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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte JOHN P. BILEZIKJIAN, THOMAS J. COUPAR,
and JAMES J. GIBBONS

Appeal 2019-000593
Application 14/281,941
Technology Center 2800

Before JAMES A. WORTH, BRIAN D. RANGE, and
MERRELL C. CASHION, JR., *Administrative Patent Judges*.

CASHION, *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 1–17. We have jurisdiction under 35 U.S.C. § 6(b).

We AFFIRM.

¹ We use the word “Appellant” to refer to “applicant” as defined in 37 C.F.R. § 1.42. Appellant identifies Ford Global Technologies LLC, a subsidiary of Ford Motor Company, as the real party in interest. Appeal Br. 1.

The invention is generally directed to an assembly and process for automating a battery discharging process. Spec. ¶ 1. The Specification explains that a high voltage battery may need to be discharged prior to transporting or storing the battery. *Id.* ¶ 2. According to the Specification, the prior art accomplishes this by using a decade box that includes a plurality of resistors of different values configured to provide a specific resistance. *Id.* The drawback of using a decade box is that it requires an operator to correctly configure the decade box to match the resistance to a voltage of the specific battery. *Id.* ¶ 3. The invention overcomes the prior art drawback by providing a method and assembly that automate discharging of a high voltage battery to reduce the time required for an operator to monitor discharging the battery. *Id.* ¶ 7. Claim 1 illustrates the subject matter claimed and is reproduced below:

1. A method of discharging a battery comprising the steps of:
 - connecting the battery to a variable resistor;
 - automatically adjusting the resistor with a controller to provide a constant load value that achieves a desired state of charge of the battery;
 - discharging the battery using the adjusted resistor.

Independent claim 7 is directed to a similar method while independent claim 12 is directed to a battery discharging assembly used to practice the methods of claims 1 and 7.

Appellant requests review of the following rejections from the Examiner's Non-Final Office Action dated July 3, 2017:

- I. Claims 1 and 3–6 rejected under AIA 35 U.S.C. § 103 as unpatentable over Darragh (US 2013/0307476 A1, published Nov. 21, 2013)

and Sheng (US 2012/0245872 A1, published Sept. 27, 2012).

II. Claim 2 rejected under AIA 35 U.S.C. § 103 as unpatentable over Darragh, Sheng, and Chen (US 2006/0132087 A1, published Jun. 22, 2006).

III. Claims 7, 10, and 11 rejected under AIA 35 U.S.C. § 103 as unpatentable over Christensen (US 2013/0200855 A1, published August 8, 2013) and Darragh.

IV. Claim 8 rejected under AIA 35 U.S.C. § 103 as unpatentable over Christensen, Darragh, and Chen.

V. Claim 9 rejected under AIA 35 U.S.C. § 103 as unpatentable over Christensen, Darragh, and Sheng.

VI. Claims 12 and 17 rejected under AIA 35 U.S.C. § 103 as unpatentable over Christensen and Darragh.

VII. Claim 13 rejected under AIA 35 U.S.C. § 103 as unpatentable over Christensen, Darragh, and Chen.

VIII. Claims 14–16 rejected under AIA 35 U.S.C. § 103 as unpatentable over Christensen, Darragh, and Sheng.

OPINION

Rejection I under 35 U.S.C. § 103 (Claim 1)

Appellant presents arguments only for independent claim 1 for this rejection. *See generally* Appeal Br. 6–8. Accordingly, we select independent claim 1 as representative of the subject matter claimed and decide this ground of rejection based on the arguments presented for claim 1.

After review of the respective positions the Appellant provides in the Appeal and Reply Briefs and the Examiner provides in the Final Action and the Answer, we affirm the Examiner's rejections of claims 1 and 3–6 under

35 U.S.C. § 103 for the reasons the Examiner provides. We add the following for emphasis.

Claim 1

Claim 1 is directed to a method that automates discharging of a high voltage battery.

