but instead
"simply appends well-understood, routine, conventional activities previously
known to the industry, specified at a high level of generality, to the judicial
exception." *See* Guidance, 84 Fed. Reg. at 56. That is, we are not persuaded
that claim 8 is directed to a specific application designed to achieve an
improved technological result, as opposed to being directed to merely
ordinary functionality of the above-recited additional elements (a processor)
to apply an abstract idea. For the reasons discussed above, we find no

element or combination of elements recited in claim 8 that contains any
"inventive concept" or adds anything "significantly more" to transform the
abstract concept into a patent-eligible application. *See Alice*, 573 U.S. at
221. For these reasons, we find no error in the Examiner's rejection of claim
8, and claims 9–11 falling therewith, under 35 U.S.C. § 101.

Independent Claim 13

Independent claim 13 is directed to "[a] method of optimizing a
traveling route of a vehicle between a departure and a destination based on
fuel consumption." Appeal Br. 43. Similar to steps A and B of claim 8,
claim 13 recites steps of "determining one or more vehicle characteristics of
the vehicle" and "determining one or more segment characteristics." *Id.* In
claim 13, a segment characteristic is determined for each of the segments
between the departure and the destination. *Id.* Also, similar to step D of
claim 8, claim 13 recites the step of "determining, with a processor . . . , a
fuel use for the vehicle." *Id.* In claim 13, the fuel use is determined for the
vehicle relating to each segment "by comparing the one or more vehicle
characteristics to corresponding information regarding the one or more
segment characteristics of each of a plurality of segments." *Id.* For reasons
similar to those discussed above in our analysis of claim 8, the determining
steps of claim 13 each recite mental processes that can be performed in the
mind or on paper.

Claim 13 adds two steps not found in claim 8. Claim 13 recites
"determining, with the processor, an optimized traveling route by identifying
a combination of segments between the departure and the destination
providing the lowest level of fuel use for the vehicle as the optimized
traveling route" and "presenting the optimized traveling route." The

"determining . . . an optimized traveling route" step amounts to adding up fuel use for each segment along alternate routes and comparing the totals to find the route with the lowest total fuel use. *See* Spec. 26–27 (describing that the alternate routes may be predefined routes between a departure and destination stored in the sortie profile and describing in step 440 that the combination of segments which achieves the lowest level of fuel use is determined). This step can be performed in the human mind through evaluation of the fuel use values for each segment that are obtained, for example, from a lookup table. Acts that can be performed in the human mind fall within the abstract idea exception subgrouping of mental processes. *See* Guidance, 84 Fed. Reg. at 52. Thus, this step recites a mental process, which is a judicial exception.

As in step D of claim 8, claim 13 recites that this step of determining an optimized traveling route is performed "with the processor." Appeal Br. 43. As discussed above, the "processor" is a general-purpose processor that does not integrate the judicial exception into a practical application and does not add significantly more to the abstract idea.

The "presenting" step generally recites presentation of the result without any specific limitations as to how the optimized traveling route is presented. Thus, this step is akin to a generic recitation to output the result of the mental steps. Such insignificant post-solution activity does not amount to significantly more than the abstract idea itself. *See Flook*, 437 U.S. at 590 (step of adjusting an alarm limit based on the output of a mathematical formula was "post-solution activity" and did not render method patent eligible).

Thus, for reasons similar to the detailed reasoning discussed above, no element or combination of elements recited in claim 13 contains any "inventive concept" or adds anything "significantly more" to transform the abstract concept into a patent-eligible application. For these reasons, we find no error in the Examiner's rejection of claim 13, and claims 14 and 15 falling therewith, under 35 U.S.C. § 101.

Independent Claim 16

Independent claim 16 is directed to "[a] method of determining a fuel economy associated with a minimum amount of horsepower and torque to move a vehicle across at least one segment of a traveling route." Appeal Br. 44. Similar to steps A and B of claim 8, claim 16 recites steps of "determining one or more vehicle characteristics of the vehicle" and "determining one or more segment characteristics of the at least one segment." *Id.* For the reasons discussed above in our analysis of claim 8, these steps recite a mental process.

