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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte SOO HYUN LIM, MIN HEE LEE, JAE HYUN LEE,
SEONG MIN LEE, JIHYUN KIM, and TAE JIN PARK

Appeal 2019-001006
Application 14/459,453
Technology Center 1700

Before MONTÉ T. SQUIRE, BRIAN D. RANGE, and JANE E. INGLESE,
Administrative Patent Judges.

RANGE, *Administrative Patent Judge.*

DECISION ON APPEAL

STATEMENT OF THE CASE

Pursuant to 35 U.S.C. § 134(a), Appellant¹ appeals from the Examiner's decision to reject claims 1, 2, 4–9, 16, 18, 20–24, and 28–32.^{2,3} We have jurisdiction under 35 U.S.C. § 6(b).

We AFFIRM.

CLAIMED SUBJECT MATTER

Appellant describes the invention as relating to an electrode assembly and secondary battery including a cathode and anode of different shapes. Spec. ¶ 2. In particular, the Specification explains that certain cathode and anode shapes can solve certain problems related to lithium batteries and achieve “desired effects.” *Id.* ¶¶ 2–12, 23. For example, the different shaped cathodes can prevent the position of the anode and cathode being confused during module assembly or wiring. *Id.* ¶ 9. Claim 1 is illustrative:

1. An electrode assembly comprising:
a plurality of alternately arranged cathode plates and anode plates;

¹ We use the word “Appellant” to refer to “applicant” as defined in 37 C.F.R. § 1.42. Appellant identifies the real party in interest as LG CHEM, LTD. Appeal Br. 2.

² In this Decision, we refer to the Non-Final Office Action dated December 28, 2017 (“Non-Final Act.”), the Appeal Brief filed June 11, 2018 (“Appeal Br.”), the Examiner's Answer dated September 18, 2018 (“Ans.”), and the Reply Brief filed November 16, 2018 (“Reply Br.”).

³ Appellant does not reference all of these claims in its statement of the grounds of rejection to be reviewed on appeal. Appeal Br. 4. We understand, nonetheless, that Appellant appeals the rejection of each of these claims because Appellant included these claims in its Claims Appendix. Also, the Examiner understood that these claims are on appeal because the Examiner references them in the rejection summary. Ans. 3–4.

a separator disposed between a one of the cathode plates and a one of the anode plates;

a plurality of cathode tabs respectively formed on the cathode plates;

a plurality of anode tabs respectively formed on the anode plates;

a cathode lead coupled to the cathode tabs; and

an anode lead coupled to the anode tabs,

wherein the cathode tabs and the anode tabs have different shapes and widths of the cathode tabs and the anode tabs are equal to 2 to 100% a length of electrode surfaces with the tabs formed thereon;

wherein the cathode lead and the anode lead have different shapes, and are respectively welded to the plurality of cathode tabs and the plurality of anode tabs; and

wherein at least one of the cathode and anode tabs has a shape that is symmetric with respect to a longitudinal axis, the shape including a continuous first edge having a first length adjacent a respective plate and a continuous second edge having a second length disposed parallel to the continuous first edge and farther from the respective plate, and a gradually-increasing width from the first edge to the second edge, the second length being greater than the first length

wherein the cathode plates comprise a cathode active material and a current collector made of aluminum, and the anode plates comprise an anode active material and a current collector made of aluminum,

wherein materials of the cathode tabs, anode tabs, the cathode leads and anode leads are aluminum, respectively, wherein the anode plate comprises, as an anode active material, lithium titanium oxide (LTO) represented by $\text{Li}_a\text{Ti}_b\text{O}_4$, where $0.5 \leq a \leq 3$ and $1 \leq b \leq 2.5$.

Appeal Br. 13 (Claims App.) (emphases added to certain key recitations).

