

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

FORD MOTOR COMPANY,
Petitioner,

v.

PAICE LLC & THE ABELL FOUNDATION, INC.,
Patent Owner.

Case IPR2015-00606
Patent 7,237,634 B2

Before SALLY C. MEDLEY, KALYAN K. DESHPANDE, and
CARL M. DEFRANCO, *Administrative Patent Judges*.

DEFRANCO, *Administrative Patent Judge*.

FINAL WRITTEN DECISION
35 U.S.C. § 318(a) and 37 C.F.R. § 42.73

I. INTRODUCTION

Paice LLC & The Abell Foundation, Inc. (collectively, “Paice”) are the owners of U.S. Patent No. 7,237,634 B2 (“the ’634 patent”). Ford Motor Company (“Ford”) filed a Petition for *inter partes* review of the ’634 patent, challenging the patentability of claims 56–65, 68–77, 242–251, 268–277, 292, 293, and 298 under 35 U.S.C. § 103. Paper 1 (“Pet.”). In a preliminary proceeding, we instituted an *inter partes* review because Ford made a threshold showing of a “reasonable likelihood” that the challenged claims are unpatentable. Paper 14 (“Dec.”).

Subsequent to institution, Paice filed a Patent Owner Response (Paper 17, “PO Resp.”), and Ford followed with a Reply (Paper 19, “Reply”).¹ An oral hearing was held on June 28, 2016, and a transcript of the hearing is included in the record. Paper 31 (“Tr.”). After reviewing the evidence and arguments of the parties, and pursuant to our jurisdiction under 35 U.S.C. § 6, we conclude Ford has proven, by a preponderance of the evidence, that claims 56–65, 68–77, 242–251, 268–277, 292, 293, and 298 are unpatentable.

II. BACKGROUND

A. *Related Cases*

The ’634 patent, which includes over 300 claims, has previously been before us, having been the subject of multiple petitions filed by Ford for *inter partes* review (“IPR”). Aside from this case, the IPRs on which we have instituted trial include IPRs 2014-00904, 2014-1416, 2015-00722,

¹ In addition, Paice filed a Motion for Observation on Cross-Examination (Paper 23) and Ford filed a Response to Motion for Observation on Cross-Examination (Paper 26), both of which have been considered.

2015-00758, 2015-00784, 2015-00785, 2015-00787, 2015-00790, 2015-00791, 2015-00799, 2015-00800, and 2015-00801. And, with this decision today, we have rendered final decisions in all of these IPRs, many of which include some overlap in terms of claims challenged or prior art asserted or both.² The instant IPR, however, presents us with an entirely new set of claims, as well as a ground, that we have not previously seen.

The '634 patent is also the subject of litigation in two co-pending district court actions, *Paice, LLC v. Ford Motor Co.*, No. 1:14-cv-00492 (D. Md.), filed Feb. 19, 2014, and *Paice LLC v. Hyundai Motor Co.*, No. 1:12-cv-00499 (D. Md.), filed Feb. 16, 2012. Pet. 3.

B. The '634 Patent

The '634 patent describes a hybrid vehicle with an internal combustion engine, at least one electric motor, and a battery bank, all controlled by a microprocessor that directs the transfer of torque between the engine, the motor, and the drive wheels of the vehicle. Ex. 1151, 17:17–56, Fig. 4. The microprocessor determines whether to operate the engine, the motor, or both, in response to “road load,” that is, the instantaneous torque required to drive the vehicle. *Id.* at 12:42–46. The microprocessor “can effectively determine the road load by monitoring the response of the vehicle

² The earliest of these cases, the -904 and -1416 IPRs, led to final determinations of unpatentability, respectively, for claims 1, 14, 16, 18, and 24 (2015 WL 8536745 (PTAB Dec. 10, 2015)) and claims 80, 93, 98, 99, 102, 109, 114, 127, 131, 132, 135, 139, 142, 161, 215, 228, 232, 233, and 235–237 (2016 WL 932948) (PTAB Mar. 10, 2016)). These two IPRs are currently on appeal at the U.S. Court of Appeals for the Federal Circuit. We issued final decisions in the other IPRs more recently.

to the operator's command for more power.”³ *Id.* at 37:42–49. The operator commands include “the rate at which the operator depresses [accelerator and brake] pedals 69 and 70 as well as the degree to which [they] are depressed.” *Id.* at 27:26–38, Figs. 3, 4. The microprocessor uses information from the operator commands “as an indication that an amount of torque . . . will shortly be required.” *Id.* at 27:41–57.