Claim 16 adds steps not found in claim 8. Claim 16 recites "sensing information about the operation of the vehicle from at least one sensor positioned on the vehicle, the information including a current amount of horsepower and torque." This step is a generic recitation of sensing information needed as inputs to the subsequent calculating step. The claim does not, for example, recite a specific sensor or a specific means of sensing this information. Although the Specification describes an example of a drive train sensor for detecting engine horsepower, the claim is not limited to this particular sensor. Spec. 12. Rather, the "sensing" step is a recitation of mere data gathering, which is insignificant extra-solution activity that does not amount to significantly more than the abstract idea itself. *See, e.g.,*

Mayo, 566 U.S. at 79 (concluding that additional element of measuring metabolites of a drug administered to a patient was insignificant extra-solution activity, which was insufficient to confer patent eligibility).

Claim 16 also recites, "determining, with a processor, a minimum amount of horsepower and torque to move the vehicle across the at least one segment, the minimum amount of horsepower and torque dependent upon the one or more characteristics of the vehicle and the one or more characteristics of the at least one segment." Appeal Br. 44. The Specification describes that this step can be performed, for example, using a "Road Load equation" to compensate for the weight of the vehicle at the posted speed limit within the given environmental conditions. Spec. 22 (describing step 123a of Fig. 1); *id.* at 20 (describing the road load equation for F_{RL}). This calculation can be performed by a human on paper by plugging in variables, such as vehicle weight, tire rolling resistance, frontal area, drag coefficient, air density, vehicle velocity, vehicle mass, time, and road gradient, into the equation. *See id.* at 20. Acts that can be performed in the human mind fall within the abstract idea exception subgrouping of mental processes. *See* Guidance, 84 Fed. Reg. at 52. Thus, this step recites a mental process, which is a judicial exception.

Claim 16 also recites, "comparing the current amount of horsepower and torque with the determined minimum amount of horsepower and torque." This simple comparison step can be performed in the human mind, and also recites a mental process, which is a judicial exception.

Claim 16 also recites, "calculating, with the processor, a wasted amount of fuel based on the difference between the current amount of horsepower and torque and the determined minimum amount of horsepower

and torque." This simple calculation step can be performed in the human mind, and also recites a mental process, which is a judicial exception.

As in step D of claim 8, claim 16 recites that the steps of determining a minimum amount of horsepower and torque and calculating a wasted amount of fuel are performed "with a processor." Appeal Br. 44. As discussed above, the "processor" is a general-purpose processor that does not integrate the judicial exception into a practical application and does not add significantly more to the abstract idea.

Thus, for reasons similar to the detailed reasoning discussed above, no element or combination of elements recited in claim 16 contains any "inventive concept" or adds anything "significantly more" to transform the abstract concept into a patent-eligible application. For these reasons, we find no error in the Examiner's rejection of claim 16, and claims 17–21 falling therewith, under 35 U.S.C. § 101.

Independent Claim 28

Independent claim 28 is similar to independent claim 8, except that instead of a method claim, claim 28 is presented as a "system for determining fuel use of a vehicle for at least one segment of a route of travel." Appeal Br. 45 (Claims Appendix). The body of claim 28 recites a "sensor configured to sense one or more vehicle characteristics including at least one of a vehicle profile or a vehicle load," "a database comprising information regarding one or more segment characteristics of the at least one segment, including at least one of a slope, government imposed traffic controls, volume of traffic, or weather conditions," and "a controller comprising a determination module configured to determine a fuel economy for the vehicle relating to the at least one segment by comparing the one or

more vehicle characteristics sensed by the at least one sensor to corresponding information in the database." *Id.* at 45–46. These claim elements recite generic structures (i.e., a sensor, a database, and a controller) that are each configured to perform mental steps akin to the mental steps discussed in detail in our analysis of claim 8 above. Specifically, a human being can sense a vehicle characteristic through observation and evaluation using the human mind. The claim is not specific as to the type of sensor, exactly what the sensor is sensing, where the sensor is located, or any other attributes of the sensor that render the function of sensing the vehicle characteristics as being a function incapable of performance by a human being. Alternatively, the "sensor" limitation is a recitation of mere data gathering performed by a generic sensor, which is insignificant extra-solution activity that does not amount to significantly more than the abstract idea itself. *See, e.g.*, *Mayo*, 566 U.S. at 79 (concluding that additional element of measuring metabolites of a drug administered to a patient was insignificant extra-solution activity, which was insufficient to confer patent eligibility).

