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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* JESUS CARDOSO

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Appeal 2019-001958  
Application 13/495,841  
Technology Center 1700

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Before ROMULO H. DELMENDO, CHRISTOPHER L. OGDEN, and  
JANE E. INGLESE, *Administrative Patent Judges*.

DELMENDO, *Administrative Patent Judge*.

DECISION ON APPEAL

The Appellant<sup>1</sup> appeals under 35 U.S.C. § 134(a) from the Primary Examiner’s final decision to reject claims 1–3, 6–13, 15–17, and 19–23.<sup>2</sup>

We have jurisdiction under 35 U.S.C. § 6(b).

We affirm in part.

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<sup>1</sup> We use the word “Appellant” to refer to “applicant” as defined in 37 C.F.R. § 1.42—i.e., the Inventor, as indicated in the Application Data Sheet filed June 13, 2012. The Appellant identifies “Ford Global Technologies, LLC” as the real party in interest (Appeal Brief filed July 20, 2018 (“Appeal Br.”) at 1).

<sup>2</sup> See Appeal Br. 6–12; Final Office Action entered December 20, 2017 (“Final Act.”) at 2–17; Examiner’s Answer entered October 31, 2018 (“Ans.”) at 3–20.

## I. BACKGROUND

The subject matter on appeal relates generally to a cooling system for a vehicle traction battery, a vehicle comprising such a cooling system, and a method of cooling a vehicle traction battery (Specification filed June 13, 2012 (“Spec.”) ¶¶ 1, 5–13; Drawings filed June 13, 2012, Fig. 1). Claims 1 and 15 are reproduced from the Claims Appendix to the Appeal Brief, as follows:

1. A vehicle traction battery cooling system comprising:

a cabin climate control duct system connected to the battery cooling system and having a blend door movable between at least an open position and a closed position to select a source of incoming air for cooling a plurality of battery cells, wherein the climate control duct system includes an air supply duct arranged to direct the incoming air to a battery chamber surrounding the battery cells;

*a controller programmed to:*

*receive a signal indicative of a presence of gases vented by the battery cells;*

*command the blend door to the open position in response to the signal; and*

*a vent tube in fluid communication with the battery chamber and extending from the battery chamber to outside the vehicle, thereby venting the gases outside the vehicle.*

15. A method for cooling a traction battery in a vehicle, the method comprising:

*receiving, by a controller, a signal indicative of a presence of gases vented by the battery;*

*commanding, by the controller, a cabin climate control system parameter to change in response to the signal.*

(Claims App. 1, 3 (emphases added)).

## II. REJECTIONS ON APPEAL

The claims on appeal stand rejected, as follows:

- A. Claims 15–17 and 19–21 under 35 U.S.C. § 101 as being directed to a judicial exception (i.e., a law of nature, a natural phenomenon, or an abstract idea) without significantly more;
- B. Claims 15 and 16 under pre-AIA 35 U.S.C. § 102(b) as anticipated by Zhu et al.<sup>3</sup> (“Zhu”);
- C. Claims 1–3, 6–13, 22, and 23 under pre-AIA 35 U.S.C. § 103(a) as unpatentable over Zhu in view of Matsumoto et al.<sup>4</sup> (“Matsumoto”) and further in view of Yoneda;<sup>5</sup>
- D. Claim 17<sup>6</sup> under 35 U.S.C. § 103(a) as unpatentable over Zhu in view of Kato et al.<sup>7</sup> (“Kato”); and
- E. Claims 19–21 under 35 U.S.C. 103(a) as unpatentable over Zhu in view of Kato and further in view of Yoneda.

(Ans. 3–20; Final Act. 2–17).

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<sup>3</sup> US 2008/0236181 A1, published October 2, 2008.

<sup>4</sup> US 2011/0059341 A1, published March 10, 2011.

<sup>5</sup> US 2005/0285563 A1, published December 29, 2005.

<sup>6</sup> Claim 17 depends from claim 16, which depends from claim 15 (Claims App. 3). Although claims 15 and 16 were not included in the statement of the rejection, these claims necessarily stand rejected on the same basis as claim 17. *Callaway Golf Co. v. Acushnet Co.*, 576 F.3d 1331, 1344 (Fed. Cir. 2009) (“A broader independent claim cannot be nonobvious where a dependent claim stemming from that independent claim is invalid for obviousness.”).

<sup>7</sup> US 6,377,880 B1, issued April 23, 2002.