The microprocessor then compares the vehicle's torque requirements against a predefined “setpoint,” or “SP,” and uses the results of the comparison to determine the vehicle's mode of operation, e.g., straight-electric, engine-only, or hybrid. *Id.* at 40:16–49. The microprocessor utilizes a hybrid control strategy that operates the engine only in a range of high fuel efficiency, which occurs when the instantaneous torque required to drive the vehicle, or road load (RL), reaches a setpoint (SP) of approximately 30% of the engine's maximum torque output (MTO). *Id.* at 20:61–67; *see also id.* at 13:64–65 (“the engine is never operated at less than 30% of MTO, and is thus never operated inefficiently”). In other words, when the road load is above 30% of the engine's maximum torque output, the vehicle operates in an engine-alone mode. *Id.* at 37:42–44. When the road load is below 30% of the engine's maximum torque, the vehicle operates in a straight-electric mode. *Id.* at 37:24–28. Operating the engine in a range above the setpoint but below the engine's maximum torque output maximizes fuel efficiency and reduces pollutant emissions of the vehicle. *Id.* at 15:55–58.

³ The '634 patent contrasts the claimed invention to prior control strategies “based solely on speed,” which are “incapable of responding to the operator's commands, and will ultimately be unsatisfactory.” Ex. 1151, 13:39–42.

C. The Challenged Claims

Of the challenged claims, only two are independent—claims 292 and 298. Dependent claim 293 stems from independent claim 292, while the remainder of the challenged dependent claims stem from independent claims that are unchallenged by the instant Petition, but are the subject of several of the related IPRs mentioned above. Specifically,

claims 56–65 depend from unchallenged claim 1, which is the subject of the -904 IPR;

claims 68–77 depend from unchallenged claim 33, which is the subject of the -722, -787, and -791 IPRs;

claims 242–251 depend from unchallenged claim 241, which is the subject of the -785, -787, and -801 IPRs; and

claims 268–277 depend from unchallenged claim 267, which is the subject of the -787 and -801 IPRs.

Common to the challenged claims, except for claims 292, 293, and 298, is that they combine a hybrid control strategy that compares “road load” to a particular “setpoint” for determining when to operate the engine and motor,⁴ with additional limitations requiring that energy⁵ supplied from the battery be at a specific “maximum DC voltage” and a specific “maximum current.” For instance, a first set of claims (*i.e.*, claims 57, 59, 62, 64, 69, 71, 74, 76, 243, 245, 248, 250, 269, 274, 276, and 292) relates to maximum voltage from the battery: “the maximum DC voltage is at least approximately 500 volts” (the “maximum voltage” limitations). A second

⁴ Claims 292, 293, and 298 do not recite a “setpoint,” but do utilize a hybrid control strategy that is responsive to “road load” for determining when to operate the engine and motor.

⁵ Some of the claims speak in terms of “power” from the battery in place of “energy” from the battery. In the context of these claims, the difference is irrelevant. *See* Ex. 1152 ¶¶ 263–264.

set of claims (*i.e.*, claims 58, 63, 65, 70, 72, 75, 77, 244, 246, 249, 251, 270, 272, 275, 277, 293, and 298) relates to maximum current, with most of these claims requiring that it be “less than approximately 150 amperes” (the “maximum current” limitations). And a third set of claims (*i.e.*, claims 56, 61, 68, 73, 242, 247, 268, 273, and all claims depending therefrom) requires that “a ratio of maximum DC voltage to maximum current supplied is at least 2.5” (the “ratio” limitation). Independent claims 292 and 298 require similar voltage and current limitations, while claim 293 requires that the current be “no more than about 75 amperes.” In analyzing the claims, we refer to the voltage, current, and ratio limitations, collectively, as the “electrical limitations.”

D. The Instituted Grounds

Ford asserts but a single ground of unpatentability, namely, that the challenged claims are unpatentable under 35 U.S.C. § 103 as obvious over the combined teachings of the ’455 PCT publication⁶ and Severinsky ’970.⁷ Pet. 4–5. In a preliminary proceeding, we instituted trial because Ford demonstrated a “reasonable likelihood” of succeeding on that one ground. Dec. 13. We now decide whether Ford has proven the challenged claims unpatentable by a “preponderance of the evidence.” 35 U.S.C. § 316. In doing so, we also decide whether the ’455 PCT publication qualifies as prior art to the ’634 patent.

