

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

OSRAM SYLVANIA INC.,
Petitioner,

v.

JAM STRAIT, INC.,
Patent Owner.

Case IPR2014-00703
Patent 6,786,625 B2

Before BART A. GERSTENBLITH, MIRIAM L. QUINN, and
JEFFREY W. ABRAHAM, *Administrative Patent Judges*.

QUINN, *Administrative Patent Judge*.

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

I. INTRODUCTION

Osram Sylvania Incorporated¹ filed a Petition to institute an *inter partes* review of claims 30 and 31 of U.S. Patent No. 6,786,625 B2 (“the ’625 patent”) pursuant to 35 U.S.C. § 311–19. Paper 5 (“Petition” or “Pet.”). We instituted trial (Paper 10, “Dec. on Inst.”) on the following grounds:

- a) Obviousness of claims 30 and 31 over Laforest;²
- b) Obviousness of claims 30 and 31 over Alvarez;³ and
- c) Obviousness of claims 30 and 31 over Horowitz.⁴

Jam Strait, Inc.⁵ filed a Patent Owner Response addressing the above-referenced grounds. Paper 13 (“PO Resp.”). Patent Owner relies on a Declaration of Mr. Bruce Wesson to support the rebuttal to Petitioner’s challenges of unpatentability. Ex. 2001 (“Bruce Decl.”).

Petitioner filed a Reply to Patent Owner’s Response. Paper 15 (“Pet. Reply”). An oral hearing was held on June 18, 2015, as scheduled, and a transcript of that hearing has been entered into the record. Paper 23 (“Tr.”).

The Board has jurisdiction under 35 U.S.C. § 6(c). Pursuant to 35 U.S.C. § 318(a), this decision is “a final written decision with respect to the patentability of any patent claim challenged by the petitioner.”

¹ Hereinafter referred to as “Petitioner.”

² French Patent Application Pub. No. 2 576 719 to Laforest, et al. (Ex. 1017). A certified translation of this reference was provided as Exhibit 1018. Therefore, hereinafter, all references to “Laforest” are with respect to the translation, Exhibit 1018.

³ U.S. Patent No. 6,252,350 B1 (Ex. 1020) (“Alvarez”).

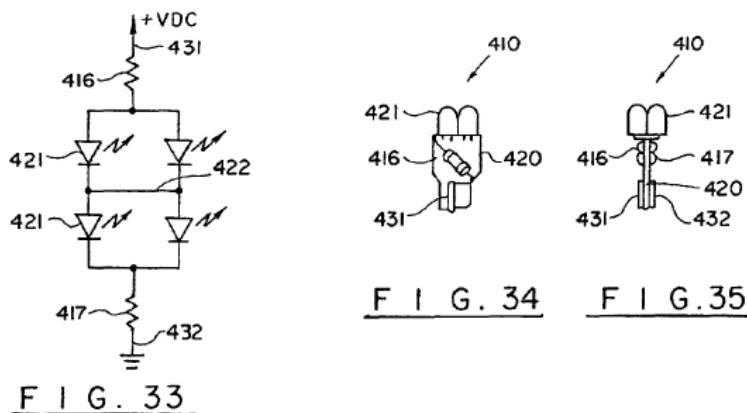
⁴ U.S. Patent No. 6,357,902 B1 (Ex. 1021) (“Horowitz”).

⁵ Hereinafter referred to as “Patent Owner.”

Petitioner has demonstrated by a preponderance of the evidence that claims 30 and 31 of the '625 patent are unpatentable.

A. THE '625 PATENT (EX. 1001)

The '625 patent, titled "LED LIGHT MODULE FOR VEHICLES," issued on September 7, 2004. LED is an acronym for Light Emitting Diode. *See* Ex. 1001, Abstract. The '625 patent describes an LED lamp module for use in a vehicle's tail, brake, or turn signal lamp fixtures. *Id.* at 1:28–33. "LED bulbs designed to replace vehicle incandescent bulbs require bases similar to the standard bayonet or the wedge bases." *Id.* at 1:54–56. A mini-wedge bulb is described with reference to Figures 33, 34, and 35, for example, reproduced below.



Figures 33, 34, and 35 of the '625 patent, reproduced above, illustrate bulb 410 including four LEDs 421 in a "2x2" array mounted on a printed circuit board (PCB). *Id.* at 14:6–9. "Resistors 416 and 417 limit current through and voltage drop across the LEDs to acceptable levels for the ratings of the LEDs 421." *Id.* at 14:12–14. The '625 patent further describes that the mini-wedge LED bulb can replace any 3-digit automotive bulb. *Id.* at 14:28–30. One example provided of a mini-wedge LED bulb that can replace standard 3-digit incandescent light bulbs is the LED bulb identified

by the part number “194-XX.” *Id.* at 24:37–41, 49–67 (Table). As for shape, the ’625 patent states that the outline of PCB 420 (shown in Figures 34–35 above), is “preferably approximately the same as the smaller 3[-]digit incandescent bulbs such as 194.” *Id.* at 14:36–37.

Claim 30 is an independent claim, and claim 31 depends from claim 30. Illustrative claim 30 is reproduced below:

30. An LED light bulb adapted for use in standard automotive mini wedge type bulb sockets comprising:
- a bulb body comprising a printed circuit board having a front side, a rear side, and an upper side; at least one light emitting diode mounted on the upper side of the printed circuit board and electrically coupled with the printed circuit board; and
 - electrical control means mounted on the printed circuit board electrically connected between the printed circuit board and at least one pair of electrical conductors.

II. ANALYSIS

This case presents at least two issues. The first issue is whether the LED lamps disclosed in the asserted references teach or suggest “[a]n LED light bulb *adapted for use in standard automotive mini wedge type bulb sockets.*” (Emphasis added.) A second issue involves whether the prior art teaches or suggests a resistor that is “mounted on” a printed circuit board as required by claim 30.

A. CLAIM INTERPRETATION

The Board interprets claims using the “broadest reasonable construction in light of the specification of the patent in which [they] appear[.]” 37 C.F.R. § 42.100(b). We presume that claim terms have their ordinary and customary meaning. *See In re Translogic Tech., Inc.*, 504 F.3d

1249, 1257 (Fed. Cir. 2007) (“The ordinary and customary meaning is the meaning that the term would have to a person of ordinary skill in the art in question.”) (internal citation and quotation marks omitted). An inventor, however, also may act as his or her own lexicographer and give a claim term a special meaning. Even where, as here, no such lexicographic definition is presented, it is appropriate, nevertheless, to rely on the written description for guidance in determining claim meaning. *See id.* Indeed, the construction that stays true to the claim language and most naturally aligns with the inventor’s description is likely to be the correct construction. *Renishaw PLC v. Marposs Societa’ per Azioni*, 158 F.3d 1243, 1250 (Fed. Cir. 1998).