### III. DISCUSSION

**Rejection A (Patent Eligibility).** Without specifically identifying the judicial exception in claims 15–17 and 19–21, the Examiner states that these claims do not include additional elements that are sufficient to amount to significantly more than the judicial exception (Ans. 3). According to the Examiner, “the limitations[ in claim 15] ‘receiving[, by a controller,] a signal indicative of a presence of gases vented by the battery[;] commanding[, by the controller,] a cabin climate control system parameter to change in response to the signal’ could be interpreted as a person notic[ing] some smoke c[oming] out from the battery, then the person just press[ing] a button to vent the smoke out of the vehicle” (*id.*). In the Examiner’s view, “[t]here is no specific structural component for prosecuting all of the command, in other words, all of the command could be done manually” (*id.* at 3–4). The Examiner posits that the recitation “by [a] controller” in claim 15 “could be interpreted as a technician who operates the battery cooling system” and that the “controller” limitation does not significantly add to the judicial exception (*id.* at 4). As to whether the method improves computer functionality, the Examiner states that “a claim whose entire scope can be performed mentally . . . cannot be said to improve computer technology” (*id.* at 18).

The Appellant contends that the Examiner’s interpretation of the disputed claim limitations is unreasonable because it is inconsistent with the Specification and Drawings (Appeal Br. 6). According to the Appellant, the Specification (¶¶ 25–27, 37) and Figure 1 would have informed a person of ordinary skill in the art that the claimed method requires a “controller” that is in electrical communication with the climate control system (*id.*).

Regarding the Examiner's position that the claim limitations at issue could be performed manually, the Appellant argues that the Examiner's position is flawed and that "a 'vehicle controller' that commands changes in the climate control system's parameters in response to receiving signals from sensors amounts to significantly more than manual control of the climate control system under the 'abstract-idea' two-step analysis" (*id.* at 7).

We concur with the Appellant that the Examiner's rejection is not well-founded. Our reasons follow.

1. *Principles of Law*

An invention is patent-eligible if it claims a "new and useful process, machine, manufacture, or composition of matter." 35 U.S.C. § 101. The Supreme Court, however, 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*, 573 U.S. at 216.

In determining whether a claim falls within an excluded category, we are guided by the Supreme Court's two-step framework, described in *Alice Corp. v. CLS Bank Int'l*, 573 U.S. 208, 217–18 (2014) (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 (1981)); “tanning, dyeing, making water-proof cloth, vulcanizing India rubber, smelting ores” (*id.* at 182 n.7 (quoting *Corning v. Burden*, 56 U.S. 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 (citations 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 with regard to the first step of the *Alice/Mayo* test (i.e., Step 2A of the USPTO’s Subject Matter Eligibility Guidance as incorporated into MPEP § 2106 and as updated in October 2019). USPTO’s January 7, 2019, *2019 Revised Patent Subject Matter Eligibility Guidance* (“Revised Guidance”). 84 Fed. Reg. 50 (Jan. 7, 2019). Thus, under Step 1 of the Guidance, as revised, we determine whether the claimed subject matter falls within the four statutory categories: process, machine, manufacture, or composition of matter. Step 2A of the Guidance is two-pronged, under which we 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)).

*See* 84 Fed. Reg. at 54–55.

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

(3) adds a specific limitation beyond the judicial exception that is 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* 84 Fed. Reg. at 54–56.

## 2. *Claim Interpretation*

Before applying the two-step framework described in *Alice/Mayo*, we construe the claim limitations that are at issue. *MyMail, Ltd. v. ooVoo, LLC*, 934 F.3d 1373, 1379 (Fed. Cir. 2019) (“Determining patent eligibility requires a full understanding of the basic character of the claimed subject matter.”).

Claim 15, the sole independent claim subject to this rejection, recites the steps of “receiving, by a controller, a signal indicative of a presence of gases vented by the battery” and “commanding, by the controller, a cabin climate control system parameter to change in response to the signal” (Claims App. 3). The only description of a “controller” in the Appellant’s disclosure is a controller that is configured to receive a signal from a battery system (e.g., by a sensor) and to command a climate control system (e.g., to vent the gases outside the vehicle) by *communicating* with such a battery system and a climate control system (Spec. ¶¶ 25–27, 30–32; Fig. 1). The Appellant’s disclosure provides no other indication that the “controller” can