The Examiner finds that Darragh teaches a method of discharging a battery that comprises using a controller to automatically provide a constant load value to a fixed resistor load bank that achieves a desired state of charge of the battery. Non-Final Act. 5–6. The Examiner finds that Darragh’s method differs from the claimed invention in that Darragh does not teach using a variable resistor and discharging the battery by adjusting the variable resistor. Non-Final Act. 5–6. Darragh, however, discloses the use of different expected resistances for a versatile battery service unit that handles multiple products. Darragh ¶ 42. The Examiner finds that Sheng teaches it is known to use a variable resistor in discharging power from a battery. Non-Final Act. 6. The Examiner determines that it would have been obvious to one of ordinary skill in the art to use Sheng’s variable resistor in Darragh’s method to match battery resistance to load resistance when using different sized batteries. *Id.*

Appellant argues that Darragh’s controller 120 does not adjust a resistor because the controller does not connect to the discharger 118, which connects to a high voltage load bank connector 210. Appeal Br. 6.

Appellant also contends that Darragh discloses controller 120 as optional and that the battery service unit 106 may provide some control capability independent of the controller 120. *Id.* Appellant additionally argues that Darragh teaches that battery service unit 106 includes a fixed resistive load

bank or electronic load. *Id.* Appellant then argues that Shen teaches a battery tester and not a battery discharger. *Id.* at 7. According to Appellant, Sheng discloses a battery testing routine to complete a detecting routine that determines the health of the battery. *Id.* Thus, Appellant contends that neither Darragh nor Sheng teach automatically adjusting a resistor with a controller to provide a constant load value to achieve a desired state of charge of the battery because Darragh has no variable resistor and Sheng is using the controller to create a “detecting curve” to determine the health of the battery. *Id.* at 8.

Appellant’s arguments do not point to reversible error in the Examiner’s determination of obviousness. It is well settled that nonobviousness cannot be established by attacking the references individually when the rejection is predicated upon a combination of prior art disclosures. *In re Merck & Co.*, 800 F.2d 1091, 1097 (Fed. Cir. 1986); *In re Keller*, 642 F.2d 413, 425–426 (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.”).

As the Examiner finds, Darragh teaches that instructions executing on controller 120 oversee operation of the discharge unit among other components. Ans. 3–4; Darragh ¶ 38. In addition, Darragh discloses that

[c]ontroller 120 may be integrated into battery service unit 106 in addition to implementations including an external element. Battery service unit 106 *may include interface elements providing some control capability of battery service interface 114, charger unit 116, and discharger unit 118 independent of controller 120.*

Darragh ¶ 38 (emphasis added).

Based on this disclosure, one skilled in the art would reasonably infer that Darragh's disclosure of providing additional or other control capability independent of controller 120 strongly infers that controller 120 exerts control over discharger unit 118. *See In re Fritch*, 972 F.2d 1260, 1264–65 (Fed. Cir. 1992) (holding that a reference stands for all of the specific teachings thereof as well as the inferences one of ordinary skill in the art would have reasonably been expected to draw therefrom). Therefore, the Examiner's analysis that controller 120 would also control the resistors in discharge unit 118 is reasonable. Ans. 4.

Appellant's arguments regarding Sheng are also unpersuasive because the Examiner principally relies on Sheng to teach that it is known to use a variable resistor in discharging a battery. Non-Final Act. 6. Appellant's argument does not dispute this finding.

While the Examiner and Appellant acknowledge that Darragh does not teach the use of a variable resistor (Non-Final Act. 6; Appeal Br. 6), Darragh recognizes that battery discharges may require different discharge rates through the use of resistors in discharge unit 118 based on battery characteristics. Darragh ¶¶ 30, 39. In fact, Darragh teaches embodiments that can be configured to handle products having different voltages or resistances. *Id.* ¶ 42. Darragh also teaches that the battery service unit includes a discharger (a fixed resistive load bank or an electronic load) and 2) a variable voltage constant current or constant voltage power supply among other items. *Id.* ¶ 41. These disclosures suggest that Darragh teaches as desirable to have a battery service unit and discharger that are versatile to accommodate different types of products.