In a similar vein, a human being can store information about segment characteristics in the mind or on paper. The claim is not specific as to the manner in which the data is contained in the claimed generic database that require the database to be housed on a computer. Even if "database" is considered to be a term of art, the recitation of a database storing data does not take an otherwise abstract idea out of the abstract realm. It is akin to insignificant extra-solution activity (storing data) for use in the abstract idea.

Finally, determining a fuel economy for the vehicle relating to the at least one segment by comparing the one or more vehicle characteristics

sensed by the at least one sensor to corresponding information in the database is described in the Specification as being performed through use of a look-up table. Spec. 26 (step 430). As discussed above in the analysis of claim 8, this determining function is a mental process. The generic recitation of a "controller" in claim 28, akin to the generic recitation of a "processor" in claim 8, does not evince a practical application of the abstract idea or add significantly more.

Thus, for reasons similar to the detailed reasoning discussed above, no element or combination of elements recited in claim 28 contains any "inventive concept" or adds anything "significantly more" to transform the abstract concept into a patent-eligible application. For these reasons, we find no error in the Examiner's rejection of claim 28 under 35 U.S.C. § 101.

Independent Claim 29

Claim 29 is similar to claim 13, except that instead of a method, claim 29 is presented as a "system for optimizing a traveling route of a vehicle." Appeal Br. 46. Also, similar to system claim 28, claim 29 recites a "sensor configured to sense one or more vehicle characteristics of the vehicle including at least one of a vehicle profile or a vehicle load," "a database comprising information regarding one or more segment characteristics of each of a plurality of segments between the departure and the destination, the segment characteristics including at least one of a slope, government imposed traffic controls, volume of traffic, or weather conditions," and "a controller comprising[] a determination module configured to determine a fuel economy for the vehicle relating each of a plurality of segments by comparing the one or more vehicle characteristics sensed by the at least one sensor to corresponding information in the

database regarding the one or more segment characteristics of each of a plurality of segments." *Id.* at 46. These claim elements recite generic structures (i.e., a sensor, a database, and a controller) that are each configured to perform mental steps akin to the mental steps discussed in detail in our analysis of claims 13 and 28 above. Specifically, these generic structures are not significantly more than the abstract ideas embodied in these steps.

Claim 29 further recites "a mapping module" that is "configured to identify, from the plurality of segments, a combination of one or more segments between the departure and the destination providing an optimized fuel economy" and "configured to present an optimized traveling route comprising the combination of one or more segments between the departure and the destination providing an optimized fuel economy." Appeal Br. 46–47. As explained in our analysis of claim 13, the mapping module being configured to identify the combination of segments with the best fuel economy amounts to adding up fuel use for each segment along alternate routes and comparing the totals to find the route with the lowest total fuel use. Thus, the identifying function that the mapping module is configured to perform is a step that can be performed in the human mind through evaluation of the fuel use values for each segment that is obtained, for example, from a lookup table. Thus, this identifying function recites a mental process, which is a judicial exception.

The mapping module being configured to present an optimized traveling route generally recites presentation of the result without any specific limitations as to how the optimized traveling route is presented. Thus, this presenting function is akin to a generic recitation to output the

result of the mental steps. Such insignificant post-solution activity does not amount to significantly more than the abstract idea itself. *See Flook*, 437 U.S. at 590 (step of adjusting an alarm limit based on the output of a mathematical formula was "post-solution activity" and did not render method patent eligible).

Thus, for reasons similar to the detailed reasoning discussed above, no element or combination of elements recited in claim 29 contains any "inventive concept" or adds anything "significantly more" to transform the abstract concept into a patent-eligible application. For these reasons, we find no error in the Examiner's rejection of claim 29, and claims 30 and 31 falling therewith, under 35 U.S.C. § 101.