be anything other than what is meant by a “controller” in the traditional sense—i.e., a control module **64**, such as that shown in Fig. 1, which electronically *communicates* with a battery system by *receiving* a signal (as distinguished from noticing smoke) and *commanding* a climate control system to perform a specified operation (as distinguished from pressing a button). Therefore, the Examiner’s proffered claim construction (Ans. 4) that the “controller” may be interpreted as “a person [who] notices some smoke” or “a technician who operates the battery cooling system”—i.e., by just pressing a button—is unreasonable. *In re Baker Hughes, Inc.*, 215 F.3d 1297, 1303 (Fed. Cir. 2000) (holding that interpreting “hydrocarbon” to read on gaseous hydrocarbons constituted reversible error in the proper context of the written description). *See also In re Smith Int’l, Inc.*, 871 F.3d 1375, 1382–83 (Fed. Cir. 2017); *In re Suitco Surface, Inc.*, 603 F.3d 1255, 1261 (Fed. Cir. 2010).

### 3. Analysis

Having construed claim 15, we turn to the PTO guidance on patent eligibility. Under Step 1 of the revised Guidance, claim 1 falls within the four statutory categories of patent subject matter identified by 35 U.S.C. § 101. Specifically, claim 15 recites a “method for cooling a traction battery in a vehicle”—i.e., a method that includes two positively-recited steps. That, however, does not end our inquiry. *Alice*, 573 U.S. at 224 (“[M]any computer-implemented claims are formally addressed to patent-eligible subject matter. But if that were the end of the § 101 inquiry, an applicant could claim any principle of the physical or social sciences by reciting a computer system configured to implement the relevant concept.”).

The Examiner appears to find that, under Step 2A, Prong 1, claim 15 recites judicial exceptions in the form of mental processes (Ans. 18 (“a claim whose entire scope can be performed mentally, cannot be said to improve computer technology”)). Specifically, the Examiner alleges that the presence of vented gases could be detected by “a nose or eyes of [a] person” and that “all of the command[ing] could be done by the person, for example, pressing a button to open a blend door” (*id.* at 3). Although Matsumoto shows that gases vented from a battery system may include smoke generated from a short circuit, which presumably could be detected by smell or sight, these gases also include hydrogen and carbon monoxide (Matsumoto ¶¶ 4, 22; Fig. 2(b)). Furthermore, the correct construction of “controller” requires a controller that is configured electronically to not only receive a signal from a battery system but also command a climate control system to carry out a specified function (Spec. ¶ 27; Fig. 1). Mechanically pressing a button has not reasonably been shown to be considered by one skilled in the relevant art as “commanding” as that term is used in the present context. Nor does the Examiner establish that a human mind per se can practically perform such a step and function. *See October 2019 Update: Subject Matter Eligibility* at 7 (“Claims do not recite a mental process when they do not contain limitations that can practically be performed in the human mind, for instance when the human mind is not equipped to perform the claim limitations.”); *Revised Guidance*, 84 Fed. Reg. at 52 n. 14.

Therefore, we conclude that claim 15 is not directed to a judicial exception (a law of nature, natural phenomenon, or abstract idea). Because we find that claim 15 is not directed to a judicial exception, we need not

address Step 2A, Prong 2, or Step 2B. Accordingly, we do not sustain the Examiner's rejection.

**Rejections B (Anticipation), D (Obviousness), and E (Obviousness).** The Examiner finds that Zhu describes every limitation recited in claims 15 and 16 (Ans. 4 (citing Zhu ¶¶ 26–33; Fig. 2C)). Specifically, the Examiner finds that Zhu teaches commanding a climate control system to be in an open position such that a battery system receives outside air in response to an air temperature measurement (Ans. 4). According to the Examiner, “[t]he air temperature could be measured only if a presence of gases inside the battery system [sic]” (*id.*).

The Appellant contends that Zhu does not disclose any signals indicating a presence of vented gases from the battery, as required by claim 15 (Appeal Br. 12). According to the Appellant, “the presence of [vented] gas is not necessary or inherent for detecting temperature” (*id.*).

We agree with the Appellant. Claims 15 and 16 require “receiving, by a controller, a signal indicative of a presence of gases vented by the battery” (Claims App. 3). The Examiner does not explain how a signal that is a mere temperature measurement would inherently or necessarily indicate the presence of vented gases.

Therefore, we do not sustain the Examiner's rejection on this ground.