The claims have been given their ordinary meaning as would be understood by a person of ordinary skill in the art in light of the ’625 patent. We address that meaning for three terms: the preamble of claim 30, “electrical control means,” and “mounted on the printed circuit board.”

1. Preamble of Claim 30: “An LED light bulb adapted for use in standard automotive mini wedge type bulb sockets”

In our Decision on Institution, the Board determined that the preamble of claim 30 is a claim limitation. “A claim’s preamble may limit the claim when the claim drafter uses the preamble to define the subject matter of the claim.” *August Tech. Corp. v. Camtek, Ltd.*, 655 F.3d 1278, 1284 (Fed. Cir. 2011). The preamble is generally construed to be limiting if it “‘recites essential structure or steps, or if it is necessary to give life, meaning, and vitality to the claim.’” *NTP, Inc. v. Research In Motion, Ltd.*, 418 F.3d 1282, 1305 (Fed. Cir. 2005) (quoting *Catalina Mktg. Int’l, Inc. v. Coolsavings.com, Inc.*, 289 F.3d 801, 808 (Fed. Cir. 2002)). For example, where the specification underscores structure recited in the preamble as

important, the preamble may operate as a claim limitation. *Catalina Mktg.*, 289 F.3d at 808.

The challenged claims are directed to a specific LED light bulb, one that can be inserted in a standard automotive mini-wedge socket. The '625 patent states that the “present invention” is an LED “vehicle lamp module adapted for mounting in standard vehicle brake/tail lamps or turn signal assemblies to replace standard vehicle incandescent bulbs.” Ex. 1001, 4:39–42. The adaptation of the LED light bulb to fit a specific socket constrains the fit of the recited PCB in the “bulb body” and the “electrical control means” that are mounted onto that PCB, such that the light bulb has the dimensions of a mini-wedge bulb. The specification of the '625 patent reflects this importance when describing that the PCB of the mini-wedge bulb of the “present invention” has the dimensions (thickness and height) of a standard automotive mini-wedge light bulb with the 194-part number, such that it can fit into the same socket as 3-digit incandescent mini-wedge bulbs with the 194-part number. *See id.* at 14:6–7, 36–44; 14:62–15:3.

Furthermore, we noted that the use of “adapted for” in the preamble denotes that the LED light bulb is *designed or made to fit* into a mini-wedge type bulb socket. *See In re Giannelli*, 739 F.3d 1375, 1380 (Fed. Cir. 2014). As stated above, the '625 patent describes that the mini-wedge type bulb has the same dimensions as a 194-part number light bulb, i.e., a 3-digit incandescent light bulb. *See* Ex. 1001, 14:6–7, 36–44; 14:62–15:3. Further, the specification describes that the mini-wedge light bulb can replace any 3-digit automotive bulb. *Id.* at 14:28–29. We interpreted these statements as an indication that the claimed LED light bulb is more than merely “capable of” fitting into a mini-wedge socket—it is designed to do so.

Based on the guidance provided by the '625 patent, we construed the preamble to mean “an LED light bulb designed to fit into sockets configured to receive a three-digit automotive incandescent lamp.” Dec. on Inst. 7.

During trial, Patent Owner argued that none of the bulbs disclosed in the asserted prior art are “for use in standard automotive mini-wedge type bulb sockets.” See PO Resp. 12 (with respect to Laforest), 13 (with respect to Alvarez), 14 (with respect to Horowitz). Although these references show a wedge base, Patent Owner argued that the size of the bulbs disclosed did not meet the claim, because the claim is directed to a “mini-wedge” type. *Id.* Our construction of the preamble, however, restated the recited “mini-wedge type socket” as a “three-digit incandescent lamp” relying on statements in the specification that described the invention in terms of the 194-part number and the replacement of *any* three-digit automotive bulb. See Ex. 1001, 14:28–29; *but see* Ex. 1001, 14:36–37 (stating that the outline of the PCB is preferably “approximately the same as the *smaller* 3[-]digit incandescent bulbs such as 194”) (emphasis added). Indeed, Patent Owner’s position, clarified during oral argument, is that, as stated in the specification, mini-wedge type bulbs and three-digit incandescent light bulbs are “synonymous.” Tr. 34:1–17. Patent Owner also argued that this position is based on the inventor’s understanding at the time the patent was drafted, and that if that understanding was incorrect, Patent Owner would agree that claim 30 is directed to bulbs that are adapted for use in standard automotive mini-wedge type bulb sockets, and not any three-digit bulb socket. *Id.*

In support of a revision of the Board’s claim construction, Petitioner argued at oral argument that the term “mini-wedge” bulb is narrower in scope than “three-digit” bulb. Tr. 14:5–19. This position is supported by

the record. For example, Dr. Peter Shackle, Petitioner's expert, explains that there is no standard definition of "automotive mini wedge type [bulb] sockets." Ex. 1002 ¶ 46. And he states that three-digit automotive lamps can have a variety of bases, including wedge bases for 161-, 168-, and 196-type lamps. *Id.* ¶ 47 (citing Exs. 1026 and 1027 as factual support). Furthermore, the specification, describes the "mini wedge" embodiment as having dimensions of a "smaller 3[-]digit incandescent bulb." Ex. 1001, 14:36–37. We are persuaded by Petitioner's evidence and the statements in the specification regarding the dimensions of the PCB, that the preamble construction should be modified to reflect the express recitation of a mini-wedge type bulb.

Patent Owner also argued at oral argument that the preamble contemplates that the LED light bulb must be as bright as an incandescent light bulb because of the words "[LED light bulb] adapted for *use*." Tr. 30:20–22 (emphasis added). This argument finds no support either in the claim or the specification. First, the claim language broadly refers to the use of the bulb in a specific *socket*. Ex. 1001, 30:4–5. There is no reference to either functionality or specifications of brightness. The word "use" alone is insufficient to require any specific threshold of brightness as the claims expressly recite the number of LEDs, "at least one light emitting diode." *Id.* 30:7–8. Furthermore, the specification broadly describes that there is a range of brightness levels depending on the color of the bulb, such as hyper-bright red and super-bright white. *See id.* at 14:30–35.

