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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte ANETT SCHUELKE, ROMAN KURPATOV, and NITIN MASLEKAR

Appeal 2019-002882
Application 15/304,074
Technology Center 2100

Before JAMES R. HUGHES, JOYCE CRAIG, and MATTHEW J. McNEILL, *Administrative Patent Judges*.

McNEILL, *Administrative Patent Judge*.

DECISION ON APPEAL

Appellant[1] appeals under 35 U.S.C. § 134(a) from the Examiner's rejection of claims 1–3 and 5–20, which are all the claims pending in this application. We have jurisdiction under 35 U.S.C. § 6(b).

We affirm.

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[1] We use the word "Appellant" to refer to "applicant" as defined in 37 C.F.R. § 42. Appellant identifies the real party in interest as NEC Laboratories Europe GMBH. Appeal Br. 1.

STATEMENT OF THE CASE

Introduction

Appellant's application relates to a method for load balancing of multiple charging stations for mobile loads, particularly for electric vehicles (EVs) within a charging stations network. Spec.[2] ¶ 2. Claim 1 is illustrative of the appealed subject matter and reads as follows:

> 1. A method for load balancing of charging stations for mobile loads within a charging stations network, the method comprising:
>
> based on a prediction of a charging demand of the mobile loads, performing a distribution of an energy-power-range limitation for each of the charging stations p under consideration of a definable optimization parameter, wherein p = 1, . . . , n and wherein n and p are integers, and
>
> under consideration of the distribution, performing at least one of an adaptation or a selection of at least one transportation parameter of at least one of the mobile loads, which comprises transforming at least one of the mobile loads into at least one time tolerant and capacity tolerant mobile load, so as to at least partially fulfill the energy-power-range limitation for each of the charging stations p or for a definable number of the charging stations p.

The Examiner's Rejection

Claims 1–3 and 5–20 stand rejected under 35 U.S.C. § 103 as unpatentable over Anglin (US 2013/0006677 A1; Jan. 3, 2013) and Schuelke (WO 2013/045449 A2; Apr. 4, 2013). Final Act. 3.

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[2] Citations to the Specification are to the "Substitute Specification (Clean Version)," filed October 14, 2016.

ANALYSIS

Appellant argues the Examiner erred in rejecting claim 1 as unpatentable over Anglin and Schuelke. *See* Appeal Br. 3–8. In particular, Appellant argues "transforming at least one of the mobile loads into at least one time tolerant and capacity tolerant mobile load" means transforming a mobile load into one that is both time tolerant *and* capacity tolerant, and that the Examiner erred by misconstruing this limitation. *Id.* at 5–6. Appellant argues that even if Schuelke teaches a time tolerant and capacity tolerant mobile load, Schuelke does not teach *transforming* a mobile load into a time tolerant and capacity tolerant mobile load, as recited in claim 1. *See* Reply Br. 2–3.

Appellant also argues Schuelke does not teach "transforming the mobile load into a time tolerant load," and instead teaches away from such limitation. *Id.* at 6–7. Appellant further argues the Examiner failed to present a prima facie case of obviousness by not articulating a reason with some rational underpinning for combining Anglin and Schuelke. *Id.* at 7–8. Ans.[3] 3–4.

Appellant has not persuaded us of Examiner error. Schuelke teaches "a method for charging electric vehicles by charging stations" that includes "[a]ssigning electric vehicles to different electric vehicle supply equipment . . . of the charging stations" and "[c]harging the electric vehicles," where "a matching of electric vehicle charging information . . . of electric vehicles . . . and charging power information . . . of different charging stations . . . is predicted based on electric vehicle information and a charging station

[3] Citations to the Answer are to the Second Examiner's Answer, dated January 4, 2019.

parameter." Schuelke, code (57). In one embodiment, Schuelke teaches the following:

> For example, if electric cars arriving at the charging station wherein assigned by the prior charging station to this charging station, these cars may be regrouped: For example if the state-of-charge (SOC) has changed during transfer of the electric vehicle from the prior adjacent charging station to this charging station, regrouping is necessary to avoid a critical state-of-charge (SOC). Other cars with non-critical state-of-charge conditions may be further assigned to the next adjacent charging station if the charging information of these electric vehicles allows travelling from this charging station to the next adjacent charging station.