REFERENCES

The Examiner relies upon the prior art below in rejecting the claims on appeal:

O’Connell	US 2002/0146620 A1	Oct. 10, 2002
Hong	US 2003/0232243 A1	Dec. 18, 2003
Kumeuchi et al. (“Kumeuchi”)	US 2007/0190402 A1	Aug. 16, 2007
Schmidt et al. (“Schmidt”)	US 2008/0044728 A1	Feb. 21, 2008
Daidoji et al. (“Daidoji”)	US 2008/0060189 A1	Mar. 13, 2008
Watanabe et al. (“Watanabe”)	US 2008/0070102 A1	Mar. 20, 2008
Shimamura et al. (“Shimamura”)	US 2008/0118826 A1	May 22, 2008
Sun et al. (“Sun”)	US 2008/0219911 A1	Sept. 11, 2008
Han et al. (“Han”)	US 2011/0143180 A1	June 16, 2011
Takeuchi et al. (“Takeuchi”)	JP 2001-243952 A	Sept. 7, 2001
Tsukamoto	JP 2012-14935 A	Jan. 19, 2012

REJECTIONS

- The Examiner maintains (Ans. 3) the following rejections on appeal:
- A. Claims 1, 2, 4–9, 16, and 29–31 under 35 U.S.C. § 103 as obvious over Daidoji in view of Watanabe, Kumeuchi, Han, Tsukamoto, O’Connell, and Takeuchi. Non-Final Act. 3.
 - B. Claim 18 under 35 U.S.C. § 103 as obvious over Daidoji in view of Watanabe, Kumeuchi, Han, Tsukamoto, O’Connell, and Takeuchi further in view of Shimamura. *Id.* at 11.

- C. Claims 20 and 21 under 35 U.S.C. § 103 as obvious over Daidoji in view of Watanabe, Kumeuchi, Han, Tsukamoto, O’Connell, and Takeuchi further in view of Hong. *Id.*
- D. Claims 22–24 under 35 U.S.C. § 103 as obvious over Daidoji in view of Watanabe, Kumeuchi, Han, Tsukamoto, O’Connell, and Takeuchi further in view of Sun. *Id.* at 12.
- E. Claim 28 under 35 U.S.C. § 103 as obvious over Daidoji in view of Watanabe, Kumeuchi, Han, Tsukamoto, O’Connell, and Takeuchi further in view of Schmidt. *Id.* at 13.
- F. Claim 32 under 35 U.S.C. § 103 as obvious over Daidoji in view of Watanabe, Han, Tsukamoto, O’Connell, and Takeuchi. *Id.*

OPINION

We review the appealed rejections for error based upon the issues identified by Appellant and in light of the arguments and evidence produced thereon. *Ex parte Frye*, 94 USPQ2d 1072, 1075 (BPAI 2010) (precedential), *cited with approval in In re Jung*, 637 F.3d 1356, 1365 (Fed. Cir. 2011) (“[I]t has long been the Board’s practice to require an applicant to identify the alleged error in the examiner’s rejections.”). After considering the evidence presented in this Appeal and each of Appellant’s arguments, we are not persuaded that Appellant identifies reversible error. Thus, we affirm the Examiner’s rejections for the reasons expressed in the Final Office Action and the Answer. We add the following primarily for emphasis.

Appellant argues all rejections together and does not present any substantively distinct arguments for any claims. *See* Appeal Br. 4–11. Therefore, consistent with the provisions of 37 C.F.R. § 41.37(c)(1)(iv)

(2013), we limit our discussion to claim 1, and all other claims on appeal stand or fall together with claim 1.

The Examiner rejects claim 1 as obvious over Daidoji in view of Watanabe, Kumeuchi, Han, Tsukamoto, O’Connell, and Takeuchi. Non-Final Act. 3. The Examiner finds that Daidoji teaches, for example, cathode and anode plates, a separator, cathode and anode tabs formed on respective plates, and cathode and anode leads. *Id.* at 3–4 (citing Daidoji). The Examiner finds that Daidoji lacks various other aspects of claim 1 but determines it would have been obvious to modify Daidoji according to the teachings of the cited secondary references. *Id.* at 4–9.