⁶ PCT International Publication No. WO 00/15455, pub. Mar. 23, 2000 (Ex. 1153).

⁷ U.S. Patent No. 5,343,970, iss. Sept. 6, 1994 (Ex. 1154, “Severinsky ’970”).

III. ANALYSIS

A. *Claim Construction*

In our Decision to Institute, we construed the term “maximum DC voltage,” which is recited throughout the challenged claims. As noted therein, we pointed to the ’634 patent specification and its discussion of battery voltage and peak electrical loading as supporting a construction of “maximum DC voltage” that means “a voltage *under load*,” as opposed to a nominal, open-circuit voltage. Dec. 5 (citing Ex. 1151, 50:44–51:26). Paice does not challenge that construction,⁸ and we do not perceive any reason or evidence that might compel us to alter it.

B. *Obviousness Over the ’455 PCT Publication and Severinsky ’970*

As discussed above, all but one of the challenged dependent claims stem from independent claims that are not challenged by the instant petition, and thus, necessarily include the limitations of their respective base claims. Accordingly, we first address the limitations incorporated from the base claims (i.e., claims 1, 33, 241, and 267), each of which is directed to a configuration of components that includes an internal combustion engine, at least one electric motor, a battery, and a hybrid control strategy that utilizes “road load” and a “setpoint” for determining when to operate the engine.⁹ We likewise address the limitations in independent claims 292 and 298 that

⁸ Indeed, Paice proposed the same construction of “maximum DC voltage” in an earlier related proceeding, IPR2014–00568 (Jul. 11, 2014) (Paper 8, 16–17), which is now terminated.

⁹ To the extent there is any dispute over construction of the term “setpoint,” we incorporate our construction from the final written decision in IPR2014–01416 (Mar. 10, 2016) (Paper 26, 8–11).

are directed to a similar configuration of components that utilize road load less the setpoint.

To begin, Ford argues that the '455 PCT publication discloses all of the limitations of base claims 1, 33, 241, and 267, as well as the hybrid configuration of independent claims 292 and 298. Pet. 2, 21–22. Most important, Ford points out that the specification and figures of the '455 PCT publication are substantially the same as those of the '634 patent (*id.* at 21) and submits a comparison illustrating the identity of the two disclosures (Ex. 1187). Ford then provides a detailed analysis of how the '455 PCT publication satisfies the limitations of the base claims, which are directed to the configuration of components and torque control strategy of a hybrid vehicle. *Id.* at 22–34. In doing so, Ford proffers the testimony of Dr. Jeffrey L. Stein, an expert witness retained by Ford, who explains why the '455 PCT publication teaches each of the limitations of the independent base claims. Ex. 1152 ¶¶ 171–261.

We are persuaded by Ford's showing, which we adopt as our own, that the '455 PCT publication discloses all of the limitations of base claims 1, 33, 241, and 267. *See* Pet. 22–34; Ex. 1152 ¶¶ 171–261. Paice does not dispute that the '455 PCT publication discloses the limitations of the base claims, nor can it reasonably do so given the identity of the disclosure of the '455 PCT publication to that of the '634 patent. *See* Ex. 1152 ¶ 165 (citing Ex. 1187). We are also persuaded by Ford's showing, which we adopt as our own, that the '455 PCT publication discloses all of the limitations of independent claims 292 and 298, except for the “voltage” and “current” limitations. *See* Pet. 50–56; Ex. 1152 ¶¶ 375–397 (claim 292), ¶¶ 412–419 (claim 298).

Having shown that the '455 PCT publication discloses the hybrid configuration and torque control strategy recited by the base claims, Ford then discusses how Severinsky '970 teaches the electrical (voltage, current, and ratio) limitations of the challenged claims (*id.* at 34–56), and explains why a skilled artisan would have been led to combine the teachings of Severinsky '970 with those of the '455 PCT publication to arrive at the claimed invention (*id.* at 57–59). And, with respect to the electrical limitations, Ford again proffers the testimony of its expert, Dr. Stein, who confirms that Severinsky '970 teaches the specific voltage, current, and ratio values recited by the challenged claims. *See* Ex. 1152 ¶¶ 262–374 (claims 56–65, 68–77, 242–251, 268–277), ¶¶ 398–407 (claim 292), ¶¶ 408–411 (claim 293), ¶ 420 (claim 298). Dr. Stein also explains why it would have been obvious to combine these teachings with the '455 PCT publication. *See id.* ¶¶ 421–428.