Id. at 7:22–33. More specifically, Schuelke teaches grouping electric vehicles approaching a charging station CSk into three sub-fleets: "a first ad hoc fleet $N\chi_k$ . . . comprising electric vehicles which have a critical-state-of-charge SOC condition"; "[a] second ad hoc fleet . . . denoted with reference sign $N\sigma_k$ compris[ing] electric vehicles having an optional state-of-charge SOC and/or user preferences conditions"; and a "third . . . ad hoc fleet $N\nu_k$ comprising all electric vehicles with uncritical state-of-charge SOC or user preferences condition." *Id.* at 10:28–11:10. Schuelke teaches assigning these sub-fleets of vehicles to charging stations as follows:

> [T]he [$N\chi_k$] sub-fleet comprising the electric vehicles with critical state-of-charge condition, will be mandatorily assigned to this charging station CSk. Otherwise due to the critical SOC condition, the electric vehicles would not have enough battery power left to reach the next charging station on their travel route. The other two groups, i.e., the second and third ad hoc sub-fleets $N\sigma_k$, $N\nu_k$ are analysed with respect to the next adjacent charging station CSk+1. Based on power grid segment conditions charging station capacity as well as the state-of-charge of the electric vehicles belonging to the sub-fleets $N\sigma_k$, $N\nu_k$ are sorted or grouped into a further ad hoc fleet $N\rho_{k+1}$ within the proximity

> range π_{k+1} defining electric vehicles assigned for potential charging at the next adjacent charging station CSk+1.

Id. at 11:19–29.

Based on the above disclosure, we find that Schuelke teaches "performing at least one of an adaptation or a selection of at least one transportation parameter of at least one of the mobile loads," as recited in claim 1. That is, Schuelke selects either a current charging station or a next charging station for an electric vehicle that represents a mobile load. This selection is based on the sub-fleet grouping of the electric vehicle, which depends on its charge state and user preferences. The assigned charging station for an electric vehicle meets the broadest reasonable interpretation of the term "transportation parameter."

We also find Schuelke teaches "at least one of an adaptation or a selection" that "comprises transforming at least one of the mobile loads into at least one time tolerant and capacity tolerant mobile load." In particular, the fact that Schuelke's electric vehicles in the second and third sub-fleets can wait to be charged until they reach a further charging station (*see* Schuelke, 7:27–30, 11:23–29) teaches that they are "time-tolerant" (*see* Spec. ¶ 7 ("Time-tolerance is used for all types of devices or processes which can accept a delay or advance in energy usage")).

Appellant's argument that Schuelke teaches away from "time tolerant" electric vehicles (Appeal Br. 6–7; Reply Br. 6–7) is not persuasive. Appellant relies on Scheulke's teaching that "power grid or charging station friendly behavior cannot be influenced reasonably in a similar way like in the case of normal charging e.g. by load shifting or throttling resulting in the disadvantage that such fast charging process can only minimally be influenced when an electric vehicle is connected to a charging station." Schuelke, 2:19–23. This teaching in Schuelke has no apparent bearing on time tolerance, which relates to a delay or advance in charging (*see* Spec. ¶ 7), not some action taken while a vehicle is charging. Accordingly, Schuelke does not "criticize, discredit, or otherwise discourage" time tolerance in electric vehicles. *See In re Fulton*, 391 F.3d 1195, 1201 (Fed. Cir. 2004). To the contrary, Schuelke in fact teaches time tolerance, as noted above. *See* Schuelke, 7:27–30, 11:23–29.

We further find that Schuelke at least suggests that the electric vehicles in the second and third sub-fleets are "capacity tolerant," because the fact that these vehicles can proceed to the next charging station indicates that they retain enough charge to do so. *See id.* at 11:4–10 (second subfleet vehicles have an "optional state-of-charge SOC and/or user preferences conditions" and third sub-fleet vehicles have an "uncritical state-of-charge or user preference condition.").

