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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte RALPH SCHMIDT, STEFAN BUTZMANN, and HOLGER FINK

Appeal 2019-002491
Application 14/345,499
Technology Center 2800

Before CATHERINE Q. TIMM, ELIZABETH M. ROESEL, and BRIAN D. RANGE, *Administrative Patent Judges.*

RANGE, *Administrative Patent Judge.*

DECISION ON APPEAL

STATEMENT OF THE CASE

Pursuant to 35 U.S.C. § 134(a), Appellant[1] appeals from the Examiner's decision to reject claims 1–5 and 7–12. 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. § 1.42. Appellant identifies the real party in interest as Robert Bosch GmbH and Samsung SDI Co. Ltd. Appeal Br. 2.

CLAIMED SUBJECT MATTER[2]

Appellant describes the invention as relating to a method of balancing the states of charge of battery cells when battery modules are series-connected. Spec. 1:8–13; 3:13–28. Claim 1 is illustrative:

> 1. A method for balancing states of charge of battery modules of a battery, the battery modules being connected in series to form a battery module string, each of the battery modules in the battery module string including at least one battery cell, a coupling unit, a first connection and a second connection, the method comprising:
>
> actuating the coupling unit of each battery module in a first group of battery modules in the battery module string to place each battery module in the first group in a first switching state during a first time interval such that **each of the battery modules in the first group is disconnected from the battery module string during the first time interval;**
>
> actuating the coupling unit of each of the battery modules in a second group of battery modules in the battery module string to place each battery module in the second group in a second switching state during the first time interval such that a first output voltage is provided to the battery module string by the second group during the first time interval;
>
> applying the first output voltage to an inductance during the first time interval, such that a current which flows through the inductance is increased;
>
> actuating the coupling unit of each battery module in the first group of battery modules to place the first group of battery modules in a third switching state during a second time interval such that **a second output voltage is provided to the battery module string by the first group during the second time interval;**

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[2] In this Decision, we refer to the Final Office Action dated December 13, 2017 ("Final Act."), the Appeal Brief filed July 2, 2018 ("Appeal Br."), the Examiner's Answer dated December 4, 2018 ("Ans."), and the Reply Brief filed February 4, 2019 ("Reply Br.").

actuating the coupling unit of each battery module in the second group of battery modules in the battery module string to place the battery modules of the second group in the first switching state during the second time interval such that each of the battery modules in the second group is disconnected from the battery module string during the second time interval; and

applying the second output voltage to the inductance during the second time interval,

wherein the second output voltage has opposite polarity with respect to the first output voltage, and wherein the first group of battery modules is different than the second group of battery modules.

Appeal Br. 14–15 (Claim App.) (emphases added to certain recitations at issue on appeal).

REFERENCES

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

Name	Reference	Date
Gollob et al. ("Gollob")	US 2011/0267005 A1	Nov. 3, 2011
Krauer	US 2012/0019212 A1	Jan. 26, 2012

REJECTIONS

The Examiner maintains (Ans. 2) the following rejections on appeal:

A. Claims 1–5 and 10 under 35 U.S.C. § 102 as anticipated by Gollob. Final Act. 2.

B. Claims 7–9 and 11 under 35 U.S.C. § 103 as obvious over Gollob in view of Krauer. *Id.* at 6.

C. Claims 12 under 103 35 U.S.C. § 103 as obvious over Krauer in view of Gollob. *Id.* at 7.

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.

The Appellant does not present any substantively separate argument for any claims or for the Examiner's second and third rejections. Appeal Br. 7, 11–12. We, therefore, limit our discussion to claim 1. All other claims stand or fall with that claim. 37 C.F.R. § 41.37(c)(1)(iv) (2013).

The Examiner finds that Gollob teaches each limitation of claim 1. Final Act. 2–4 (citing Gollob). Among other things, the Examiner finds that,

as depicted in Gollob Figures 1–15, items 11, 12, and 1n form a battery module string and that each battery in the battery module string (for example, 11) along with corresponding switches (for example, 40 and 51) form battery modules. *Id.* at 2. The Examiner finds that, for example, Figures 5A and 5B illustrate how a Gollob battery module is disconnected during a first time interval. *Id.* at 2–3; *see also* Ans. 3–5. The Examiner also finds that Gollob teaches its device is configured to provide an opposite polarity to the battery module string at a different time interval. Final Act. 4 (citing Gollob Figs. 5A and 5B); *see also* Ans. 3–5.

Appellant argues that Gollob does not disclose or suggest the capability of disconnecting a battery module from the battery module string. Appeal Br. 9–10. The Examiner and Appellant agree that, in the context of claim 1, disconnecting a module means that the module is electrically disconnected—in other words, not providing a voltage or current. Appeal Br. 8–9; Final Act. 8–9.[3] Here, the preponderance of the evidence supports the Examiner's position that Gollob Figure 5A, for example, demonstrates that, during at least one time interval, the cells 11, 12, and 1n (which, along with associated switches, are each a battery module in the parlance of claim 1) are disconnected from the battery module string. We reproduce Gollob Figure 5A below.