Paice does not dispute Ford's contentions that the '455 PCT publication and Severinsky '970 together teach the limitations of the challenged claims, nor does Paice dispute the reason to combine those teachings. After reviewing Ford's evidence and arguments, and notwithstanding Paice's argument that the '455 PCT publication is not prior art, as discussed below, we are persuaded that Ford has shown, by a preponderance of the evidence, that the challenged claims would have been obvious over the '455 PCT publication and Severinsky '970.

C. The '455 PCT Publication Is Prior Art to the Challenged Claims

Paice's sole argument against Ford's proof of obviousness is that the '455 PCT publication is "not prior art" because the effective filing date of the challenged claims "pre-dates" the '455 PCT publication. PO Resp. 6.

Specifically, Paice contends that, with respect to the claims reciting the electrical limitations, “there is more than sufficient support for those claims in earlier applications from which the ’634 patent claims priority, which pre-date the ’455 PCT publication.” *Id.* at 6–7.

The earlier applications identified by Paice as providing support for the claimed electrical limitations include provisional application No. 60/100,095, filed September 14, 1998 (Ex. 1158, “the ’095 application”), continuation-in-part application No. 09/264,817 filed March 9, 1999 (Ex. 1162, “the ’817 application”), and continuation-in-part application No. 09/392,743, filed September 9, 1999 (Ex. 1163, “the ’743 application”). *See* Ex. 1151, cover page, item 60 (“Related U.S. Application Data”). According to Paice, these ancestor applications convey to a skilled artisan that the inventors had possession of the claimed electrical limitations by no later than September 9, 1999, which is prior to the March 23, 2000 publication date of the ’455 PCT publication. PO Resp. 9 (citing Ex. 2105 ¶¶ 41–93). We disagree.

Although the priority applications¹⁰ have earlier filing dates than the publication date of the ’455 PCT publication, we agree with Ford that the benefit of those earlier dates does not extend to the challenged claims because the priority applications fail to provide adequate written description support for the electrical (voltage, current, and ratio) limitations. *See* Pet. 8–15; Reply 2–16. Paice argues two reasons why we should find that the priority applications provide support for the electrical limitations of the

¹⁰ We refer to the ancestor ’095, ’817, and ’743 applications, upon which Paice relies for support of the challenged claims, collectively as “the priority applications.”

challenged claims—*first*, “the incorporated disclosure of Severinsky ’970” into each of the priority applications; and *second*, the “four corners of the applications themselves.” We address each argument in turn.

1. *Paice’s Argument That Severinsky ’970 Is Incorporated By Reference Into the Priority Applications*

Paice argues that Severinsky ’970, which purportedly provides written description support for the claimed electrical limitations, is incorporated by reference into each of the ’095, ’817, and ’743 priority applications. PO Resp. 9–16. “Incorporation by reference provides a method for integrating material from various documents into a host document . . . by citing such material *in a manner that makes clear* that the material is effectively part of the host document as if it were explicitly contained therein.” *Zenon Envtl., Inc. v. U.S. Filter Corp.*, 506 F.3d 1370, 1378 (Fed. Cir. 2007) (citations omitted) (emphasis added). But, to incorporate material by reference properly, “the host document must identify with *detailed particularity* what specific material it incorporates and *clearly indicate where* that material is found in the various documents.” *Id.* (emphases in original).

Here, Paice relies on several passages from the priority applications as support for the incorporation by reference of Severinsky ’970. PO Resp. 11–13. First, Paice points to a general assertion of “incorporation” found in each of the three priority applications:

This application discloses a number of improvements over and enhancements to the hybrid vehicles disclosed in the inventor’s U.S. Pat. No. 5,343,970 (the “’970 patent”), which is incorporated herein by this reference. *Where differences are not mentioned, it is to be understood that the specifics of the vehicle design shown in the ’970 patent are applicable to the vehicles shown herein as well.*

* * *

The hybrid drive train shown in the '970 patent has *many aspects and advantages* with respect to the prior art which are retained by the present invention. . . . As compared to the prior art, the battery bank, motor/generator, and associated power circuitry are operated at relatively high voltage and relatively low current, reducing losses due to resistive heating and simplifying component selection and connection.