Independent Claim 32

Independent claim 32 is directed to "[a] method of selecting a vehicle for a route of travel." Appeal Br. 47. Similar to several of the claims discussed above, claim 32 recites the step of "dividing a route of travel into a plurality of segments" and "identifying a segment characteristic of each of the plurality of segments." As discussed in detail above in our analysis of steps B and C of claim 8, these steps of dividing a route into segments and identifying segment characteristics can be performed through observation in the human mind or on paper. Acts that can be performed in the human mind fall within the abstract idea exception subgrouping of mental processes. *See* Guidance, 84 Fed. Reg. at 52. Thus, these steps of claim 32 recite a mental process, which is a judicial exception.

Independent claim 32 further recites, "determining, with a processor, a fuel use for each of a plurality of vehicles moving across the segments, the fuel use dependent upon the segment characteristic." Appeal Br. 47.

Similar to step D of claim 8, this step refers to the act of choosing a value from a lookup table that matches a determined segment characteristic for each vehicle in the plurality of vehicles being considered, and then summing the values for each vehicle for all the segments in the route. This act can be performed in the human mind through observation of a lookup table for a matching entry. *See* Spec. 29 (describing that "the fuel use is a variable which is dependent upon both the vehicle characteristic(s) and the segment characteristic(s), which may be determined using a lookup table"); *id.* at 30 (describing that "an overall fuel use may be determined by summing the fuel use by that vehicle for each segment of the route of travel"). Acts that can be performed in the human mind fall within the abstract idea exception subgrouping of mental processes. *See* Guidance, 84 Fed. Reg. at 52. Thus, this determining step recites a mental process, which is a judicial exception.

Independent claim 32 further recites, "selecting, with the processor, from the plurality of vehicles, a vehicle having a relative optimized fuel economy for the plurality of segments by comparing the determined fuel use of each vehicle." The Specification describes that "[t]he vehicle having the lowest overall fuel use may be selected and, subsequently, presented." Spec. 30. Thus, this step recites a simple comparison of the summed fuel use for each vehicle to determine which vehicle from among those being considered is the lowest. This act can be performed in the human mind through evaluation. Thus, this selecting step recites a mental process, which is a judicial exception.

As in step D of claim 8, claim 32 recites that the determining and selecting steps are performed "with the processor." Appeal Br. 47. As discussed above, the "processor" is a general-purpose processor that does

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not integrate the judicial exception into a practical application and does not add significantly more to the abstract idea.

Independent claim 32 further recites, "presenting information regarding the vehicle having a relative optimized fuel economy." As discussed above for the "presenting" step of claim 13, this "presenting" step generally recites presentation of the result without any specific limitations as to how the information is presented. Thus, this step is akin to a generic recitation to output the result of the mental steps. Such insignificant post-solution activity does not amount to significantly more than the abstract idea itself. *See Flook*, 437 U.S. at 590 (step of adjusting an alarm limit based on the output of a mathematical formula was "post-solution activity" and did not render method patent eligible).

Thus, for reasons similar to the detailed reasoning discussed above, no element or combination of elements recited in claim 32 contains any "inventive concept" or adds anything "significantly more" to transform the abstract concept into a patent-eligible application. For these reasons, we find no error in the Examiner's rejection of claim 32, and claims 33–35 falling therewith, under 35 U.S.C. § 101.

Independent claim 36

Claim 36 is directed to "[a] method of optimizing a vehicle having an engine control unit programmed with a first vehicle profile for a route of travel." Appeal Br. 48. The claim recites, in relevant part, "determining, with the processor, a second vehicle profile, the second vehicle profile dependent upon one or more of a fuel use and the segment characteristic" and "reprogramming the engine control unit with the second vehicle profile." *Id.* The Specification describes, for example, that "[t]he second

vehicle profile may be selected so as to result in a lower fuel use by the vehicle traversing the segment(s)." Spec. 30. In another example, "the second vehicle profile may be selected so as to result in compliance with a posted speed limit." *Id.* at 31. The Specification further describes that "the vehicle profile may be changed by reprogramming the ECU to optimize fuel consumed by a vehicle while traversing segment(s) within a route of travel." *Id.* "Reprogramming may include changing the fuel/horsepower/torque map based on a load weight of the vehicle." *Id.* Such a change would "prevent[] the operator from demanding more horsepower than would be required and would improve the overall fuel economy." *Id.* Thus, we understand the step of "reprogramming the engine control unit" to encompass changes to the operational software that controls the engine so as to effect changes to the operation of the vehicle to achieve better fuel economy or other desired results. This step recites a practical application of the abstract idea that reflects an improvement in the technical field of engine performance that implements the judicial exception with a particular machine, i.e., an engine control unit, which is integral to claim 36. *See* Guidance, 84 Fed. Reg. at 54 (Step 2A, Prong Two). For these reasons, we do not sustain the rejection of independent claim 36, and its dependent claims 37–40, under 35 U.S.C. § 101.

