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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* JOEL ZABULON and DAVID FRANK

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Appeal 2019-002969  
Application 14/862,227  
Technology Center 2800

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Before LINDA M. GAUDETTE, MONTÉ T. SQUIRE, and  
JANE E. INGLESE, *Administrative Patent Judges*.

INGLESE, *Administrative Patent Judge*.

DECISION ON APPEAL

Appellant<sup>1</sup> requests our review under 35 U.S.C. § 134(a) of the Examiner's decision to finally reject claims 1–15.<sup>2</sup> We have jurisdiction over this appeal under 35 U.S.C. § 6(b).

We AFFIRM.

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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. Appellant identifies MESSIER-BUGATTI-DOWTY as the real party in interest. Appeal Brief filed September 10, 2018 (“Appeal Br.”) at 2.

<sup>2</sup> Final Office Action entered February 14, 2018 (“Final Act.”) at 1.

### CLAIMED SUBJECT MATTER

Appellant claims a measurement device for measuring the rotational speed of a vehicle wheel. Appeal Br. 4–6. Claim 1, the sole pending independent claim, illustrates the subject matter on appeal, and is reproduced below with contested subject matter italicized:

1. A measurement device for measuring the rotational speed of a vehicle wheel, the measurement device comprising a body incorporating:

a rotor which can be rotated by the wheel and on which at least one permanent magnet is mounted;

*a stator comprising a winding generating a measurement voltage ( $V_{mes}$ ) when the wheel and therefore the permanent magnet tum, the measurement voltage being indicative of the rotational speed of the wheel;*

an electronic board comprising processing means for processing the measurement voltage;

*power supply means designed to generate, from the measurement voltage, a power supply voltage ( $V_{ali}$ ) intended to power the electronic board;*

*the electronic board comprising first voltage-matching means intended to drop the power supply voltage when the latter is above a predetermined first voltage threshold so as not to damage components of the electronic board and to raise the power supply voltage when the latter is below a predetermined second voltage threshold.*

Appeal Br. 29 (Claims Appendix) (emphasis added).

### REJECTIONS

The Examiner maintains the following rejections in the Examiner's Answer entered January 2, 2019 ("Ans."):

- I. Claims 1, 2, 4, 8–11, and 13–15 under 35 U.S.C. § 103 as unpatentable over Windmueller<sup>3</sup> in view of Hang<sup>4</sup>;
- II. Claim 3 under 35 U.S.C. § 103(a) as unpatentable over Windmueller in view of Hang and Kirkwood<sup>5</sup>;
- III. Claims 5 and 6 under 35 U.S.C. § 103 as unpatentable over Windmueller in view of Hang and Kusch<sup>6</sup>;
- IV. Claim 7 under 35 U.S.C. § 103 as unpatentable over Windmueller in view of Hang, Kusch, and Lee<sup>7</sup>; and
- V. Claim 12 under 35 U.S.C. § 103 as unpatentable over Windmueller in view of Hang and Lo<sup>8</sup>.

#### FACTUAL FINDINGS AND ANALYSIS

Upon consideration of the evidence relied upon in this appeal and each of Appellant’s contentions, we affirm the Examiner’s rejections of claims 1–15 under 35 U.S.C. § 103 based on the fact-finding and for the reasons set forth in the Final Action, the Answer, and below.

We review appealed rejections for reversible error based on the arguments and evidence the appellant provides for each issue the appellant identifies. 37 C.F.R. § 41.37(c)(1)(iv); *Ex parte Frye*, 94 USPQ2d 1072,

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<sup>3</sup> Windmueller et al. (“Windmueller”), US 2011/0018526 A1, published January 27, 2011.

<sup>4</sup> Hang et al. (“Hang”), US 2015/0123631 A1, published May 7, 2015.

<sup>5</sup> Kirkwood et al. (“Kirkwood”), US 2006/0199697 A1, published September 7, 2006.