Accordingly, we construe the preamble to mean: an LED light bulb designed to fit into sockets configured to receive a mini-wedge type bulb.

2. *“electrical control means”*

In our Decision on Institution we adopted Petitioner’s proposed construction of the term as a means-plus-function term, with the identified structure being “one or more resistors, or equivalents thereof.” Pet. 18–20 (citing Ex. 1001, 6:11–12, 17–19, 22–24, 28–30; 14:12–14, 46–48; 15:10–12, 44–46; 16:12–16 (“Resistors 416 and 417 could be replaced with a single, larger value resistor . . .”). The function recited in the claims is “electrical control” as it is the only function that is attributed to the means. Neither party has expressed any disagreement with the construction of “electrical control means” that was adopted by the Board. That construction, therefore, is appropriate also with respect to this Final Decision.

3. *“mounted on the printed circuit board”*

The words “mounted on” are recited twice in independent claim 30: “at least one light emitting diode mounted on the upper side of the printed circuit board” and “electrical control means mounted on the printed circuit board.” Ex. 1001, 30:7–9, 11–12. Neither party proposed a construction for the term “mounted on.” But the parties’ application of the term differs in scope. For example, Petitioner argues that “mounted on” does not require that both leads of a resistor are connected to a PCB. Tr. 21:3–15. Yet Patent Owner argues that both leads of the resistor would need to be connected to the PCB to meet the claim. Tr. 38:21–39:2. On this issue, we agree with Patent Owner that a resistor “mounted on” the PCB requires at least that both leads of the resistor are connected to the PCB. This understanding stems from the ordinary meaning of the term as understood by those of ordinary skill in the art. First, we note that the ordinary meaning of the word

“mount” is “to fix securely to a support.”⁶ The specification confirms this definition by describing consistently how the LEDs and resistors are “mounted on” the PCB. *See e.g.*, Ex. 1001, 14:6–9 (LEDs mounted on a PCB); 14:15–17 (resistors can be thru hole resistors or they can be surface mounted on the PCB). The diagrams all show that both electrical leads from these devices are fixed onto the PCB. For example, Figure 37 illustrates resistor 456 placed flat on the PCB with the leads coupled to it. Ex. 1001, Fig. 37. Figure 38 also shows the profile of the PCB illustrating LEDs 421 and resistors 456 and 457 connected to the PCB. Other embodiments of the ’625 patent also confirm this understanding. For example, Figures 7 and 8 depict one embodiment in which one lead of control circuitry 84 is connected to the LED, with control circuitry 84 *suspended* in the body cavity to allow for air cooling. Ex. 1001, 9:37–42. Additionally, the second lead of control circuitry 84 is neither shown nor described as being connected to the PCB. Another, similar, embodiment is shown in Figure 18, and is described as “suspended control circuitry.” *Id.* at 5:42–44. These descriptions lead us to conclude that the applicant used the term “mounted on the printed circuit board” to mean an installation of a device with its electrical connections, or leads, affixed to the PCB, and wherein the control circuitry is *not* suspended in a cavity. Compare this with a connection where at least one lead of the control circuitry is not affixed to a PCB, a connection described as *suspended*—not “mounted on.” Accordingly, guided by the use of the term “mounted on” in the specification and the term’s ordinary meaning as understood by a person of ordinary skill in the art, we conclude

⁶ *See mount definition*, THE AMERICAN HERITAGE COLLEGE DICTIONARY, 891 (Houghton Mifflin 3rd ed. 1997) (Ex. 3001).

that “mounted on the printed circuit board” means that, at a minimum, all of the electrical leads of the electrical control means must be affixed to the PCB.

B. RELEVANT LEGAL PRINCIPLES

To prevail in its challenges to the patentability of claims, Petitioner must establish facts supporting its challenges by a preponderance of the evidence. 35 U.S.C. § 316(e); 37 C.F.R. § 42.1(d). A claim is unpatentable under 35 U.S.C. § 103(a) if the differences between the claimed subject matter and the prior art are such that the subject matter, as a whole, would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 406 (2007). The question of obviousness is resolved on the basis of underlying factual determinations including: (1) the scope and content of the prior art; (2) any differences between the claimed subject matter and the prior art; (3) the level of skill in the art; and (4) where in evidence, so-called secondary considerations including commercial success, long-felt but unsolved needs, failure of others, and unexpected results. *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966) (“the *Graham* factors”). The level of ordinary skill in the art usually is evidenced by the references themselves. See *Okajima v. Bourdeau*, 261 F.3d 1350, 1355 (Fed. Cir. 2001); *In re GPAC Inc.*, 57 F.3d 1573, 1579 (Fed. Cir. 1995); *In re Oelrich*, 579 F.2d 86, 91 (CCPA 1978).

For an obviousness analysis, prior art references must be “considered together with the knowledge of one of ordinary skill in the pertinent art.” *In re Paulsen*, 30 F.3d 1475, 1480 (Fed. Cir. 1994) (quoting *In re Samour*, 571 F.2d 559, 562 (CCPA 1978)). Moreover, “it is proper to take into

account not only specific teachings of the reference but also the inferences which one skilled in the art would reasonably be expected to draw therefrom.” *In re Preda*, 401 F.2d 825, 826 (CCPA 1968). That is because an obviousness analysis “need not seek out precise teachings directed to the specific subject matter of the challenged claim, for a court can take account of the inferences and creative steps that a person of ordinary skill in the art would employ.” *KSR*, 550 U.S. at 418; *see also Translogic Tech.*, 504 F.3d at 1262.

C. LEVEL OF ORDINARY SKILL IN THE ART

Petitioner proposes a particular level of ordinary skill in the art to which Patent Owner disagrees, without providing any evidence supporting such disagreement. Ex. 1002 ¶ 41; PO Resp. 18. In light of the evidence before us, we find that the references themselves represent the level of ordinary skill in the art, and that we need not explicate it further. *See Okajima*, 261 F.3d at 1355; *GPAC*, 57 F.3d at 1579 (finding that the Board of Patent Appeals and Interferences did not err in concluding that the level of ordinary skill was best determined by the references of record); *Oelrich*, 579 F.2d at 91 (“[T]he PTO usually must evaluate . . . the level of ordinary skill solely on the cold words of the literature.”).

D. LAFOREST

Petitioner has asserted that Laforest’s teachings combined with the knowledge of a person of ordinary skill in the art account for all the features of claims 30 and 31 of the ’625 patent, and that one of ordinary skill in the art would have had sufficient motivation to modify Laforest as asserted.