Further, Appellant acknowledges in the Specification that it is known to configure resistors to match the resistance to a voltage of the specific battery. Spec. ¶ 3. Thus, the capability to vary the resistors to achieve a desired resistance is well within the skill in the art, albeit manually. Appellant also acknowledges that the invention modifies a manual technique for configuring resistors by using a controller in combination with a variable resistor to match the resistance to a voltage of the specific battery. Spec. ¶ 4. It is well settled that it is within the ordinary skill to broadly provide a mechanical or automatic means to replace manual activity which has accomplished the same result. *In re Venner*, 262 F.2d 91, 95 (CCPA 1958) (citing *In re Rundell*, 48 F.2d 958, 959 (CCPA 1931)). Sheng exemplifies the use of a variable resistor in determining a proper resistance of a load for a battery according to the battery capacity, the battery voltage, etc. Sheng ¶ 9. In addition, Sheng's use of a variable resistor replaces the prior art's fixed resistance of a load that leads to imprecise testing results. *Id.* ¶ 6.

Accordingly, we affirm the Examiner's prior art rejection of claims 1 and 3–6 under 35 U.S.C. § 103 for the reasons the Examiner presents and we provide above.

Rejection II under 35 U.S.C. § 103 (Claim 2)

Claim 2 recites a method comprising a further step of connecting a shorting bar to the discharged battery. According to the Specification, the shorting bar prevents voltage rebound after the battery is discharged but still connected to the assembly. Spec. ¶ 15.

The Examiner finds Chen, directed to an electronic device with function of protection against abnormal charging, teaches connecting a

shorting bar, noted as a ground terminal, to a discharged battery. Non-Final Act. 9; Chen Figure 1, ¶¶ 1, 17.

Appellant argues Chen does not teach using a shorting bar in a discharged battery but, instead on a charged battery. Appeal Br. 9.

This argument lacks persuasive merit. As the Examiner notes, Chen teaches connecting to a shorting bar after a discharge for protection purposes. Ans. 5. Appellant has not adequately explained why one skilled in the art, using no more than ordinary creativity, would not have been capable of incorporating Chen's shorting bar to the assembly from the combined teachings of Darragh and Sheng given that it provides a desirable safety feature for batteries experiencing variations in current. *See KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 421 (2007) ("A person of ordinary skill is also a person of ordinary creativity, not an automaton."); *see also In re Sovish*, 769 F.2d 738, 743 (Fed. Cir. 1985) (presuming skill on the part of one of ordinary skill in the art).

Accordingly, we affirm the Examiner's prior art rejection of claim 2 under 35 U.S.C. § 103 for the reasons the Examiner presents and we provide above.

Rejection III under 35 U.S.C. § 103 (Claim 7)

Appellant presents arguments only for independent claim 7. We limit discussion to this claim with the understanding that claims 10 and 11 stand or fall with claim 7.

Claim 7 differs from the method of claim 1 in that it recites a specific step of discharging the battery using the resistor while a controller automatically adjusts resistance of the resistor as a function of an operating sequence for the resistor to achieve a desired state of charge of the battery,

wherein the sequence is selected from a plurality of predetermined sequences.

The Examiner finds Christensen teaches a method of discharging a battery that differs from the claimed invention in that Christensen does not teach a function of an operating sequence for the resistor requiring selecting a sequence from a plurality of predetermined sequences. Non-Final Act. 9–10. The Examiner finds Darragh teaches the missing feature and determines that it would have been obvious to one of ordinary skill in the art to modify a controller so that it automatically adjusts resistance of the resistor as a function of an operating sequence for the resistor to achieve a desired state of charge for the purpose of discharging to levels that meet different scenarios. *Id.* at 10.