<sup>6</sup> Kusch et al. (“Kusch”), US 2013/0307489 A1, published November 21, 2013.

<sup>7</sup> Lee, US 2011/0115288 A1, published May 19, 2011.

<sup>8</sup> Lo, US 2012/0080934 A1, published April 5, 2012.

1075 (BPAI 2010) (precedential) (cited with approval in *In re Jung*, 637 F.3d 1356, 1365 (Fed. Cir. 2011) (explaining that even if the Examiner had failed to make a prima facie case, “it has long been the Board’s practice to require an applicant to identify the alleged error in the examiner’s rejections”)).

Appellant presents arguments for claim 1 (Appeal Br. 8–26), and although Appellant also separately addresses each of claims 2 and 3, Appellant asserts only that claims 2 and 3 are unpatentable for the same reasons as claim 1. Appeal Br. 26–27. We accordingly select claim 1 as representative, and decide the appeal as to claims 1–15 based on claim 1 alone. 37 C.F.R. § 41.37(c)(1)(iv).

Claim 1 requires the recited measurement device for measuring the rotational speed of a vehicle wheel to comprise a body incorporating a stator comprising a winding that generates a measurement voltage ( $V_{mes}$ ), power supply means designed to generate, from the measurement voltage, a power supply voltage ( $V_{ali}$ ), and an electronic board comprising a voltage-matching means intended to drop the power supply voltage when the latter is above a predetermined first voltage threshold, and raise the power supply voltage when the latter is below a predetermined second voltage threshold.

Windmueller discloses a device for measuring the rotational speed of a rotor comprising inductive pulse generator 4 including induction coil 6 (winding) wound about a pole pin to which magnet 8 is attached, and in which an electrical voltage representing a rotational speed measurement signal (measurement voltage,  $V_{mes}$ ) is induced by rotation of the rotor with respect to a stator. Windmueller ¶¶ 1, 23, 24; Fig. Windmueller discloses that the device also includes pulse shaper 18 that shapes alternating voltage

generated by induction coil 6 into direct voltage. Windmueller ¶ 29; Fig. Windmueller discloses that the direct voltage is used to charge energy store 16 (power supply means that generates power supply voltage  $V_{ali}$  from measurement voltage  $V_{mes}$ ), which supplies energy to wireless transmitting device 10 (electronic board). *Id.* Windmueller discloses that the voltage induced in induction coil 6 (measurement voltage  $V_{mes}$ ) thus carries out a dual function: providing a rotational speed measurement signal, and supplying electrical energy (power supply voltage  $V_{ali}$ ) for operation of transmitting device 10 (electronic board). Windmueller ¶ 7.

The Examiner finds that Windmueller does not disclose that Windmueller's device includes voltage matching means intended to drop the power supply voltage when the latter is above a predetermined first voltage threshold, and raise the power supply voltage when the latter is below a predetermined second voltage threshold, and the Examiner relies on Hang for suggesting incorporation of such a voltage matching means into Windmueller's device. Final Act. 4.

Hang discloses an over voltage protection control apparatus (voltage matching means) comprising a buck-boost converter including four switches, and an over voltage detection circuit. Hang ¶¶ 2, 4, 5. Hang discloses that the buck-boost converter can operate in a buck mode to decrease the output voltage when the input voltage  $V_{in}$  is much greater than the output voltage  $V_o$ , and can operate in a boost mode to increase the output voltage when the input voltage  $V_{in}$  is much less than the output voltage  $V_o$ . ¶¶ 18, 28–32.

Hang discloses that the over voltage detection circuit receives a voltage feedback signal indicative of an output voltage of the buck-boost

converter, and generates an over voltage signal if the output voltage is greater than an over voltage threshold signal. Hang ¶ 22. Hang discloses controlling the four switches in response to the over voltage signal to prevent the output voltage “from overshooting” a desired level. Hang ¶¶ 18–20, 38; Fig. 6.