Independent Claim 45

Claim 45 is similar to claim 29, except that claim 45 omits a positive recitation of a sensor and recites instead that the database includes vehicle information sensed by a sensor. Appeal Br. 49–50. We do not discern a patentable distinction under 35 U.S.C. § 101 between the subject matter of

claims 29 and 45. Thus, for the same reasons discussed above, we find no error in the Examiner's rejection of claim 45 under 35 U.S.C. § 101.

Rejection of claims 8–11, 13–21, 28–40, and 45 under 35 U.S.C. § 102(a)(1)
as anticipated by McQuade

McQuade

McQuade describes a system and method for predefining events that will be used to trigger the collection of vehicle position data. McQuade, Abst. McQuade describes, with reference to Figure 1, that "the vehicle is operated while collecting both GPS data (i.e., position data, preferably including time indexed longitude and latitude data) and fuel use data (as measured through the fuel injectors)." McQuade ¶ 52. The GPS data and fuel use data are combined into a time indexed data set to produce fuel use encoded position data, which is conveyed to a remote computing device. *Id.* ¶¶ 52–53. McQuade describes that this fuel use encoded position data is analyzed to determine "at least one operational characteristic of the vehicle." *Id.* ¶ 54. In one embodiment, the data is "used to determine how much fuel is . . . consumed during idle time." *Id.* ¶ 55. McQuade describes that fuel use during idle time can be calculated by analyzing the fuel use encoded position data "to determine how much fuel is consumed when the vehicle is on but its position remains the same." *Id.*

McQuade describes that "another use for the fuel use encoded position data is to provide a data set to be used to analyze fuel consumption relative to elevation change." *Id.* ¶ 67. In this embodiment, "previously generated fuel use encoded position data for a specific vehicle is acquired" and "the accessed data is analyzed to determine how road elevation affects fuel

consumption (i.e., fuel use)." *Id.* McQuade describes that "[b]y quantifying how much fuel is consumed traveling over a route with elevation changes, one can identify alternate, possibly longer routes, that are more fuel efficient due to fewer elevation changes." *Id.* McQuade describes that "[t]his analysis may include comparing data collected while traveling different routes connecting the same starting point and destination, where the different routes involve different elevation changes" or may "involve comparing actual data with estimated fuel use over a hypothetical alternate route, to aid in determining if the alternate route (for example, a route that includes fewer elevation changes) is more fuel efficient." *Id.*

McQuade describes, with reference to Figure 11, a screen shot of a web page upon which a vehicle owner can view fuel use data overlaid upon vehicle route data. McQuade ¶ 75. The fuel use data was collected using the method of Figure 9, in which GPS position data was logged along the route, at least in part, based on a fuel use parameter (i.e., when fuel use increased or decreased). *Id.* ¶¶ 69–71, 75. McQuade describes that this screen shot enables vehicle operators to quickly review vehicle routes to determine areas associated with relatively good and relatively poor fuel economy. *Id.* ¶ 75. This enables vehicle operators to identify conditions associated with greater or lesser fuel efficiency, which may lead to redesigning routes. *Id.* As described further in McQuade, in Figure 11 the screen shot shows segments of the route divided based on different fuel economies (i.e., over 7.0 MPG, between 5.1 and 6.9 MPG, and under 5.0 MPG). *Id.* ¶ 76. McQuade describes that a vehicle operator may analyze this report to determine, for example, if in the segment of the route associated with poor fuel economy, the vehicle encountered a high traffic

volume. *Id.* This analysis might suggest to the operator to change the time of day the vehicle travels on that route to increase fuel efficiency. *Id.*