Appellant argues that Christensen discloses resistors that are internal to the battery 102 (i.e., built-in) and, thus, does not teach connecting the battery to a variable resistor, with resistance controlled by a controller, as part of its discharging process. Appeal. Br. 10. Appellant further contends that, while the other resistor 114 may be variable, Christensen does not teach or suggest adjusting the resistance of the resistor with the controller. *Id.*

We are unpersuaded of reversible error by these arguments. The Examiner contends that Appellant is responding to the wrong element pointed out in rejection. Ans. 6. According to the Examiner, the rejection relies on a load 114 that is separate from the energy storage device 102 shown. Ans. 6; Christensen Figure 1. The Examiner further explains that the energy storage device is the battery and the load noted as a variable load resistor, which is separate from the battery and, therefore, not internal to the battery. Ans. 6; Christensen ¶ 18. The Examiner asserts that Christensen

discloses that the resistance of the load is selected based upon an internal resistance of the strings and controlled by the controller 104 to modify the resistance of the internal load by adjusting the resistance of the load using a variable resistor within the load 114. Ans. 6; Christensen ¶¶ 22, 26.

Appellant replies that the portions of Christensen relied upon by the Examiner do not teach the controller 104 controlling the resistance of the resistor 114 while discharging the battery to achieve a desired state of charge of the battery, as recited in claim 7. Appeal Br. 10. According to Appellant, Christensen teaches that controller 104 varies the resistors that are internal to battery 102 during discharge to avoid overheating. Appeal Br. 10; Reply Br. 4–5; Christensen ¶¶ 20–27.

We are unpersuaded of reversible error in the Examiner’s determination of obviousness. Christensen discusses an embodiment comprising a variable load resistor 114. Christensen ¶ 18. Christensen also discloses in that same paragraph that “[t]he controller 104 is further operably coupled to a memory 116 in which programmed instructions are stored.” *Id.* According to Christensen, “the controller 104 electrically controls the switching device 112 to control the flow of current from the battery 102 through the load 114 based upon the program instructions stored in the memory 116” such that “a portion of heat is dissipated in the load 114” during a battery discharge process. *Id.* ¶ 19. One skilled in the art would infer from this disclosure that Christensen’s controller 104 controls the resistance of the variable resistor 114 while discharging the battery to achieve a desired state of charge of the battery, as recited in claim 7. *Fritch*, 972 F.2d at 1264–65. Therefore, we agree with the Examiner’s findings. Ans. 6.

While Appellant argues that Christensen’s paragraph 26 is specifically discussing the resistance of the internal load within the battery (Reply Br. 4–5), we note that the discussion is in the context of “some embodiments.” It is well settled that a reference may be relied upon for all that it discloses and not merely the preferred embodiments as suggested by Appellant. *See Merck & Co. v. Biocraft Labs., Inc.*, 874 F.2d 804, 807 (Fed. Cir. 1989) (“[A]ll disclosures of the prior art, including unpreferred embodiments, must be considered.” (quoting *In re Lamberti*, 545 F.2d 747, 750 (CCPA 1976))); *In re Fracalossi*, 681 F.2d 792, 794 n.1 (CCPA 1982) (explaining that a prior art reference’s disclosure is not limited to its examples). At best, Christensen is highlighting an alternate preferred embodiment in paragraph 26 and Appellant has not explained adequately why this embodiment limits Christensen’s broader disclosure. *See Merck*, 874 F.2d at 807; *Fracalossi*, 681 F.2d at 794.

Appellant argues that Christensen is limited to one scenario (emergency) and does not suggest multiple scenarios as claimed. Appeal Br. 11. Thus, Appellant contends that there is no reason to employ the multiple scenarios of Darragh in Christensen. *Id.*

We find these arguments lack persuasive merit for the reasons the Examiner presents. Ans. 7.