In view of these disclosures in Hang, the Examiner concludes that it would have been obvious to one of ordinary skill in the art before the effective filing date of the present application to incorporate Hang’s over voltage protection control apparatus (voltage matching means) into Windmueller’s rotational speed measuring device, downstream of Windmueller’s energy store 16 (power supply means that generates power supply voltage  $V_{ali}$  from measurement voltage  $V_{mes}$ ) and upstream of Windmueller’s transmitting device 10 (electronic board), so that the output of energy store 16 would serve as the input of the over voltage protection control apparatus (voltage matching means), in order to prevent over voltage from being supplied to transmitting device 10 (electronic board), while also ensuring supply of sufficient power to transmitting device 10 (electronic board) by boosting the power supplied to transmitting device 10 (electronic board) when necessary. Ans. 6–7.

Appellant argues that “one having ordinary skill in the art would not have [had] a motivation to combine Windmueller and Hang in order to reproduce the invention” because “Windmueller does not recognize a need to control the voltage from a power supply, where the power is due to a recovery of energy,” and does not teach or suggest that “power supplied by recovered energy should be raised or lowered if the voltage varies in any way,” while Hang “is not concerned with the regulation of power supplied

through recovery of energy.” Appeal Br. 16–17, 21. Appellant argues that “recovered energy” generated from current induced in a stator by the rotation of a rotor on which a permanent magnet is mounted (as disclosed in Windmueller) is low, and using “voltage-matching means [as disclosed in Hang] in an application in which electronic boards are supplied by recovered energy is not a common, conventional or even obvious solution, because in such application, since the recovered energy is low, the first objective is to increase the voltage and not to reduce it.” Appeal Br. 19. Appellant argues that Hang does not disclose use of a buck-boost converter “in an application in which **electronic boards are supplied with recovered energy, where the recovered energy necessarily makes the supply current limited,**” but Hang instead discloses “an application in which the supply current is **unlimited**.” Appeal Br. 20–21. Appellant argues that “the problem solved by Hang is to protect electronics board against over voltage,” and “Hang is not designed to optimize the power consumption of a board supplied through recovery of energy.” Appeal Br. 21. Appellant argues that the Examiner’s proposed combination of Windmueller and Hang, therefore, “is driven solely by hindsight reconstruction based on Appellant’s own teachings.” Appeal Br. 19.

Appellant’s arguments do not identify reversible error in the Examiner’s rejection, for reasons well-expressed by the Examiner in the Answer, and discussed below.

Appellant’s argument that Windmueller does not recognize a need to control (by raising or lowering) the voltage from a power supply, where the power is due to a recovery of energy, is improperly based on Windmueller alone, and does not take into consideration what the combined disclosures of

Windmueller and Hang reasonably would have suggested to one of ordinary skill in the art before the effective filing date of the present application, as further discussed below. *In re Merck & Co., Inc.*, 800 F.2d 1091, 1097 (Fed. Cir. 1986) (“Non-obviousness cannot be established by attacking references individually where the rejection is based upon the teachings of a combination of references.”); *In re Keller*, 642 F.2d 413, 425 (CCPA 1981) (The test for obviousness “is what the combined teachings of the references would have suggested to those of ordinary skill in the art.”).

And although Hang does disclose a buck-boost converter that operates in a buck mode to decrease the output voltage when the input voltage is much greater than the output voltage, Hang also discloses that the buck-boost converter operates in a boost mode *to increase the output voltage when the input voltage is much less than the output voltage*. Hang’s disclosures, therefore, are not limited to protecting an electronic board against over voltage as Appellant’s arguments imply, and Hang also discloses *increasing* output voltage supplied to an electronic board. *In re Applied Materials, Inc.*, 692 F.3d 1289, 1298 (Fed. Cir. 2012) (“A reference must be considered for everything that it teaches, not simply the described invention or a preferred embodiment.”); *see also In re Lamberti*, 545 F.2d 747, 750 (CCPA 1976) (“all disclosure of the prior art, including unpreferred embodiments, must be considered”).