Claims 8–11

In the rejection of claim 8, the Examiner found that McQuade discloses dividing the route into segments based on variation in one or more route of travel characteristics, including at least one of slope, government imposed traffic controls, volume of traffic, or weather conditions. Final Act. 5 (citing McQuade ¶ 76). The Examiner explains that in McQuade, the route is shown in Figure 11 in segments divided by fuel economy, and McQuade describes that poor fuel economy can be caused by traffic volume. Ans. 7. The Examiner finds that McQuade teaches using this data to suggest how to improve fuel economy. *Id.*

Appellant argues that McQuade's route is not divided into path segments based on the claimed characteristics. Appeal Br. 34. Appellant argues that "any segments in McQuade are divided on the basis of fuel economy, *not* one of **slope, government imposed traffic controls, volume of traffic, or weather conditions**." Reply Br. 5.

We agree with Appellant that the embodiment disclosed in paragraph 76 of McQuade and shown in Figure 11 is a route divided into segments based on fuel usage. Although a particular segment's fuel usage may be related to volume of traffic, McQuade does not describe dividing the route into segments based on traffic volume or any other defined route of travel characteristic. Thus, we do not sustain the rejection of claims 8–11 under 35 U.S.C. § 102(a)(1) as anticipated by McQuade.

Claims 13–15

Claim 13 recites the step of determining fuel use for the vehicle relating to each segment along the route by comparing one or more vehicle characteristics to corresponding information regarding one or more segment characteristics, wherein the segment characteristics include at least one of a slope, government imposed traffic controls, volume of traffic, or weather conditions. Appeal Br. 43. In the rejection of claim 13, the Examiner found that McQuade discloses determining fuel use as claimed. Final Act. 7 (citing McQuade ¶¶ 57–60, 75–76). The Examiner explains that in McQuade, "a comparison of the fuel economy of segment 84c is [made] with the traffic volume of the same segment, to indicate the time and the area [that] may lead to the poor [fuel] economy, and that changing the time of the route may increase the fuel economy for that segment." Ans. 7.

McQuade describes, in relation to the embodiment described in paragraph 76 as cited by the Examiner, that an operator can examine a segment of poor fuel economy to determine reasons, such as increased traffic volume, for the poor fuel economy. However, the Examiner has not explained adequately where McQuade describes the step of "determining . . . fuel use for the vehicle relating to each segment" in the route, "by comparing" the information specified in claim 13. In other words, the Examiner has not explained where McQuade describes comparing the fuel use data measured using fuel injectors and a segment characteristic of each segment along the route to determine the fuel usage for the vehicle for the route. Thus, we do not sustain the rejection of claims 13–15 under 35 U.S.C. § 102(a)(1) as anticipated by McQuade.

Claims 16–21

Claim 16 recites the steps of sensing information about a current amount of horsepower and torque of a vehicle, determining a minimum amount of horsepower and torque to move the vehicle across a segment, and calculating a wasted amount of fuel based on the difference between the current and minimum amounts of horsepower and torque. Appeal Br. 44. The Examiner found that McQuade discloses using engine power on different types of roads to explain lower fuel economy, as well as when the engine is in use versus when the vehicle is stationary. Ans. 8 (citing McQuade ¶¶ 54–55). The Examiner explained that "the calculation of the waste is done in McQuade, so that the operators can avoid certain roads, idle times, and other factors based on the power use to optimize the fuel economy." *Id.*

Appellant argues that "**no portion** of McQuade even discusses horsepower and torque, let alone calculating a wasted amount of fuel based on the **difference between the current amount of horsepower and torque and the determined minimum amount of horsepower and torque**." Reply Br. 7.

McQuade describes, in one embodiment, that fuel use encoded position data is "used to determine how much fuel is . . . consumed during idle time." McQuade ¶ 55. McQuade describes that fuel use during idle time can be calculated by analyzing the fuel use encoded position data "to determine how much fuel is consumed when the vehicle is on but its position remains the same." *Id.* We fail to find in the cited paragraphs, and the Examiner has not adequately identified, where McQuade discloses calculating a wasted amount of fuel based on the difference between current

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and determined minimum amounts of horsepower and torque. For this reason, we do not sustain the rejection of claims 16–21 under 35 U.S.C. § 102(a)(1) as anticipated by McQuade.