Appellant argues that "[w]hile having electrical battery storage can be used to enable capacity tolerance, a battery alone is not enough to render a vehicle capacity tolerant." Reply Br. 3. This argument is unpersuasive. The Specification provides that "[c]apacity tolerance is possible for devices which can reduce their power/energy usage either by different operational modes, or by flexibility of power adaption, like *electrical battery storages*." Spec. ¶ 7 (emphasis added). One of ordinary skill in the art would have understood that electric vehicles with an "optional" or "uncritical state-of-charge," such as vehicles in Schuelke's second or third sub-fleet (*see* Schuelke, 11:6–10), not only have the possibility of being capacity tolerant by virtue of being electric vehicles with batteries, but are actually capacity tolerant due to the fact that they have sufficient charge remaining to reach the next charging station. Appellant has not identified what more is required to be capacity tolerant than having a battery with some level of charge, and we have found no further definitions in the Specification.

Appellant also argues that, "to the extent . . . that Schuelke's 2nd sub-fleet is a time tolerant and capacity tolerant mobile load, it was not *transformed* into that state." Reply Br. 2. Specifically, Appellant argues that "nothing in Schuelke's charging station assignment transforms the vehicle into one that can accept a delay or advance in energy usage" and "Schuelke's vehicles presumably already had a battery and nothing else is disclosed as providing a transformation to a capacity tolerant load." *Id.* at 3. Here, Appellant appears to imply that claim 1 requires some physical transformation of an electric vehicle. We disagree.

The Specification does not expressly define what "transforming" means in the context of claim 1, but provides the following examples: "Utilization of EV mobility for transforming the EVs into time- and capacity-tolerant mobile loads through traffic control procedures" Spec. ¶ 50; and "Active transforming the EVs into time- AND capacity-tolerant mobile loads by impacting the charging profile for a certain point of location and time through modifications of transportation parameters" *Id.* ¶ 51. Thus, without specifying exactly what transforming entails,[4] Appellant's disclosure provides that it may be accomplished through traffic

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[4] Upon further prosecution, the Examiner may wish to consider whether the "transforming" limitation is properly enabled under 35 U.S.C. § 112(a). Although the Board is authorized to reject claims under 37 C.F.R. § 41.50(b), no inference should be drawn when the Board elects not to do so. *See* Manual of Patent Examining Procedure (MPEP) § 1213.02.

control procedures or modification of transportation parameters. "[A] transportation parameter can be one or more of a user preference, a route, a route guidance, a routing information, a distance, a direction, a charging time, a travel time, a speed, a waiting time and a break." *Id.* ¶ 29. So, in Appellant's disclosure, determining a route, for example, is a way to transform a mobile load into a time tolerant and capacity tolerant mobile load. In other words, the transformation can be an entirely conceptual step, such as recognizing, in a model or some other representation, mobile loads that correspond to electric vehicles as time tolerant and capacity tolerant if the vehicles proceed on a particular route.[5] Accordingly, the broadest reasonable interpretation of "transforming at least one of the mobile loads into at least one time tolerant and capacity tolerant mobile load," as recited in claim 1, includes recognizing a mobile load as time tolerant and capacity tolerant as part of adapting or selecting a transportation parameter for that mobile load.

We find that Schuelke teaches the "transforming" limitation as construed above because Schuelke's grouping or re-grouping of electric vehicles into different sub-fleets as they approach a charging station ("transforming") is at least part of determining whether the current charging station or a next charging station ("selecting a transportation parameter")

[5] We urge the Examiner to consider whether the claims are patent-ineligible for being directed to an abstract idea, e.g., a mental process, without significantly more. *See* 2019 Revised Patent Subject Matter Eligibility Guidance, 84 Fed. Reg. 50 (Jan. 7, 2019). Although the Board is authorized to reject claims under 37 C.F.R. § 41.50(b), no inference should be drawn when the Board elects not to do so. *See* MPEP § 1213.02.

should be assigned to each electric vehicle. *See* Schuelke, 7:22–30, 10:28–11:29.