Hang does not explicitly disclose use of the over voltage protection control apparatus (voltage matching means) described in the reference in an application in which recovered energy is used to power an electronic board. However, one of ordinary skill in the art seeking to produce a device as disclosed in Windmueller, in which voltage induced in induction coil 6

supplies electrical energy (power supply voltage  $V_{ali}$  or “recovered energy”) for operation of transmitting device 10 (electronic board), reasonably would have been led to incorporate an over voltage protection control apparatus (voltage matching means) as disclosed in Hang into Windmueller’s device downstream of energy store 16 (power supply means that generates power supply voltage  $V_{ali}$  from measurement voltage  $V_{mes}$ ), to prevent voltage above a desired level from being supplied to transmitting device 10 (electronic board), and to allow increased voltage to be supplied to transmitting device 10 (electronic board) when necessary to provide sufficient voltage to power transmitting device 10.

The Examiner’s proposed combination of Windmueller and Hang, therefore, is based on explicit disclosures in Windmueller and Hang, and what those disclosures reasonably would have suggested to one of ordinary skill in the art, rather than based on impermissible hindsight reconstruction as Appellant argues.

Appellant also argues that even if combined, Windmueller and Hang would not have led to the device of claim 1, because in the claimed device, the power supply voltage is an input of the first voltage matching means, which is not disclosed in Hang. Appeal Br. 21–22. Appellant argues that Hang instead discloses that “the power stage circuit operates according to a condition related to a comparison between input voltage  $V_{in}$  and output voltage  $V_{o}$ , but does not (1) compare input voltage  $V_{in}$  from a power supply with thresholds and (2) control the voltage supplied to the electronic board based on that comparison.” Appeal Br. 22–23 (emphasis omitted) (citing Hang ¶ 18); *see also* Appeal Br. 23–25 (citing Hang ¶¶ 28, 34). Appellant argues that if one of ordinary skill in the art were to “combine Windmueller

and Hang, such person would monitor the output of the first voltage-matching means in order to detect an over voltage,” and “would not monitor the output of the power supply.” Appeal Br. 25.

Appellant’s arguments do not identify reversible error in the Examiner’s rejection. Hang discloses that the over voltage detection circuit in Hang’s apparatus receives a voltage feedback signal indicative of an output voltage of the buck-boost converter, and generates an over voltage signal if the output voltage is greater than an over voltage threshold signal. Hang ¶ 22. In view of this disclosure, the ordinarily skilled artisan would have recognized that if Hang’s voltage protection control apparatus (voltage matching means) were incorporated into Windmueller’s device downstream of Windmueller’s energy store 16 and upstream of Windmueller’s transmitting device 10 as discussed above, the output of energy store 16 would serve as the input of the over voltage protection control apparatus (voltage matching means), corresponding to the input voltage  $V_{in}$  disclosed in Hang, and this voltage would be compared to a threshold to control the voltage output from the voltage protection control apparatus and supplied to transmitting device 10 (electronic board), corresponding to the output voltage  $V_o$  disclosed in Hang. Contrary to Appellant’s arguments, the proposed combination of Windmueller and Hang, therefore, would result in a device that compares input voltage  $V_{in}$  from a power supply with a threshold, and controls the voltage supplied to an electronic board  $V_o$  based on that comparison.

Appellant argues that “the technical field of Hang is far from the technical field of the invention.” Appeal Br. 19. Appellant argues that Appellant’s invention is directed to “a device for measuring the rotational

speed of a vehicle wheel,” but in contrast, Hang is directed to “power electronics and over voltage protection.” Appeal Br. 19–20.