Claim 28

Claim 28 is directed to a system for determining fuel use of a vehicle for at least one segment and recites a sensor to sense a vehicle characteristic, a database comprising information regarding a segment characteristic of the segment, including slope, and a controller configured to determine a fuel economy for the vehicle relating to the segment by comparing the vehicle characteristic and the segment information in the database. Although, in the Final Office Action, the Examiner cited the embodiment disclosed in paragraphs 75 and 76 of McQuade as the anticipating disclosure, in the Answer, the Examiner cites the embodiment disclosed in paragraph 67. Ans. 8. The Examiner finds paragraph 67 describes that "fuel use data is collected per vehicle and is saved in 'a database or memory accessible in a networked environment'" and that "[t]he data is analyzed to determine how road elevations affect fuel consumption." Ans. 8. Appellant addressed the Examiner's reliance on paragraph 67 in the Reply Brief, arguing that "mere disclosure of vehicle fuel use data stored in a database cannot anticipate a database comprising information regarding a segment characteristic which is **a slope, government imposed traffic controls, volume of traffic, or weather conditions**." Reply Br. 7. For the reasons discussed below, Appellant's argument does not adequately address the complete teaching in paragraph 67 of McQuade.

We agree with the Examiner that McQuade describes sensing a vehicle characteristic (i.e., the fuel usage is a vehicle characteristic sensed by

the fuel injector), in the embodiment described in paragraph 67, which is different from the embodiment described in paragraphs 75 and 76. McQuade ¶ 67 (describing that "fuel use encoded position data for a specific vehicle is … collected during operation of the vehicle"). McQuade describes that the fuel use encoded position data provides "a data set to be used to analyze fuel consumption relative to elevation change." *Id.* Specifically, McQuade describes that the fuel use encoded position data "is analyzed to determine how road elevation affects fuel consumption" and that analysis is done "[b]y quantifying how much fuel is consumed traveling over a route with elevation changes." *Id.* The analysis uses the position of the vehicle, which is part of the recorded fuel use encoded position data, to determine the slope of the route at the various points along the route at which the fuel use data was recorded. In order to perform this analysis, the system of McQuade must include a database containing information about elevation changes (i.e., slope) along a route.

McQuade further describes that the analysis can compare data collected while traveling different routes between the same starting point and destination, where the different routes involve different elevation changes. *Id.* And McQuade describes the analysis can compare actual data with estimated fuel use over a hypothetical alternate route, to determine if the alternate route is more fuel efficient. *Id.* Again, to compare data collected over different routes, and to calculate an estimated fuel use over a hypothetical alternate route, requires information about the elevation changes along the route.

McQuade's system then determines fuel use of the vehicle over each route by summing the fuel use along the segments of the route while taking

into account elevation changes along the route. These descriptions in paragraph 67 of McQuade anticipate the controller limitation of claim 28.

For these reasons, we sustain the rejection of claim 28 under 35 U.S.C. § 102(a)(1) as anticipated by McQuade.

Claims 29–31

Claim 29 is directed to a system for optimizing a traveling route of a vehicle along a route based on fuel consumption. Similar to claim 28, claim 29 recites a sensor configured to sense a vehicle characteristic, a database comprising information regarding a segment characteristic and a determination module configured to determine a fuel economy for the vehicle. Unlike claim 28, claim 29 determines a fuel economy for the vehicle for each one of a plurality of segments on the route. Claim 29 further recites a mapping module "configured to identify . . . a combination of . . . segments . . . providing an optimized fuel economy and . . . to present an optimized traveling route."

The Examiner cites paragraph 67 of McQuade as disclosing the subject matter of claim 29. Ans. 8. Although McQuade discloses optimizing a route based on changes in elevation (¶ 67), the Examiner has not explained adequately where McQuade discloses presentation of this optimized traveling route using a mapping module.[4] We note that McQuade discloses a mapping function (Fig. 11). McQuade describes, however, that this mapping function is used to display a route traveled by a truck, showing

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[4] Because the rejection on appeal is based on anticipation, we must find adequate evidence that each and every element of the claim is disclosed, either explicitly or inherently, in the prior art. We do not make any determinations as to obviousness in this appeal.

segments of different fuel economy displayed in different colors along the route. McQuade ¶ 76. McQuade describes that a vehicle operator can analyze the route to see if some rerouting might bypass areas of poor fuel economy. *Id.* This paragraph does not, however, explicitly describe presenting this optimized route using a mapping module.