In particular, the Examiner:

- (1) finds that Watanabe discloses cathode tabs and anode tabs of different shapes that “are capable of being easily welded at different positions” and determines that it would have been obvious to modify Daidoji to have different tab shapes in order to “easily perform a welding operation at different positions” (*Id.* at 4–5 (citing Watanabe));
- (2) finds that Kumeuchi discloses cathode and anode tabs with widths within claim 1’s recited range and determines it would have been obvious to choose a tab width for Daidoji in order to improve battery performance (*id.* at 5–6 (citing Kumeuchi));
- (3) finds that Han teaches different cathode and anode shapes “in order to avoid various problems caused by possible failure to identify [cathodes and anode sides] of the battery unity module” and determines it would have been obvious to employ different cathode and anode shapes with Daidoji in order to avoid this same problem (*id.* at 6–7 (citing Han));

(4) finds that Tsukamoto teaches a positive electrode tab “substantially identical” in shape to the shape recited by claim 1 (effectively a wedge shape (*see* Spec. Fig. 1)) and determines that it would have been obvious to employ such a tab with Daidoji in order to “simplify the production line and to prevent the scum from adhering as impurities after forming the electrode plate” and to improve battery quality (Non-Final Act. 7–8 (citing Tsukamoto));

(5) finds that O’Connell discloses that all cathode and anode collectors, tabs, and leads can be made of aluminum and determines that it would have been obvious to choose aluminum as Daidoji’s cathode and anode active materials because aluminum was known to be suitable for this purpose (*id.* at 8–9 (citing O’Connell)); and

(6) finds that Takeuchi teaches use of lithium titanium oxide (LTO) as recited in claim 1 may be used as an anode active material and determines that it would have been obvious to modify Daidoji to include Takeuchi’s LTO to achieve “excellent high temperature cycle characteristics and high temperature storage characteristics” (*id.* at 9 (citing Takeuchi)).

Appellant’s primary argument is that the cited art does not recognize a problem solved by the inventors—namely that aluminum foil and LTO coated aluminum foil are difficult to distinguish with the naked eye and that having leads and tabs of different shapes can ensure an appropriate connection. Appeal Br. 5–7. Appellant argues that because the prior art does not recognize this problem, combining the references’ teachings is an improper hindsight-guided combination of elements. *Id.* at 7–9.

Appellant’s argument is not persuasive because, as explained by the Examiner, “why or how the Appellant invents the claimed invention” should

not be our focus. Ans. 5 (emphasis omitted). Indeed, the Supreme Court, in its seminal *KSR* decision, held that the Court of Appeals erred by “fail[ing] to recognize that the problem motivating the patentee may be only one of many addressed by the patent’s subject matter.” *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 420 (2007). Thus, “[u]nder the correct analysis, **any** need or problem known in the field of endeavor at the time of invention and addressed by the patent can provide a reason for combining the elements in the manner claimed.” *Id.* (emphasis added); *see also Ex Parte Obiaya*, 227 USPQ 58, 60 (BPAI 1985) (“The fact that appellant has recognized another advantage which would flow naturally from following the suggestion of the prior art cannot be the basis for patentability when the differences would otherwise be obvious.”); *Cross Med. Prods., Inc. v. Medtronic Sofamor Danek, Inc.*, 424 F.3d 1293, 1323 (Fed. Cir. 2005) (“One of ordinary skill in the art need not see the identical problem addressed in a prior art reference to be motivated to apply its teachings.”).

Here, as explained above, the Examiner provided cogent rationales supported by a preponderance of the evidence as to why a person of ordinary skill in the art would have been inclined to combine the teachings of each of the cited references. Ans. 5–6; Non-Final Act. 4–9. Appellant does not persuasively dispute the Examiner’s findings and does not persuasively argue that the Examiner’s stated rationales for combining the references lack merit. The fact that the Examiner’s rationales to combine are not the same as Appellant’s rationale does not constitute error in the Examiner’s analysis.