Id. at 8, 11–12 (quoting Ex. 1158, 2–3 (the '095 application) (emphasis added)); *see also* Ex. 1162, 18–20 (the '817 application); Ex. 1163, 1–2 (the '743 application). Paice also points to “incorporation” language from the '095 and '817 applications:

Essentially *similar functions* were provided by the solid-state switching AC/DC converter 44 in the '970 patent; where not specified to the contrary, the discussion thereof is applicable to the inverter design shown in FIG. 5 hereof.

PO Resp. 12–13 (quoting Ex. 1162, 49:8–12) (emphasis added); *see also* Ex. 1158, 16:30–34.

We are not persuaded that these incorporation clauses from the priority applications “clearly indicate” what is being incorporated, let alone incorporating the specific teachings of maximum voltage and maximum current found in Severinsky '970. *See Zenon*, 506 F.3d at 1378. Rather, in our view, these incorporation clauses leave open the question of exactly which “advantages” and “similar functions” from Severinsky '970 are being incorporated into the priority applications. Most notably, the applicant’s general assertion of incorporation, as indicated above, is coupled with an express qualification limiting the extent of Severinsky '970’s incorporation: “[w]here differences are not mentioned, it is to be understood that the specifics of the vehicle design shown in the '970 patent are applicable to the vehicles shown herein as well.” Ex. 1158, 2:12–15, Ex. 1162, 18:27–30;

Ex. 1163, 1:22–25 (emphasis added). In other words, the incorporation excludes “differences” between Severinsky ’970 and the priority applications where mentioned.

But, with respect to specific ranges for voltage and current, differences are mentioned that appear to preclude incorporation of Severinsky ’970 into the priority applications. For instance, Severinsky ’970 discloses a DC voltage of 1,000–1,400 volts under load, as compared to the disclosure in the ’817 and ’743 applications of a 768 open-circuit voltage and an 800–1200 open-circuit voltage range, respectively. *Compare* Ex. 1154, 19:42–47 *with* Ex. 1162, 50:34–35 and Ex. 1163, 16:25–28. Likewise, with respect to the “current” limitation, Severinsky ’970 discloses that the current should be less than 75 amperes,” whereas the ’095 application discloses currents of “100 amperes” and the ’817 application discloses “currents of up to 200 amperes.” *Compare* Ex. 1154, 19:42–44 *with* Ex. 1158, 18:1–2, and Ex. 1162, 50:26–29. Thus, Ford’s expert, Dr. Stein, testifies that Severinsky ’970’s voltage and current ranges are “different” from the voltage and current ranges disclosed in the priority applications, thereby precluding incorporation of the specific voltage and current ranges disclosed in Severinsky ’970. Ex. 1188 ¶¶ 44–48. We find this testimony persuasive.

Based on Dr. Stein’s testimony, we find that, at the very least, a skilled artisan would have had difficulty ascertaining the extent of the incorporation due to the mentioned differences between Severinsky ’970 and the priority applications in describing voltage and current. Ex. 1152 ¶¶ 153–154. Without a more detailed accounting, the skilled artisan would have been left to guess about the extent of the incorporation and whether the

differences were too vast to be applicable to the priority applications. *Id.* That type of incorporation by reference falls short of the Federal Circuit’s mandate that the host document identify the incorporated material with sufficient particularity and clarity. *See Zenon*, 506 F.3d at 1378–79.

Paice relies heavily on the decision in *Harari v. Lee*, 656 F.3d 1331, 1335 (Fed. Cir. 2011), and argues that the incorporation in that case is “nearly identical” to the incorporation language here. PO Resp. 14; *see also id.* at 10–11. We disagree. That case involved a broad incorporation clause followed, several pages later, by an incorporation directing the reader to certain “relevant portions” of the material being incorporated. *Harari*, 656 F.3d 1335–36. Here, no such direction is given. Rather, the general incorporation here is followed *immediately* by qualifying language expressly informing the reader that any “differences” with Severinsky ’970 are excluded from the incorporation. That limitation, or qualification, distinguishes the incorporation here from the incorporation in *Harari*, where the incorporation did not include any such qualifying language expressly excluding incorporation of “differences” between the host document and the document being incorporated. If the general incorporation clause here was intended to constitute a complete incorporation of Severinsky ’970, there would be no need to follow it immediately with a limitation on the extent of the incorporation.