For these reasons, the Examiner has not presented adequate evidence of anticipation, and we do not sustain the rejection of claims 29–31 under 35 U.S.C. § 102(a)(1) as anticipated by McQuade.

Claims 32–35

Claim 32 recites, "selecting, with the processor, from the plurality of vehicles, a vehicle having a relative optimized fuel economy for the plurality of segments by comparing the determined fuel use of each vehicle." Appeal Br. 47. The Examiner relies on the disclosures in paragraphs 67 and 76 of McQuade, discussed above, for disclosure of this selecting step. Ans. 8. We agree with Appellant, that these paragraphs in McQuade do not teach "compar[ing] determined fuel use of vehicles in order to select one of the vehicles having a relative optimized fuel economy for the plurality of segments." Reply Br. 8. We find no discussion in these cited portions of McQuade about vehicle selection. Thus, we do not sustain the rejection of claims 32–35 under 35 U.S.C. § 102(a)(1) as anticipated by McQuade.

Claims 36–40

Claim 36 recites, "determining, with the processor, a second vehicle profile, the second vehicle profile dependent upon one or more of a fuel use and the segment characteristics" and "reprogramming the engine control unit with the second vehicle profile." Appeal Br. 48. The Examiner found "McQuade discloses that GPS logging paradigm is used to modify

'parameters such as fuel use, brake temperature, oil temperature, coolant temperature, throttle position, engine load, engine RPM, shift position/gear selected, and/or accessory device status.'" Ans. 8–9 (citing McQuade ¶ 74). The Examiner explains that "[t]he logging paradigm can be applied to optimize the fuel economy, such as reducing parasitic load, choosing optimal roads and time of day to maximize the fuel economy." *Id.* at 9. Appellant argues that "McQuade does not determine a different vehicle profile dependent upon fuel use or segment characteristics in order to reprogram an engine control unit." Reply Br. 9.

We agree with Appellant that the Examiner has not adequately shown where, in the cited paragraphs, McQuade discloses reprogramming the engine control unit with a second vehicle profile based on fuel use or segment characteristics. Paragraph 74 of McQuade describes modifying the GPS logging paradigm based on the recited parameters. We understand this disclosure to mean that the points along the route at which GPS data is captured is modified to coincide with changes in one or more of the recited vehicle conditions. We do not understand McQuade to disclose modifying the engine control unit.

For these reasons, we do not sustain the rejection of claims 36–40 under 35 U.S.C. § 102(a)(1) as anticipated by McQuade.

Claim 45

Claim 45, similar to claim 29, recites a mapping module configured to identify and present an optimized traveling route. For the reasons discussed above, we also do not sustain the rejection of claim 45 under 35 U.S.C. § 102(a)(1) as anticipated by McQuade.

DECISION

We sustain the rejection of claims 8–11, 13–21, 28–35, and 45 under 35 U.S.C. § 101 and the rejection of claim 28 under 35 U.S.C. § 102(a)(1) as anticipated by McQuade.

We do not sustain the rejection of claims 36–40 under 35 U.S.C. § 101 and the rejection of claims 8–11, 13–21, 29–40, and 45 under 35 U.S.C. § 102(a)(1) as anticipated by McQuade.

Thus, the Examiner's decision as to the unpatentability of claims 8–11, 13–21, 28–35, and 45 is affirmed, and the Examiner's decision as to the unpatentability of claims 36–40 is reversed.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a). *See* 37 C.F.R. § 1.136(a)(1)(iv).

CONCLUSION

In summary:

Claims Rejected	Basis	Affirmed	Reversed
8–11, 13–21, 28–40, 45	§ 101	8–11, 13–21, 28–35, 45	36–40
8–11, 13–21, 28–40, 45	§ 102(a)(1) McQuade	28	8–11, 13–21, 29–40, 45
Overall Outcome		8–11, 13–21, 28–35, 45	36–40

AFFIRMED-IN-PART