Finally, Appellant's argument that the Examiner failed to present a prima facie case of obviousness (Appeal Br. 7–8; Reply Br. 4–5) is not persuasive of Examiner error. We note that the Federal Circuit has repeatedly explained that "the prima facie case is merely a procedural device that enables an appropriate shift of the burden of production." *Hyatt v. Dudas*, 492 F.3d 1365, 1369 (Fed. Cir. 2007) (citing *In re Oetiker*, 977 F.2d 1443, 1445 (Fed. Cir. 1992)). The "PTO carries its procedural burden of establishing a prima facie case when its rejection satisfies 35 U.S.C. § 132, in 'notify[ing] the applicant . . . [by] stating the reasons for [its] rejection, or objection or requirement, together with such information and references as may be useful in judging of the propriety of continuing the prosecution of [the] application.'" *In re Jung*, 637 F.3d 1356, 1362 (Fed. Cir. 2011) (alterations in original) (quoting 35 U.S.C. § 132). The PTO violates § 132 "when a rejection is so uninformative that it prevents the applicant from recognizing and seeking to counter the grounds for rejection." *Chester v. Miller*, 906 F.2d 1574, 1578 (Fed. Cir. 1990). But if the PTO "adequately explain[s] the shortcomings it perceives . . . the burden shifts to the applicant to rebut the prima facie case with evidence and/or argument." *Hyatt*, 492 F.3d at 1370.

The Examiner here has met the burden of establishing a prima facie case by identifying where in the prior art references the claim limitations can be found and providing a reason for combining the prior art references on the ground of obviousness. *See* Ans. 3–6; Final Act. 3–13. In particular, the Examiner finds it would have been obvious to combine Schuelke with

Anglin "in order to provide users an increased flexibility for charging electric vehicles." Final Act. 5 (citing Schuelke, 2:31–32).

Appellant argues that "the Office's proffered reasons to combine the prior art do not have a rational connection between the facts and the conclusion that the invention as a whole is obvious." Appeal Br. 7. More specifically, Appellant argues that "there is not a reasoned explanation *why* a skilled artisan would have specifically wanted to provide users flexibility for fast charging their electric vehicles by assigning them to charging stations based on wait time when Anglin is concerned with load balancing at the charging station." *Id.* at 8; *see also* Reply Br. 5. Appellant's arguments are not persuasive of Examiner error.

Both Anglin and Schuelke relate to charging electric vehicles. *See* Anglin, code (57); Schuelke, code (57). Anglin addresses the concern that "electrical grid systems could be strained if battery electric vehicles are plugged in en masse at times of peak electricity demand," particularly where "the location of the electrical need is not as predictable." Anglin ¶ 3. Accordingly, Anglin discloses redistributing the electrical supply on an electrical grid system to charging stations based on anticipated electric loads (*id.* ¶ 4), which Appellant refers to as load balancing (*see* Appeal Br. 8). Schuelke also addresses power grid concerns by disclosing an "objective of the present invention to provide an operator of a power grid connected to charging stations also an enhanced flexibility with regard to the variability of the loads at the charging stations due to the fluctuating number of electric vehicles to be charged at the charging station." Schuelke, 3:4–7. Thus, Schuelke's assigning of electric vehicles to charging stations based on state-of-charge not only provides users some measure of "increased flexibility for charging their electric vehicles" (Schuelke, 2:31–32), as the Examiner identifies (Final Act. 5), but also addresses similar power grid problems addressed by Anglin.

Given the similarities between the electric vehicle charging systems and the problems addressed in Anglin and Schuelke, we agree with the Examiner that implementing Schuelke's electric vehicle charging station assignments based on state-of-charge in Anglin's system would have been obvious to one of ordinary skill in the art. *See KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 417 (2007) ("[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"). Moreover, Appellant has not shown that using state-of-charge information from electric vehicles to assign charging stations in Anglin would have been "uniquely challenging or difficult for one of ordinary skill in the art" at the time of Appellant's invention, *see Leapfrog Enters., Inc. v. Fisher-Price, Inc.*, 485 F.3d 1157, 1162 (Fed. Cir. 2007) (citing *KSR*, 550 U.S. at 418), particularly in view of the fact that Anglin already "receives from a number of battery electric vehicles usage data that comprises a current charge level." Anglin ¶ 56.

Accordingly, we sustain the obviousness rejection of independent claim 1. We also sustain the obviousness rejection of independent claim 19, and dependent claims 2, 3, 5–18, and 20, for which Appellant relies on the same arguments as independent claim 1. *See* Appeal Br. 8–9.

DECISION SUMMARY

In summary:

Claims Rejected	**35 U.S.C. §**	**Reference(s)/Basis**	**Affirmed**	**Reversed**
1–3, 5–20	103	Anglin, Schuelke	1–3, 5–20	
Overall Outcome			1–3, 5–20	

TIME PERIOD FOR RESPONSE

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. § 41.50(f).

AFFIRMED