1. Overview of Laforest (Exhibit 1018)

Laforest is directed to an LED connector support for use in a dashboard of an automobile. Ex. 1018, 2:1–2.⁷ The connector support comprises a plate of an electrically-insulating material onto which is mounted an LED. *Id.* at 2:3. Figure 1, reproduced below, illustrates one embodiment of the LED connector support.

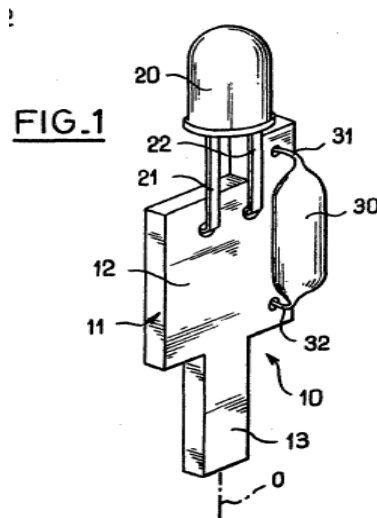


Figure 1, reproduced above, shows LED 20 and resistor 30 that are soldered to connector support 10. *Id.* at 3:19–20. Small support plate 11 comprises rectangular main body 12. *Id.* at 3:26–27. One face of small support plate 11 has electrically-conductive elements. *Id.* at 3:21–23. Figure 2, reproduced below, depicts electrically-conductive elements 15 and 16.

⁷ Identified page numbers in Laforest refer to the page number provided in the header of the reference.

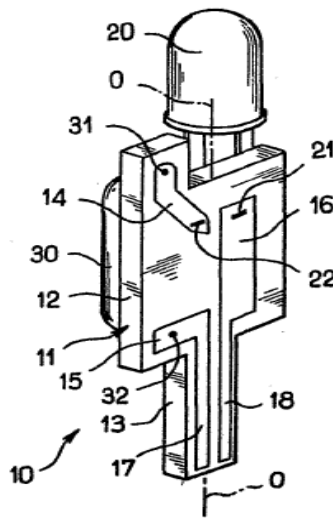
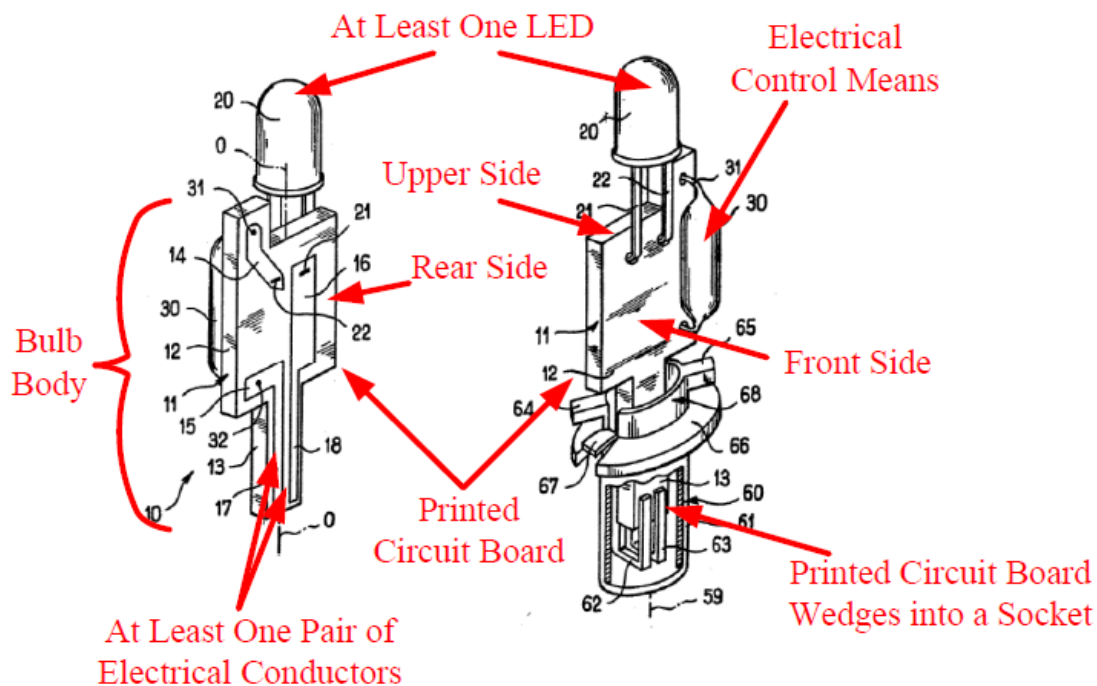


FIG. 2

According to Figure 2, reproduced above, LED 20 is soldered to electrically-conductive strip 14, and one end of resistor 30 is soldered to electrically-conductive strip 14 with the other end soldered to strip 15, so that LED 20 and resistor 30 are connected in series. *See id.* at 4:8–13.

Petitioner asserts that Laforest discloses each limitation of claims 30 and 31. *Pet.* 27–30. Specifically, Petitioner provides an annotated diagram of Laforest illustrating how Laforest teaches the claim elements. *Id.* at 27. That diagram is reproduced below for ease of reference.



Annotated Figure 2 (left) and 3 (right) of Laforest

The diagram above shows Petitioner-annotated Figures 2 and 3 of Laforest identifying that LED 20 teaches the “at least one LED,” resistor 30 teaches the “electrical control means,”⁸ connector support 10 teaches the “bulb body,” and electrically-conductive traces 17 and 18 teach the “at least one pair of electrical conductors.” See Pet. 27.

2. Reasons to Modify Laforest

Laforest contemplates the use of connector support 10 for an automobile dashboard. Ex. 1018, 2:1–2. Nevertheless, Laforest does not expressly disclose that the wedge socket onto which connector support 10 fits is a mini-wedge type socket. Petitioner asserts that it would have been obvious for a person of ordinary skill in the art to modify Laforest’s socket

⁸ There is no dispute that the “electrical control means” in Laforest are “mounted on” the PCB.

to be configured in the required dimensions. Pet. 32–33. It is clear from Laforest that fitting LED bulbs to standard sockets was a known problem. See Ex. 1018, 1:23–25 (“the Applicant has posed the problem of designing a connector support for an LED compatible with standard sockets”). Although the solution provided by Laforest involves ensuring also the correct polarity of an LED, thereby making the body of the support asymmetrical, Laforest teaches the overall motivation of replacing conventional lamps with LEDs because of advantages of style, reliability, and reduction of heat dissipation. *Id.* at 1:7–8. It further provides that fitting the LED lamps in standard sockets in automobiles was desirable because of the high cost of providing special LED-adapted sockets. *Id.* at 1:14–16.