In sum, we are not persuaded that the general incorporation of Severinsky ’970 would have been understood by a skilled artisan as also incorporating its specific ranges of maximum voltage and current, particularly in view of the express qualification that differences with Severinsky ’970 were not subject to incorporation.

2. *Paice's Argument that the Priority Applications Themselves Adequately Describe the Electrical Limitations*

Paice argues that, the incorporation of Severinsky '970 aside, the priority applications themselves provide ample support for the electrical (voltage, current, and ratio) limitations of the challenged claims. PO Resp. 23, 33, 36. We disagree.

a. *The Maximum Voltage Limitation*

The challenged claims require that the maximum DC voltage supplied from the battery be “at least approximately 500 volts.” Ford’s expert, Dr. Stein, testifies that a skilled artisan would not have understood the ’095, ’817, and ’743 applications as evincing possession of the claimed voltage range. Ex. 1152 ¶¶ 125–143. Paice responds that the voltage limitation is supported by at least the ’743 application, which discloses an “*open-circuit voltage*” in the 800-1200 volt range. PO Resp. 23–24 (emphasis added). But, it is undisputed that, as claimed, the “at least approximately 500 volts” limitation refers to voltages “under load, as opposed to a nominal, open-circuit voltage.” *See* Section III.A. (noting that neither party disputes our construction of “maximum DC voltage” as “a voltage *under load*”).

Nonetheless, Paice and its expert, Mr. Hannemann, rely on an “open-circuit voltage” in the ’743 application that they admit is “not under load,” without any explanation of how such an open-circuit voltage translates to a voltage *under load*. Ex. 2105 ¶ 62. On the other hand, Ford’s expert, Dr. Stein, testifies that, because the conversion of an open circuit voltage to a closed circuit or “under load” voltage depends on several parameters—such as type of battery, internal resistance as a function of current flow, voltage and current losses through the circuit, etc.—which are not disclosed

by the '743 application, the required “under load” voltage cannot be ascertained. Ex. 1188 ¶ 30; *see also* Ex. 1152 ¶¶ 128, 137 (explaining further why voltage under load “cannot be deduced from the information provided by the '743 application”). We find Dr. Stein’s testimony more persuasive, particularly in view of Mr. Hannemann’s reliance on an improper type of voltage from the '743 application.

In apparent recognition of the '743 application’s deficiency in disclosing a voltage under load, as required by the claims, Paice argues alternatively that a skilled artisan “could derive” the proper voltage value. PO Resp. 23–27. To do so, however, Paice’s expert, Mr. Hannemann, mixes and matches power and current values across the three priority applications in an attempt to derive the proper voltage. *See* Ex. 2105 ¶¶ 64–69. We find this mix-and-match approach highly speculative. In our view, it does not convey the level of “reasonable clarity” necessary to show possession of the invention by the filing date sought. *See Ariad Pharms., Inc. v. Eli Lilly & Co.*, 560 F.3d 1366, 1371 (Fed. Cir. 2009). Indeed, Ford’s expert, Dr. Stein, testifies that Mr. Hannemann’s derivation of a voltage under load relies on power and current values taken from “unrelated” examples in the priority applications. Ex. 1188 ¶ 33.

In the end, we are not persuaded by Paice’s attempt to derive voltage values for support of the claimed “500 volt” limitation by combining unrelated values from three different applications. Instead, we find more persuasive the testimony of Ford’s expert that “a POSA would have no rationale to (1) look to the '743 Application for a power value; and (2) to pair a power value from the '743 Application with the disclosure of a 200 amperes current value in the '817 Application to calculate a maximum

voltage value.” Ex. 1188 ¶¶ 34–36. Accordingly, we determine that the disclosures in the priority applications fail to provide written description support for the claimed maximum voltage limitation.

b. The Maximum Current Limitation

The challenged claims require that maximum current from the battery be “less than approximately 150 amperes.” Paice relies exclusively on the ’817 application as providing “ample support” for this maximum current limitation. PO Resp. 33. In particular, Paice argues that the ’817 application discloses that current from the battery may range “from 30 amperes up to 200 amperes,” and that this broad range would have conveyed to a skilled artisan the narrower range of “less than approximately 150 amperes,” as recited in the challenged claims. *Id.* at 33–35.

