United States Court of Appeals for the Federal Circuit

REDLINE DETECTION, LLC,
Appellant

v.

STAR ENVIROTECH, INC.,
Appellee

2015-1047

Appeal from the United States Patent and Trademark Office, Patent Trial and Appeal Board in No. IPR2013-00106.

Decided: December 31, 2015

MATTHEW NEWBOLES, Stetina, Brunda, Garred & Brucker, Aliso Viejo, CA, argued for appellant. Also represented by GREGORY CLARKSON, LOWELL ANDERSON.

BRENTON R. BABCOCK, Knobbe, Martens, Olson & Bear, LLP, Irvine, CA, argued for appellee. Also represented by JARED C. BUNKER, EDWARD A. SCHLATTER.

JEREMIAH HELM, Office of the Solicitor, United States Patent and Trademark Office, Alexandria, VA, argued for intervenor. Also represented by JOSEPH MATAL, JAMIE

LYNNE SIMPSON, SCOTT WEIDENFELLER, THOMAS W. KRAUSE.

Before LOURIE, WALLACH, and HUGHES, *Circuit Judges.*

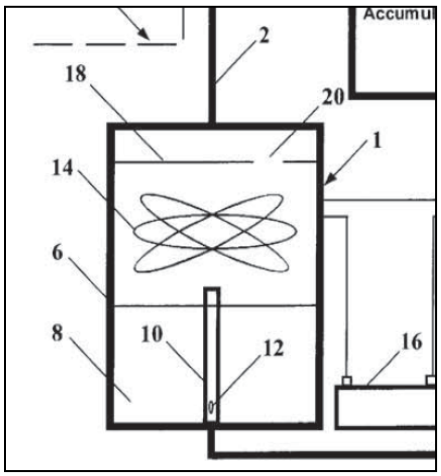
WALLACH, *Circuit Judge.*

Appellant Redline Detection, LLC ("Redline") appeals the inter partes review ("IPR") decision of the United States Patent and Trademark Office's ("USPTO" or "the Office") Patent Trial and Appeal Board ("the PTAB" or "the Board"), which denied Redline's motion to submit supplemental information under 37 C.F.R. § 42.123(a) (2012) and found Redline failed to show that claims 9 and 10 of U.S. Patent No. 6,526,808 (the "'808 patent") would have been obvious. *See Redline Detection, LLC v. Star Envirotech, Inc.*, IPR2013-00106, 2014 WL 2995050 (P.T.A.B. June 30, 2014) (J.A. 36–75) ("Final Decision"). For the reasons set forth below, we affirm.

BACKGROUND

I. The '808 Patent

Appellee Star Envirotech, Inc. ("STAR") owns the '808 patent, which relates to methods of generating smoke for use in volatile and explosive environments. Specifically, the '808 patent describes methods for generating smoke that "enables the presence and location of leaks in a fluid system (e.g. the evaporative or brake system of a motor vehicle) to be accurately and visually detected depending upon rate of the air flow through the fluid system under test and whether smoke escapes from the system." '808 patent col. 1 ll. 12–16. A partial schematic of the smoke-generating apparatus is depicted below.



Id. fig.1.

This apparatus "includes a sealed chamber 6 which contains a non-toxic oil supply 8. An air inlet tube 10 projects upwardly from the bottom of chamber 6 and extends above the oil supply 8." *Id.* col. 3 ll. 25–28. "An inlet orifice 12 is formed in the air inlet tube 10 so as to lie within the oil supply 8 immediately above the bottom of chamber 6. A resistor heating grid (e.g. coil) 14 extends laterally across the sealed chamber 6 . . . ." *Id.* col. 3 ll. 30–34. The "fluid baffle 18" contains "a smoke outlet orifice 20" that "extends laterally across the sealed chamber 6 above the heating grid 14." *Id.* col. 3 ll. 35–38.