For additional evidence of motivation, Petitioner relies on U.S. Patent No. 6,342,762 B1, issued to Young et al. (“Young,” Ex. 1024). Pet. 33–34. Young is titled “AMBER VEHICLE LAMP,” and describes incandescent light bulbs. See Ex. 1024 1:14–17, 2:14–15. The relevant teaching of Young pertains to the description of the base suitable for the vehicle lamp. In particular, Young states that: “A base is attached to the press seal region to provide a convenient mechanical coupling and electrical connection for the bulb. Several base designs are known. The particular choice of the base design is felt to be [a] matter of design choice.” *Id.* at 2:21–25. Petitioner further asserts that one of Young’s embodiments discloses a mini-wedge lamp. See Pet. 33 (citing to Ex. 1024, Figs. 1–3, Ex. 1002 ¶ 68). Dr. Shackle supports Petitioner’s assertion by pointing out that Young’s Figure 3 discloses a lamp with a W2.1x9.2d base, i.e., a mini-wedge lamp. Ex. 1002 ¶ 69. Thus, motivated by either Laforest or Young, or both,

Petitioner argues that a person of ordinary skill in the art would modify the base of Laforest as the claim requires. Pet. 33.

3. Patent Owner's Arguments

In its Preliminary Response, Patent Owner argued that there are insufficient reasons to modify Laforest. In the Patent Owner response submitted pursuant to 37 C.F.R. § 42.120, Patent Owner proffers the same arguments, but with supporting evidence: declaration testimony of Bruce Wesson, the named inventor of the '625 patent. See Ex. 2001. For the reasons that follow, we conclude that Laforest teaches all the limitations recited in the body of the claim, and that a person of ordinary skill in the art would have had adequate reason to modify those teachings to meet the preamble of the claim.

a. Physical Characteristics of Laforest's Bulb

Patent Owner argues that Laforest's bulb is not for use in automotive mini-wedge type bulb sockets because the disclosed bulb is smaller than a mini-wedge type bulb. PO Resp. 12. According to Patent Owner, Laforest's connector is only 2.5 mm wide, corresponding to a micro wedge socket size. *Id.* This argument is unpersuasive because it is directed to distinguishing Laforest individually, and not in combination with the teachings and reasons for the modification of the socket as asserted by Petitioner. That is, Petitioner has asserted that the Laforest bulb would render obvious the claims because it would have been obvious to modify the base, such that the bulb would fit into a standard mini-wedge socket. Pet. 33–34. As discussed above, Petitioner presented evidence in Laforest and in Young that such a motivation was known in the art at the time of the invention. Therefore, an argument that Laforest's bulb or socket is smaller than a mini-wedge type

bulb is not persuasive. For it is not Laforest's socket size or bulb size that is relevant to the claim, but, rather, the modified Laforest bulb, as asserted, which Petitioner contends would render the claims obvious. *See 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.").

Furthermore, we do not find persuasive Patent Owner's arguments regarding the size of Laforest's bulb, because Laforest does not disclose any dimensions for the disclosed embodiments. Patent Owner's Declarant appears to have measured the drawing in Figure 1 of Laforest to arrive at the conclusion of the dimensions of the bulb. *See* Ex. 2001, 10 ("It measures however in my copy 0.35" and the base measures 0.2000.""). There is no evidence, however, that Laforest's figures are drawn to scale.

b. Modifications to the Automobile

Patent Owner also argues that plugging the Laforest bulb into a standard automotive mini-wedge type bulb socket would require a modification of the automobile. PO Resp. 12. In particular, Patent Owner's Declarant states that the vehicle's dash-socket-mounting hole in Laforest would have to be modified by removing the socket, cutting an opening, checking for clearance, re-installing the socket, and inserting the LED. Ex. 2001, 10. The reasons for the alleged modification are that Laforest's resistor 30 causes the bulb body to be asymmetrical, requiring a slot 74, as shown in Figure 4 of Laforest. *Id.* Also, the contacts shown in Laforest are wired on the same side, instead of one on each side. *Id.* at 11. These arguments are insufficient to rebut the evidence of record that a person of ordinary skill in the art would have been motivated to modify the base of

Laforest so the bulb fits into a standard automotive mini-wedge type socket. In particular, the testimony of Mr. Wesson is not persuasive because it does not explain how the alleged modifications—removing the socket, cutting an opening, etc.—present any complexity that would have been uniquely challenging or beyond the level of an ordinarily skilled artisan. See *Leapfrog Enters., Inc. v. Fisher-Price, Inc.*, 485 F.3d 1157, 1162 (Fed. Cir. 2007).

Additionally, the modification of Laforest’s base has been shown to implement a known modification—an improvement of LED light bulbs to fit a standard socket, including a mini-wedge socket. This improvement was applied to other bulbs in the prior art as discussed in *Young*, and “we do not ignore the modifications that one skilled in the art would make to a device borrowed from the prior art.” *In re Icon Health and Fitness, Inc.*, 496 F.3d 1374, 1382 (Fed. Cir. 2007) (citing *Optivus Tech., Inc. v. Ion Beam Apps., S.A.*, 469 F.3d 978, 989–90 (Fed. Cir. 2006)). In particular, we also recognize that:

[I]f a technique has been used to improve one device, and a person of ordinary skill in the art would recognize that it would improve similar devices in the same way, using the technique is obvious unless its actual application is beyond his or her skill [A] court must ask whether the improvement is more than the predictable use of prior[-]art elements according to their established functions.

KSR, 550 U.S. at 417.

With a modified base so the bulb fits into a standard mini-wedge type socket, the modified Laforest bulb would render obvious the claims, regardless of whether that modified bulb may not fit perfectly into Laforest’s unmodified socket.

c. Alleged Inoperability

Whether an alleged modification would have been obvious also depends on whether that modification would render the prior art inoperable for its intended purpose. *See In re Fritch*, 972 F.2d 1260, 1266 n.12 (Fed. Cir. 1992) (citing *In re Gordon*, 733 F.2d 900, 902 (Fed. Cir. 1984)) (“a proposed modification [is] inappropriate for an obviousness inquiry when the modification rendered the prior art reference inoperable for its intended purpose”). Patent Owner argues that the alleged modification of Laforest would be “likely inoperable” because the heat generated by resistor 30 would “likely cause the LED to fail after a short period of time.” PO Resp. 13. According to Mr. Wesson, “there are no means [in Laforest] for dissipating the heat generated by this resistor.” Ex. 2001, 13. We are not persuaded by these arguments.