[3] In the Reply Brief, Appellant appears to argue that a battery module could be "connected to the string" while providing 0V to the battery module string. Reply Br. 2. In view of Appellant's Specification and the context of claim 1, severing all physical connections from a module is unnecessary to "disconnect" a module (electrically) from the battery module string.

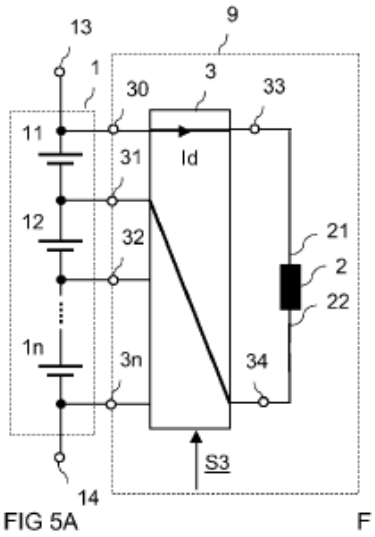

FIG 5A F

Gollob Figure 5A illustrates the operating principle of the charge balancing circuit in cell-to-cell balancing mode. Gollob ¶ 14. When Gollob's switches (depicted in Figure 6) are configured for the mode Figure 5A depicts, current flows through cell 11 and through inductive storage element 2. Gollob ¶¶ 50–51 ("In the example illustrated in FIG. 5A the first charge storage element 11 is the one to be discharged."). Figure 5A indicates no current or voltage flow through cell 11 to other elements of the string (for example, through 1n to 12 or through 12 to 11) during this stage of the "cell-to-cell balancing" mode. *Id.* at ¶ 50. Thus, cell 12, for example, is electrically disconnected from the battery module string in this configuration.

Appellant emphasizes that, even in cell-to-cell balancing mode, cell 12 remains connected to the battery module string. Reply Br. 2–3. To illustrate this point, Appellant modifies Gollob Figure 5A by reproducing the left side of of the figure alone (i.e., Gollob battery 1 along with first load terminal 13 and second load terminal 14) and omitting switch arrangement 3 that allows selective connection of battery cells 11, 12, 1n. *Id.* at 3. Appellant argues, "As is known in the art, battery cells 11, 12, . . . 1n, when

connected as shown above [in Appellant's modified version of Gollob Figure 5A], provide a voltage/current to the string." *Id.* Appellant, however, does not cite evidence to support this proposition. Nor does Gollob support Appellant's contention. To the contrary, Figure 5A indicates currents flowing through cell 11 and inductor 2 but indicates no current is flowing through, for example, cell 12. Gollob ¶ Fig. 5A (showing switch arrangement 3 with connection between terminals 30 and 33 and between and 31 and 34); *see also* Gollob ¶ 51.

Moreover, Gollob indicates that elements within the string are electrically connected during operation but not during charge balancing mode. In particular, Gollob states that load terminals 13 and 14 "are configured to have a load or a charging device Z . . . connected thereto" during "operation." Gollob ¶ 25; *see also id.* at Fig. 1. Gollob does not indicate any similar load or charging of device Z through load terminals 13 and 14 during "charge balancing mode." *See, e.g., id.* at ¶¶ 37, 50–52. Because the preponderance of the evidence, as explained above, supports the Examiner's position that Gollob's Figure 5A teaches disconnection of a battery module, Appellant's argument in this regard does not demonstrate error.

Appellant also argues that Gollob does not teach claim 1's recitations that "a second output voltage is provided to the battery module string . . . during the second time interval" and "the second output voltage has opposite polarity with respect to the first output voltage." Appeal Br. 10–11. The Examiner, however, finds that Gollob teaches a second voltage with opposite polarity. Final Act. 3–4; Ans. 5–7. The preponderance of the evidence supports the Examiner's position. Gollob's Figure 5B depicts an

alternative current path flow (enabled by the switches Gollob Figure 6 depicts) where polarity is the opposite of that in Figure 5A. Ans. 6–7; *see also* Gollob ¶ 52 ("the polarity of the inductive storage element 2 is to be reversed between the first and the second step"). This opposite polarity voltage is output to cell 12 (Gollob Fig. 5B, ¶ 52), and cell 12 is part of Gollob's battery module string (Final Act. 2). A second output voltage, therefore, is provided to the battery module string. Appellant's Specification similarly describes providing opposite polarity voltage to a battery module. Spec. 11:26–13:5. Appellant's argument, therefore, does not identify error.

Because Appellant's argument does not identify harmful error, we sustain the Examiner's rejections.

CONCLUSION

In summary:

Claims Rejected	**35 U.S.C. §**	**Reference(s)/Basis**	**Affirmed**	**Reversed**
1–5, 10	102	Gollob	1–5, 10	
7–9, 11	103	Gollob, Krauer	7–9, 11	
12	103	Krauer, Gollob	12	
Overall Outcome			1–5, 7–12	

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