Appellant emphasizes *Leo Pharm. Prods., Ltd. v. Rea*, 726 F.3d 1346, 1357 (Fed. Cir. 2013). Reply Br. 4–5. That precedent, however, is distinguishable. There, the inventors of the patent at issue recognized and

solved a problem relating to the storage of Vitamin D combined with a corticosteroid. *Leo Pharm. Prods.*, 726 F.3d at 1353–54. The prior art either discouraged such a combination or attempted the combination without recognizing the storage stability problem. *Id.* at 1353. Thus, the facts established a “lack of expectation of a successful result” and “failure of the prior art to provide direction.” *Id.* at 1357. Our reviewing court reversed the Board’s obviousness determination because its rationale that “one of ordinary skill would have used vitamin D to solve the well-known side effects of steroid treatment” was inadequate to support the combining of the references’ teachings under the facts and circumstances in that case. *Id.* at 1355. In contrast to the facts of *Leo Pharm. Prods.*, the record here includes no evidence that one of ordinary skill in the art would have been discouraged from making the Examiner’s proposed combination. Appellant also does not argue that success in combining the art’s teachings would not have been expected.

Although not strictly necessary to sustain the Examiner’s rejection, we also agree with the Examiner that the cited art appreciates solutions to the problem of difficulty in distinguishing anodes and cathodes. Ans. 5–6. In particular, Han recognizes the problem of battery terminals being improperly connected and thus teaches asymmetrically formed battery terminals to ensure that improper connections are not possible. Han ¶ 49; *see also* Non-Final Act. 6–7. Also, as the Examiner explains, Watanabe teaches differently shaped electrode tabs. Ans. 5–6 (citing Watanabe Figs. 4, 13–16, ¶¶ 74, 108, 195). While we agree with Appellant (Reply Br. 5–7) that Watanabe uses different shaped tabs primarily to allow welding connections (Watanabe ¶ 108 (“By combining any of the shapes shown in these Figures,

electrode tabs are capable of being welded at different positions.”)), the result is the same: Watanabe’s anode tab shape and different cathode tab shape ensure that the tabs are not confused during assembly.

Appellant also argues that none of the cited references “hint or suggest that an LTO be used as an anode active material by coating onto an Al [aluminum] foil and that materials of all constitutions comprise aluminum.” Appeal Br. 9–10. Claim 1, however, does not require LTO coated on aluminum foil. Moreover, Appellant does not persuasively dispute the Examiner’s stated reason as to why a person of skill in the art would have used aluminum and LTO for the battery components.

Finally, the Examiner’s Answer states that Appellant “appears to state the super[ior] results or unexpected results of the present invention.” Ans. 10. We do not understand Appellant’s Appeal Brief as raising any arguments with respect to secondary considerations such as unexpected results, so we do not address such considerations here.

Because Appellant’s arguments do not identify harmful error, we sustain the Examiner’s rejections.

CONCLUSION

In summary:

Claims Rejected	35 U.S.C. §	Reference(s)/Basis	Affirmed	Reversed
1, 2, 4–9, 16, 29–31	103	Daidoji, Watanabe, Kumeuchi, Han, Tsukamoto, O’Connell, Takeuchi	1, 2, 4–9, 16, 29–31	
18	103	Daidoji, Watanabe, Kumeuchi, Han,	18	

Claims Rejected	35 U.S.C. §	Reference(s)/Basis	Affirmed	Reversed
		Tsukamoto, O'Connell, Takeuchi, Shimamura		
20, 21	103	Daidoji, Watanabe, Kumeuchi, Han, Tsukamoto, O'Connell, Takeuchi, Hong	20, 21	
22–24	103	Daidoji, Watanabe, Kumeuchi, Han, Tsukamoto, O'Connell, Takeuchi, Sun	22–24	
28	103	Daidoji, Watanabe, Kumeuchi, Han, Tsukamoto, O'Connell, Takeuchi, Schmidt	28	
32	103	Daidoji, Watanabe, Han, Tsukamoto, O'Connell, Takeuchi	32	
Overall Outcome			1, 2, 4–9, 16, 18, 20–24, 28–32	

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. § 1.136(a)(1)(iv).

AFFIRMED