First, the claims do not recite any particular operational characteristic, such as brightness, durability, or quality of service of the claimed LED bulb. As we discussed above in our claim construction analysis of the preamble limitation, there is no claim requirement of any specific brightness. *See supra*, Section II.A.1. Likewise, being able to *fit* into a mini-wedge type socket does not limit the claims to a particularly durable bulb. Indeed, the claims make no mention of any improvements or operational values for the electronic control means such that the claim requires a light bulb with any specific duration. That is, alleging that heat dissipation is a particular characteristic of the claimed LED bulb has no support in the claim language.

Furthermore, we find the testimony of Mr. Wesson in this regard speculative. The statement that the modified Laforest bulb would “likely” be inoperable is tentative, at best. Also, Mr. Wesson did not perform any

testing to support the theoretical explanation that the resulting LED bulb would flicker, degrade, and burn out prematurely. *See* 2001, 12; Tr. 28:22–29:15. Indeed, Laforest does not disclose any specific values of the disclosed LED or resistor components, as acknowledged by Patent Owner’s counsel during oral argument. Tr. 29:4–8. Mr. Wesson’s testimony is too tentative to persuade us that Laforest’s bulb would be inoperable if the base were modified to fit a mini-wedge type socket. We also give less weight to Mr. Wesson’s testimony in support of Patent Owner’s “inoperability” argument because Mr. Wesson’s testimony is based on a “heat dissipation” technique disclosed in the specification, but not claimed. *See* Ex. 2001, 13 (comparing the bulb of Laforest with the embodiments of the ’625 patent by stating that “there are no means for dissipating the heat generated by this resistor”).

4. Conclusions Regarding the Laforest Ground

Based on the foregoing, we determine that Petitioner has presented sufficient evidence that claims 30 and 31 would have been obvious over Laforest. But we do not reach yet the final conclusion of obviousness, because Patent Owner has presented arguments regarding secondary indicia of nonobviousness, which we address below.

E. SECONDARY CONSIDERATIONS OF NONOBVIOUSNESS

As Patent Owner correctly asserts, we must consider evidence presented concerning reasons why the claimed invention may not have been obvious, i.e., secondary considerations of nonobviousness. *See Graham*, 383 U.S. at 17–18 (secondary considerations include commercial success, long-felt but unsolved needs, failure of others, and unexpected results).

Patent Owner has raised arguments bearing on commercial success and copying by others. PO Resp. 16–18.

1. Commercial Success

Regarding commercial success, this factor “may have relevancy” to the overall obviousness determination (*Graham*, 383 U.S. at 18), but a nexus must exist between the commercial success and the claimed invention.

Ormco Corp. v. Align Tech., Inc., 463 F.3d 1299, 1311–12 (Fed. Cir. 2006) (“Evidence of commercial success . . . is only significant if there is a nexus between the claimed invention and the commercial success.”). The Patent Owner argues that it has sold LED bulbs “adapted for use in standard automotive mini wedge type bulb sockets” since 2002. PO Resp. 16. Mr. Wesson avers that the LED light bulb “claimed in claims 30 and 31”—the patented 194 LED bulb—is shown in Exhibit 2003. Ex. 2001, 2. It is not clear from the photograph shown in Exhibit 2003 whether all the claim elements are present. Nevertheless, Patent Owner alleges that it has sold over 500,000 “patented” 194 LED bulbs, while selling only 24,903 of “cheaper” 194 LED light bulbs. Ex. 2001, 2; PO Resp. 16. The reason for the higher sales of the “patented” 194 LED bulbs is stated as follows,

I believe that this is because the patented design allows more LEDs to be used in the bulbs, allowing them to be brighter and thus more desirable to our customers, because the bulbs are more robust, and more compact (due to mounting the resistors on the PCB, which can occur because the PCB acts as a heat sink as explained in the [']625 patent).

Ex. 2001, 2–3.

The explanation for the sales of the “patented” 194 LED bulb, provided by Mr. Wesson, does not amount to a sufficient nexus to the claimed invention. The claims do not recite robustness, brighter lighting, or

heat sink technology. Indeed, the claims do not require any particular number of LEDs to be mounted on the PCB, nor do they recite a feature of the mounting that allows for “more LEDs” to be used in the bulbs.

Likewise, as discussed previously, the claims neither mention nor require any particular brightness. Finally, although there may be some argument that the compactness of the bulb may be due to the claimed body of the bulb, the dimensions of the body of the bulb are constrained by the claim only to the extent the bulb is designed to fit the socket of a standard mini-wedge socket. There is neither a robustness nor compactness design disclosed in the specification or recited in the claims.

Furthermore, we are not persuaded that the gross sales averred by Mr. Wesson amount to a showing of commercial success. Patent Owner has stated that the company grossed around \$2.9 million in sales revenue. PO Resp. 7, 16 (citing Ex. 2001, 2). Petitioner challenges Patent Owner’s gross sales as unsubstantiated and weak evidence that fails to show Patent Owner’s market share. Reply 12–13. We agree with Petitioner that, in this instance, the evidence of gross sales alone is insufficient to show commercial success. Patent Owner has not shown its share of the mini-wedge bulb market for automotive use, or of any market, for that matter. There is not even an attempt to show that the proffered sales are substantial for the Patent Owner. Consequently, we cannot gauge whether the proffered sales show commercial success of the allegedly covered product. *See In re Baxter Travenol*, 952 F.2d 388, 392 (Fed. Cir. 1991) (“Information solely on numbers of units sold is insufficient to establish commercial success.”); *see also In re Huang*, 100 F.3d 135, 140 (Fed. Cir. 1996) (“Declining to find evidence of commercial success because ‘[a]lthough [the inventor’s] affidavit

certainly indicates that many units have been sold, it provides no indication of whether this represents a substantial quantity in this market.””).

Accordingly, because we find no nexus and lack of evidence of market share, we are not persuaded that the evidence presented amounts to a sufficient showing of commercial success attributable to the claimed invention.