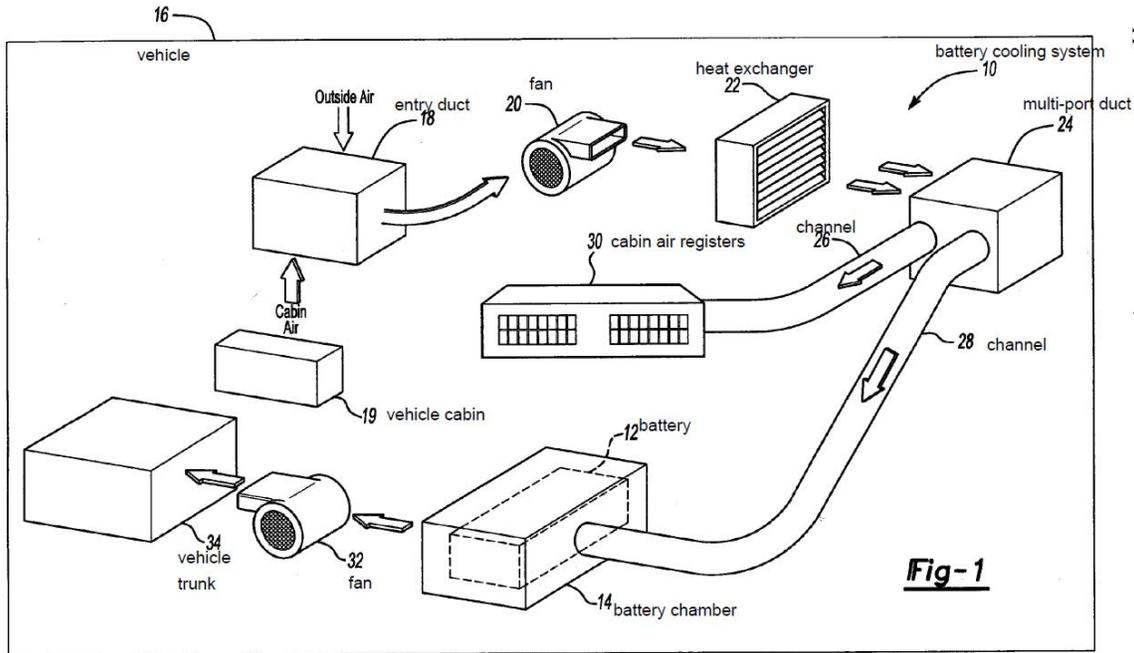
Rejections D and E are not sustained for the same reason because neither Kato nor Yoneda has been cited to cure the deficiency in the Examiner's anticipation finding as to claim 15's subject matter over Zhu.

**Rejections C (Obviousness).** Except for independent claim 9 and claims 6–8 and 12 as a group, the Appellant's arguments focus primarily on claim 1 (Appeal Br. 7–11). Therefore, we decide the appeal as to these

rejections on the basis of claims 1 and 9, which we select as representative. All other claims subject to Rejection C stand or fall with either claim 1 or claim 9. See 37 C.F.R. § 41.37(c)(1)(iv).

2. *Claim 1*

Zhu's Figure 1 (annotated) is reproduced, as follows:



Zhu's Figure 1 above depicts a battery cooling system 10 for a vehicle 16 comprising an entry duct 18 for drawing outside air, a fan 20 directing the air to a heat exchanger 22 to cool the air, a multi-port duct 24 that channels the cooled air to cabin air registers 30 to cool vehicle cabin 19 and/or a battery 12 via channels 26 and 28, respectively, and a fan 32 that draws air from a battery chamber 14 into vehicle trunk 34 (Zhu ¶¶ 10, 32–33).

The Examiner correctly finds that, in contrast to claim 1, Zhu does not disclose: (1) a controller that is programmed to receive a signal indicative of a presence of gases vented by the battery cells and to command a blend door to an open position in response to such a signal; and (2) a vent tube for

venting the gases from the battery chamber to outside the vehicle (Ans. 5–6). For the reasons given by the Examiner and below, however, these differences do not confer patentability to claim 1 over the combined teachings of the applied prior art references.