Moreover, Christensen’s disclosure is not as limited as Appellant argues. Christensen teaches battery system configured to reduce the risk of uncontrolled rapid discharge of a battery and that reduces the electrical or electrochemical energy stored in the battery rapidly, while minimizing the risk of fire or explosion. Christensen ¶¶ 2, 4. Christensen discloses the emergency condition as an example. *Id.* ¶ 29. Thus, given Christensen’s

broad disclosure and Darragh's disclosure of additional scenarios, including an emergency scenario where controlled discharge of a battery is desirable (*see* Darragh ¶¶ 31, 56), Appellant has not explained adequately why one skilled in the art, using no more than ordinary creativity, would not have been capable of adapting Christensen's process for multiple scenarios where controlled discharge of a battery is desirable. *See KSR*, 550 U.S. at 421; *Sovish*, 769 F.2d at 743.

Accordingly, we affirm the Examiner's prior art rejection of claims 7, 10, and 11 under 35 U.S.C. § 103 for the reasons the Examiner presents and we provide above.

Rejection V under 35 U.S.C. § 103 (Claim 9)

Claim 9 recites that the resistance of the resistor is varied as a decreasing step function of time during battery discharging.

The Examiner relies on the additionally cited reference to Sheng for this feature. Non-Final Act. 12–13; Sheng Figure 7 and ¶¶ 46–47.

Appellant argues that Sheng's Figure 7 teaches an on-off-on-off loading and unloading function and does not teach or suggest a decreasing step function for varying the resistor resistance. Appeal Br. 13.

We are unpersuaded of reversible error by this argument for the reasons the Examiner expresses. Ans. 8.

Moreover, Appellant does not direct us to any definition of the term "decreasing step function" that would exclude Sheng's disclosed on-off-on-off loading and unloading function. *See* Ans. 6. Nor does Appellant argue any criticality with respect to the use of the claimed decreasing step function. Thus, based on our independent review of Sheng's Figure 7, we determine that the shape of the discrete curves delineated therein are within

the broadest reasonable interpretation of a step function. In addition, Christensen discloses as conventional to use a desirable current profile throughout the discharge process in accordance to set criteria. Christensen ¶ 26. Therefore, Appellant has not adequately explained why one skilled in the art, using no more than ordinary creativity, would not have had reason to apply and would not have been capable of applying a desirable profile for a battery discharge process such as the one disclosed by Sheng. *See KSR*, 550 U.S. at 421; *Sovish*, 769 F.2d at 743.

Accordingly, we affirm the Examiner's prior art rejection of claim 9 under 35 U.S.C. § 103 for the reasons the Examiner presents and we provide above.

Rejections IV (Claim 8), VI and VII (Claim 12), and VIII (Claim 15), all under 35 U.S.C. § 103

Appellant presents a line of arguments for claims 8, 12, and 15 that is substantially the same as the arguments presented for claims 2, 7, and 9, respectively. Appeal Br. 11–12, 13–15, and 17.²

We remain unpersuaded by these arguments for the reasons given above in our previous discussion of these arguments.

Accordingly, we affirm the Examiner's prior art rejections of claims 8 and 12–17 under 35 U.S.C. § 103 for the reasons the Examiner presents and we provide above.

² Appellant relies on the arguments presented for claim 12 in addressing the rejection of dependent claim 13 (Rejection VII). Appeal Br. 16. Therefore, claim 13 stands or falls with independent claim 12.

CONCLUSION

In summary:

Claims Rejected	35 U.S.C. §	Reference(s)/Basis	Affirmed	Reversed
1, 3–6	§ 103	Darragh, Sheng	1, 3–6	
2	§ 103	Darragh, Sheng, Chen	2	
7, 10, 11	§ 103	Christensen, Darragh	7, 10, 11	
8	103	Christensen, Darragh, Chen	8	
9	103	Christensen, Darragh, Sheng	9	
12, 17	103	Christensen, Darragh	12, 17	
13	103	Christensen, Darragh, Chen	13	
14–16	103	Christensen, Darragh, Sheng	14–16	
Overall Outcome			1–17	

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) (2017).

AFFIRMED