2. *Copying*

Patent Owner also argues that Petitioner copied the claimed invention. PO Resp. 16. This is a bare allegation, however, unsupported by evidence. For example, offering as proof pictures of the allegedly infringing product and a bare assertion that it is a copy does not amount to proof of copying. Copying, as objective evidence of nonobviousness, requires evidence of effort to replicate a specific product. *Wyers v. Master Lock Co.*, 616 F.3d 1231, 1246 (Fed. Cir. 2010); *Iron Grip Barbell Co., Inc. v. USA Sports, Inc.*, 392 F.3d 1317, 1325 (Fed. Cir. 2004). No such evidence is found in the record.

Accordingly, we are not persuaded by Patent Owner’s argument of copying as indicia of nonobviousness.

F. PATENT OWNER’S REQUEST OF PRESUMPTION OF NONOBVIOUSNESS

Patent Owner’s Response describes a discovery dispute with Petitioner regarding interrogatories requesting information relating to commercial success. PO Resp. 17–18. In particular, Patent Owner urges the Board to presume that the interrogatory responses Patent Owner could not obtain, and did not present in this record, are “sufficient to overcome any alleged obviousness of claims 30 and 31.” *Id.* The argument has neither basis in the law nor support of fact. First, if the parties had a dispute

concerning whether the information sought via interrogatories is routine discovery under 37 C.F.R. § 42.51(b)(1), it was incumbent upon the party seeking the discovery to request a conference call with the Board to seek authorization to file either a motion for additional discovery under 37 C.F.R. § 42.51(b)(2) or a motion to compel under § 42.52. Petitioner asserts that it objected to the interrogatories relating to allegedly infringing sales.

Reply 13. Patent Owner has not asked for a ruling on that objection by requesting, as stated above, a motion to compel. Furthermore, there is no rule or authority cited by Patent Owner that would persuade us to presume that information not produced in this proceeding, regardless of whether the proper procedures were followed, would be sufficient to prove nonobviousness. The request for a presumption of nonobviousness is denied.

G. ALVAREZ AND HOROWITZ GROUNDS

Petitioner asserts that Alvarez and Horowitz each teaches every limitation in the body of the challenged claims, including a resistor mounted on the PCB. Pet. 42–43, 51–52. Petitioner argues that the teachings in those references would have been modified by a person of ordinary skill in the art to meet the preamble of the challenged claims. Pet. 41–57. We discuss the grounds based on Alvarez and Horowitz together because our analysis of the issues presented concerning these grounds is the same.

1. *Overview of Alvarez (Ex. 1020)*

Alvarez is titled “SURFACE MOUNTED LED LAMP.” Ex. 1020, [54]. Alvarez describes the need for LED lights as replacement for incandescent lamps in automobiles. *Id.* at 1:20–37. In particular, Alvarez describes an LED lamp with a base identical to the prior art incandescent

light structures so the LED lamp can replace conventional lamps without modification to the socket. *Id.* at 4:12–22. Petitioner relies on Figure 3 of Alvarez, reproduced below, to argue that Alvarez teaches all the limitations of the claims.

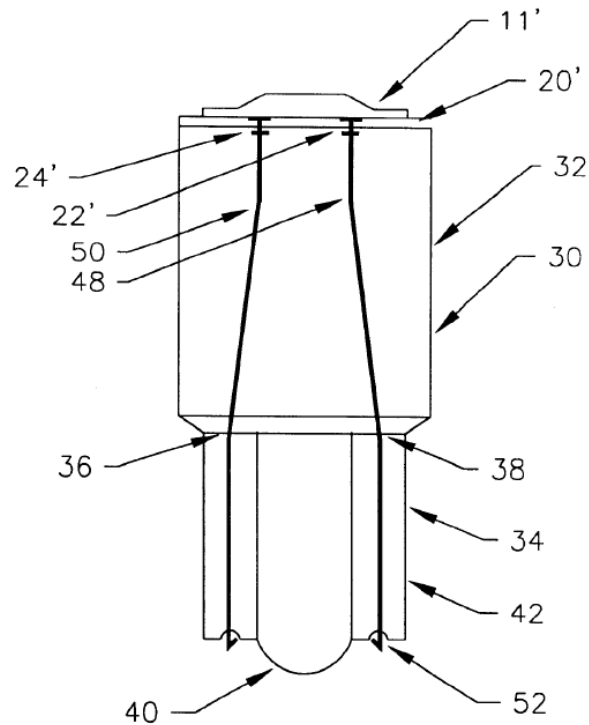


FIG. 3

Figure 3, reproduced above, depicts surface mount LED 11, mounted onto printed circuit board 20' and installed in lamp housing 30. *Id.* at 3:50–53. The lamp housing comprises main body 32 and base 34. *Id.* at 3:54–55. Electrical leads 48 and 50 are connected to plated through terminal holes 22' and 24' on printed circuit board 20. *Id.* at 3:66–4:1. Electrical leads 48 and 50 extend through the closed end of the housing where axial groove 52 receives the electrical leads and holds them in place on the base for electrical connection in a lamp socket. *Id.* at 4:1–11.

In connection with the disclosure on resistors, Petitioner further relies on the embodiment of Figure 11, reproduced below.