Appellant’s argument does not identify reversible error in the Examiner’s rejection. Appellant’s Specification explains that the problem with which the present inventors were concerned was improving the distribution architecture of data concentrators and processors used for aircraft wheel braking systems by carrying out as many processing operations as possible near the wheels (rather than remote from the wheels), including processing voltage generated by rotation of the wheels to measure their rotational speed. Spec. 1, l. 34–2, l. 20; 5, ll. 12–17. The Specification explains that Appellant’s invention involves performing processing operations on voltage generated by a rotational speed measurement device by an electronic board incorporated directly into the measurement device, and powering the electronic board directly from the measurement voltage. Spec. 3, ll. 1–19.

One of ordinary skill in the art seeking to address the problem with which the present inventors were concerned, and seeking to develop a device for processing voltage generated by rotation of wheels to measure their rotational speed, reasonably would have looked to Hang’s disclosure of an over voltage protection control apparatus (voltage matching means) comprising a buck-boost converter and an over voltage detection circuit. The ordinarily skilled artisan would have recognized that Hang’s over voltage protection control apparatus for controlling the level of voltage supplied to an electronic board (to protect against supplying excessive voltage, and to increase the voltage supplied when necessary), would be reasonably pertinent to developing an electronic board that functions to

process voltage generated by a rotational speed measurement device, because an apparatus as disclosed in Hang would allow control of the level of voltage generated by the rotational speed measurement device that is supplied to the electronic board. *In re Kahn*, 441 F.3d 977, 986–87 (Fed. Cir. 2006) (stating that the analogous art test requires that “a reference is either in the field of the applicant’s endeavor or is reasonably pertinent to the problem with which the inventor was concerned . . . based on the judgment of a person having ordinary skill in the art”); *Medtronic, Inc. v. Cardiac Pacemakers, Inc.*, 721 F.2d 1563, 1573–74 (Fed. Cir. 1983) (A claimed cardiac pacemaker included an inhibitor for preventing application of pulses at too high a frequency rate. Two references disclosed circuits used in high power, high frequency devices which inhibited the runaway of pulses from a pulse source. The court held that one of ordinary skill in the pacemaker art faced with a rate-limiting problem would look to the solutions of others faced with rate limiting problems, and therefore the references were in an analogous art).

Appellant argues that “Hang is the **third** document combined by the examiner with Windmueller” during prosecution of the present application, which indicates “that the invention is not obvious.” Appeal Br. 18–19 (referring to the first, second, and third Office Actions issued for the present application.).

The rejection of claim 1 before us in the present appeal, however, is based on a combination of only two prior art references. Any prior art reference that was applied earlier in prosecution that is not applied in a rejection of the pending claims contested by Appellant in the present appeal is not pertinent to this appeal. 37 C.F.R. § 41.37(c)(1)(iv). Nonetheless, we

point out that it is well settled that the number of references required to show obviousness does not, by itself, demonstrate that the claimed subject matter would not have been obvious to one of ordinary skill in the art. *In re Gorman*, 933 F.2d 982, 986 (Fed. Cir. 1991) (affirming obviousness rejection over thirteen references) (“The criterion . . . is not the number of references, but what they would have meant to a person of ordinary skill in the field of the invention.”).

We, accordingly, sustain the Examiner’s rejections of claims 1–15 under 35 U.S.C. § 103.

**CONCLUSION**

<b>Claims</b>	<b>35 U.S.C. §</b>	<b>Reference(s)/Basis</b>	<b>Affirmed</b>	<b>Reversed</b>
1, 2, 4, 8–11, 13–15	103	Windmueller, Hang	1, 2, 4, 8–11, 13–15	
3	103	Windmueller, Hang, Kirkwood	3	
5, 6	103	Windmueller, Hang, Kusch	5, 6	
7	103	Windmueller, Hang, Kusch, Lee	7	
12	103	Windmueller, Hang, Lo	12	
<b>Overall Outcome</b>			1–15	

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

**AFFIRMED**