To arrive at that broad range, however, Paice combines two unrelated ranges, a range of “30-50 amperes,” which the ’817 application says is for continuous “long-term” operation of the motor, and another range of “up to 200 amperes,” which the ’817 application says is for “full-power acceleration” of no more than “10-15 seconds.” Ex. 1162, 50:22–29. In doing so, Paice is “effectively rewriting the disclosure” of the ’817 application in an effort to expand the range beyond what is actually disclosed, according to Ford’s expert, Dr. Stein. Ex. 1188 ¶¶ 37–38.

Dr. Stein further explains that the “30-50 amperes” disclosure is actually a “limit” on continuous operation, “not a range of maximum current values, as required by the claims.” *Id.* ¶ 38. Thus, in Dr. Stein’s view, that disclosure cannot provide support for the higher 150 amperes maximum current limitation. *Id.* We agree. And, with respect to the ’817 application’s disclosure of “up to 200 amperes,” we again agree with

Dr. Stein that there is too significant a disparity with the claimed maximum threshold of 150 amperes to convey possession thereof. *Id.* ¶ 39.

Accordingly, we find that the disclosures of the priority applications fail to provide written description support for the claimed maximum current limitation.¹¹

c. The “Ratio” Limitation

Finally, with respect to the limitations requiring that a “ratio” of “at least 2.5” of maximum DC voltage-to-current supplied from the battery, Paice admits that none of the priority applications alone discloses such a ratio. Instead, Paice argues that a skilled artisan “could calculate” the ratio from various disclosures in the three priority applications. PO Resp. 38–39. Indeed, Paice’s expert, Mr. Hannemann, plucks “power” values from the ’743 application and “maximum current” values from the ’095 and ’817 applications to calculate voltage, and thereby, derive a number of ratios that purport to satisfy the claimed ratio. Ex. 2105 ¶¶ 90–92. We are not persuaded by this mix-and-match approach. Rather, we find more persuasive the testimony of Ford’s expert, Dr. Stein, that a skilled artisan would “not derive voltage to current ratios from power and current values found in *unrelated* examples disclosed in three different applications.” Ex. 1188 ¶¶ 19–20 (emphasis added); *see also* Ex. 1152 ¶¶ 122–129. Thus,

¹¹ Paice also argues that the ’817 application provides support for the “75 amperes” limitation found only in dependent claim 293. PO Resp. 33. We are not persuaded for the simple reason that the ’817 application emphasizes twice that maximum current from the battery not exceed “50 amperes” (Ex. 1162, 21:30–34, 50:22–24), whereas claim 293 expands the range much higher, i.e., up to 75 amperes.

we conclude that the priority applications fail to provide written description support for the “ratio” limitations of the challenged claims.

d. The Prosecution History

Although arguably not determinative, the prosecution history of the ’634 patent lends some credit to Ford’s assertion that the electrical limitations were disclosed by the inventors for the first time in continuation-in-part application No. 09/822,866 (“the ’866 application”), which was filed after publication of the ’455 PCT publication. Pet. 8–12. Specifically, during prosecution, the inventors admitted that new claims “have been added reciting *specifics of the preferred ranges of voltage and current, and their ratio*” and that support for these new claims could be found at “pages 89-91 of the application,” which is titled “Further Improvements According to the Continuation-in-part.” Ex. 1164, 311 (emphasis added).

Based on our review, that section of the ’866 application describes the electrical limitations in a manner of detail not done previously in the ’095, ’817, or ’743 applications. *See* Ex. 1152 ¶¶ 100–113. Thus, we agree with Ford that disclosure of the electrical limitations appears not to have occurred until April 2, 2001, which is after the date of the ’455 PCT publication. *See* Pet. 8–12; Reply 23.

IV. CONCLUSION

We conclude that the electrical limitations of the challenged claims are not supported by the priority applications, and therefore the claims containing those limitations are not entitled to the benefit of the earlier-filed ’095, ’817, and ’743 priority applications. As such, the ’455 PCT publication qualifies as prior art to the challenged claims. And, after considering the evidence and arguments presented by the parties, we

determine that Ford has demonstrated, by a preponderance of the evidence, that the challenged claims are unpatentable under 35 U.S.C. § 103 as obvious over the '455 PCT publication and Severinsky '970.

V. ORDER

Accordingly, it is hereby:

ORDERED that claims 56–65, 68–77, 242–251, 268–277, 292, 293, and 298 of the '634 patent are held *unpatentable*; and

FURTHER ORDERED that any party seeking judicial review of this Final Written Decision must comply with the notice and service requirements of 37 C.F.R. § 90.2.

IPR2015-00606
Patent 7,237,634 B2

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