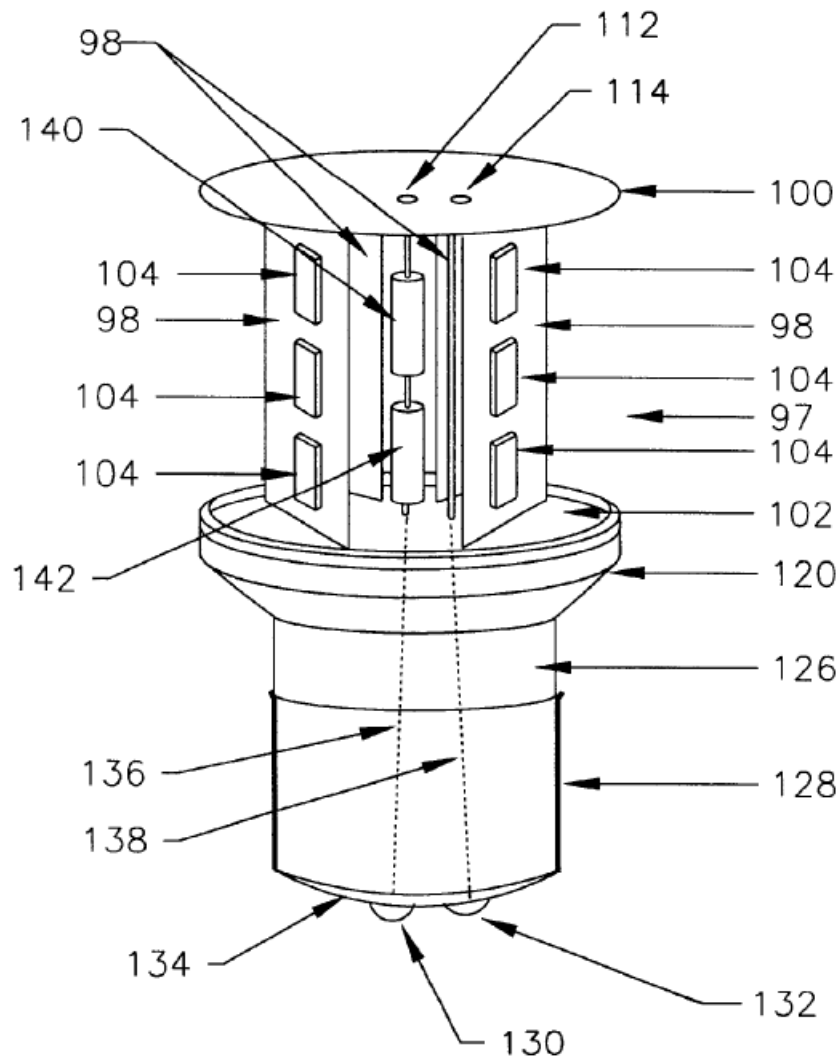


FIG. 11

Figure 11, reproduced above, depicts resistor 140 and diode 142 inserted in series between case terminal 130 and plated through terminal hole 112 in the cap. *See id.* at 6:59–67.

providing contact points that are mated with the female connector of the vehicle. *Id.* at 3:64–4:14.

3. *Patent Owner's Arguments*

Patent Owner argues that Alvarez and Horowitz both disclose “spaced away” or “floating” resistors, which are not “mounted on” the PCB, as required by the claims. PO Resp. 13–14. We determined that the construction of the claim term “mounted” requires that the leads of the electrical device are affixed onto the PCB. *See supra* Section II.A.3. In Alvarez, Petitioner points to an electrical conductor with electrical leads 48 and 50 or resistor 140 connected between LED 11’ and one of the electrical leads 48, 50, as disclosing the electrical control means. Pet. 42. And in Horowitz, Petitioner points to electrical components 140 as disclosing the limitation-at-issue. Pet. 52. Both of these references, however, teach that the resistors are installed with the first lead connected to the PCB on which the LED is mounted, and the second lead is not connected to that PCB or any other PCB. For example, in Alvarez, the second lead is connected to axial groove 52 in the body of the lamp (Figure 3) or case terminal 130 (Figure 11). Ex. 1020, 4:10–11, 6:59–67. In Horowitz, the second lead is connected to slit 176 in the body of the bulb, or the housing. Ex. 1021, 3:64–4:13; Tr. 23:16–23. Neither of these configurations discloses, teaches, or suggests, that the second lead is connected to the PCB comprising the recited “bulb body.” In addition, both of these configurations include resistors that are suspended in a cavity spaced apart from the PCB, similar to the embodiments described in Figures 7, 8, and 18 of the ’625 patent, which are distinguishable from the embodiments shown in Figures 34 and 35, wherein the resistor is mounted on the PCB.

Nevertheless, Petitioner argues in the Reply that Alvarez teaches that resistors are mounted on a PCB because Alvarez discloses that “resistors and/or diodes may be inserted in series in a conventional manner between the surface mount LED and base depending upon the particular power requirements.” Reply 11 (citing Ex. 1020, 4:7–10). The argument is that because one “‘conventional manner’ for mounting resistors to a printed circuit board” is using a surface mounted resistor, Alvarez fully discloses the “electrical control means” limitation. Reply 11. We are not persuaded by this argument because it lacks factual support. Also, this disclosure in Alvarez refers to *inserting* a resistor in series with the surface mount LED and the base. The inference we draw from the disclosure is that the “conventional manner” refers to the *method* of inserting the disclosed suspended resistor, not that the suspended resistor may be replaced by a surface mount resistor. Indeed, Alvarez does not disclose, teach, or suggest using surface mount resistors in any of the embodiments relied on by Petitioner. Furthermore, the Petition neither asserts nor explains that Alvarez would be modified to insert a surface mount resistor, such that one end would be connected to the LED and the other end would be connected to the base of the bulb.

The argument Petitioner proffers in the Reply regarding Horowitz fares no better. Petitioner argues that because Horowitz states that electronic component and wiring 140 is secured in a confined area, Horowitz, therefore, teaches “electrical control means mounted to a printed circuit board.” Reply 12. The disclosure relied on in Horowitz (Ex. 1021, 6:44–48), at best, teaches that the bulb housing offers a secure and confined area for electrical component and wiring 140, to protect the component from

water exposure and vibrational damage. The inference we draw from the disclosure of Horowitz “securing” the component is in the sense of protecting or making it safe. We do not see how this disclosure can be read to infer that electrical component 140 is installed differently, such that the second lead is not connected to the body of the bulb, and instead is connected to a PCB. The Petition does not explain sufficiently any modification of Horowitz in this respect. Therefore, we agree with Patent Owner that Horowitz fails to disclose, teach, or suggest the recited “electrical control means mounted on a printed circuit board.”

4. Conclusions Regarding the Alvarez and Horowitz Grounds

Based on the foregoing, we determine that Petitioner has not shown by a preponderance of the evidence that the challenged claims would have been obvious by either Alvarez or Horowitz.

III. CONCLUSION

After weighing the evidence of obviousness and nonobviousness of record, on balance, we conclude that the strong evidence of obviousness over Laforest outweighs the weak evidence of nonobviousness. Consequently, we determine that Petitioner has demonstrated by a preponderance of the evidence that claims 30 and 31 are unpatentable under 35 U.S.C. § 103(a) as obvious over Laforest. Petitioner, however, has not demonstrated that claims 30 and 31 are unpatentable as obvious over either Alvarez or Horowitz.

This is a final written decision of the Board under 35 U.S.C. § 318(a). Parties to the proceeding seeking judicial review of this decision must comply with the notice and service requirements of 37 C.F.R. § 90.2.

IV. ORDER

Accordingly, it is hereby:

ORDERED that, as set forth in Section III above, claims 30 and 31 of the '625 patent have been shown to be *unpatentable*; and

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

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