Specifically, Matsumoto teaches an electrically-driven vehicle in which a controller **50** obtains a gas temperature, carbon monoxide concentration, and hydrogen concentration from sensors **36–38** in a gas discharge passage **28** connected to a chamber **27** for collecting gas discharge from a cell **21** of a lithium ion battery pack **20** and determines whether an abnormality has occurred in the battery pack **20** (Matsumoto ¶¶ 20, 25; Fig. 3). Matsumoto teaches that, in the normal state, the battery pack **20** is provided with an air intake duct **23** for introducing air from the vehicle interior **11** for cooling and an air discharge duct **25** for discharging warmed air into the vehicle interior **11** (*id.* ¶ 20). Matsumoto teaches that when an internal pressure inside the cell **21** is increased due to generated gas in an abnormal state, rupture disk **26a** is ruptured to discharge the gas from inside the cell **21** to the outside, whereby gas from the gas discharge passage **28** connected to chamber **27** is discharged into vehicle interior **11** (*id.*). Specifically, when an abnormality is detected—i.e., “[w]hen smoke is confirmed to be emitted from the battery pack **20**, the controller **50** outputs an outside air introduction command to [a] fan damper interface **54** by [an] outside air introduction mechanism starting means **51**” and “also outputs a command to open a window to [a] window glass drive mechanism interface **55** by [a] window opening starting means **52**” (*id.* ¶ 31). Thus, Matsumoto would have reasonably suggested that any harmful gases such as carbon

monoxide and hydrogen are vented outside the vehicle through an open window.

Yoneda teaches the known concept of cooling a battery pack using cooling air from a vehicle's interior and then exhausting the cooling wind directly out of the vehicle through an exhaust port (Yoneda ¶¶ 7, 102; Fig. 5). Yoneda shows that an exhaust duct **12** can be used for this purpose (*id.* Fig. 5).

Given the collective teachings found in Zhu, Matsumoto, and Yoneda, we agree with the Examiner that a person having ordinary skill in the art would have been prompted to modify Zhu's battery cooling system to include Matsumoto's controller and sensors to determine an abnormal state (i.e., the presence of carbon monoxide and hydrogen) and, when such an abnormal state exists, to vent harmful gases directly outside the vehicle without passage through the vehicle's passenger cabin in order to avoid the presence of harmful gases within the cabin. *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.”); *id.* at 420 (“Common sense teaches . . . that familiar items may have obvious uses beyond their primary purposes, and in many cases a person of ordinary skill will be able to fit the teachings of multiple patents together like pieces of a puzzle.”).

The Appellant argues that “Matsumoto is dealing with a very different system where the air conditioning system is not connected to the battery pack for cooling the battery, as in claim 1” and “[i]nstead of venting to the

battery system outside the vehicle, as required by the claims, Matsumoto discloses that the battery system vents to the interior cabin so that ‘air which was warmed after cooling the battery pack’ is used to warm the vehicle compartment” (Appeal Br. 8). This argument fails because the Examiner is relying on the collective teachings found in all three references. Zhu teaches using air cooled by a heat exchanger to cool the battery system and Yoneda teaches the concept of venting gases directly outside the vehicle. *In re Keller*, 642 F.2d 413, 426 (CCPA 1981) (“[O]ne cannot show non-obviousness by attacking references individually where, as here, the rejections are based on combinations of references.”).

The Appellant’s related argument that “Matsumoto teaches away from venting the air *outside* the vehicle since Matsumoto teaches venting to *inside* the vehicle to warm the cabin” is also without persuasive merit. Merely pointing out differences between a claimed device and a prior art device does not suffice to establish a teaching away. Here, the Appellant does not explain why a person having ordinary skill in the art would have been dissuaded from combining the references in the manner as proposed by the Examiner. *In re Urbanski*, 809 F.3d 1237, 1244 (Fed. Cir. 2016) (“Nothing in the prior art teaches that the proposed modification would have resulted in an ‘inoperable’ process.”).

For these reasons, we uphold the Examiner’s rejection of claim 1.

### 3. *Claim 9*

With respect to claim 9, the Appellant argues that Zhu teaches a fan **32** for pulling air from within the battery chamber **14** and directing the air into a vehicle trunk **34**, and not outside the vehicle as required by the claim (Appeal Br. 10 (citing Zhu ¶ 33)). For the same reasons discussed above for

claim 1, we agree with the Examiner that the collective teachings found in not only Zhu, but also Matsumoto and Yoneda, would have suggested the subject matter recited in claim 9.

#### IV. CONCLUSION

In summary:

<b>Claims Rejected</b>	<b>35 U.S.C. §</b>	<b>Reference(s)/ Basis</b>	<b>Affirmed</b>	<b>Reversed</b>
15-17, 19-21	101	Eligibility		15-17, 19-21
15, 16	102(b)	Zhu		15, 16
1-3, 6-13, 22, 23	103(a)	Zhu, Matsumoto, Yoneda	1-3, 6-13, 22, 23	
15-17	103(a)	Zhu, Kato		15-17
19-21	103(a)	Zhu, Kato, Yoneda		19-21
<b>Overall Outcome</b>			1-3, 6-13, 22, 23	15-17, 19-21

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

AFFIRMED