Alternative embodiments allow for the use of nitrogen ("N_2") or carbon dioxide ("CO_2") gas in place of air for testing high-pressure systems (e.g., air brakes) with high operating temperatures without the risk of an explosion. *Id.* col. 6 ll. 63–67. "A mixture of air [or inert gas] and oil is then blown upwardly and outwardly from the air inlet tube 10 towards and into contact with the heating grid [14], whereby the[] oil is instantaneously vaporized into smoke." *Id.* col 3 ll. 47–50. The resulting "smoke travels through the outlet orifice 20[] in fluid baffle 18 for receipt

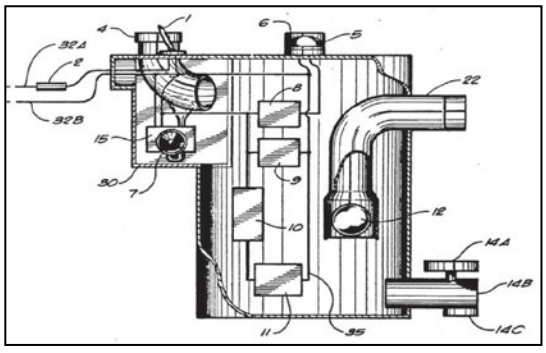
by the smoke outlet line 2." *Id.* col. 3 ll. 50–52. This smoke is carried by the smoke supply line 4 "to the fluid system to be tested so that the integrity of the system may be visually inspected for leaks depending upon the absence or presence of smoke escaping therefrom." *Id.* col. 3 ll. 52–56.

II. Prior Art

The prior art discloses various methods to generate smoke—e.g., combusting smoke-producing fluid with a heating element, vaporizing mixtures of oil and CO_2 gas, and vaporizing small droplets of oil dispersed in a stream of inert gas. Each of these methods advance smoke generating technology, but these methods are not suitable for leak testing closed systems that have volatile hydrocarbons. The '808 patent generates smoke that can be used to test closed and potentially explosive systems for leaks.

A. Gilliam

U.S. Patent No. 5,107,698 ("Gilliam") describes methods and devices for detecting leaks in fluid systems via smoke. J.A. 972–82. Figure 3 of Gilliam is depicted below.



Gilliam fig.3.

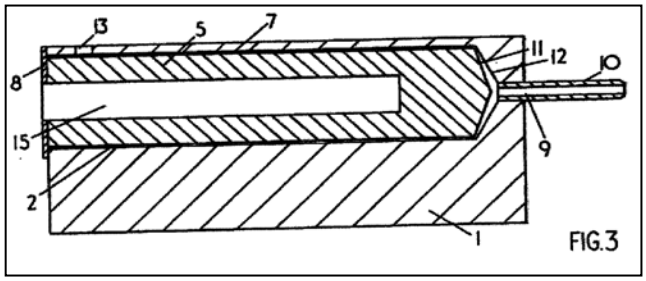
"Smoke-generating assembly 35 includes [air] pump 15, thermistor 8, spike-protecting diode 9, switch 10, and ceramic heating element 11. A smoke-producing fluid is

poured into chamber 20 through filler port 6." *Id.* col. 6 ll. 20–23. Smoke is circulated throughout the system by air pump 15. If heating element 11 becomes "submerged, vaporization is prevented and the fluid is merely heated and eventually reaches it boiling point." *Id.* col. 6 ll. 38–41. When the heating element 11 becomes sufficiently hot, the smoke-producing fluid vaporizes within chamber 40. The generated smoke then passes through "conduit 22 into the vacuum system connected thereto for leak testing purposes." *Id.* col 8 ll. 11–13. Thus, the "[s]moke generating fluid should preferably be non-flammable and non-toxic." *Id.* col. 5 ll. 67–68.

Because temperature control of the heating element is important to this prior art, Gilliam discloses several preferred embodiments for controlling temperature. *See, e.g.*, *id.* col. 7 ll. 1–4, 14–18, 26–28. Additionally, the "spark-arrestor 3 prevents sparks or even flames from entering a vehicle's engine, thereby causing an explosion. Flames could be generated . . . if a flammable fluid mixture was inadvertently created in chamber 20." *Id.* col. 7 ll. 55–59.

B. Stoyle

Great Britain Patent No. 1,240,867 ("Stoyle") (J.A. 1004–08) describes an apparatus for "heating [] oil or other mixtures of oil and [CO_2], oil and water, or oil, [CO_2] and water to produce smoke or mist . . . for testing ventilation systems or for theatrical effects." Stoyle p. 1 ll. 11–17. Figure 3 of Stoyle is depicted below.

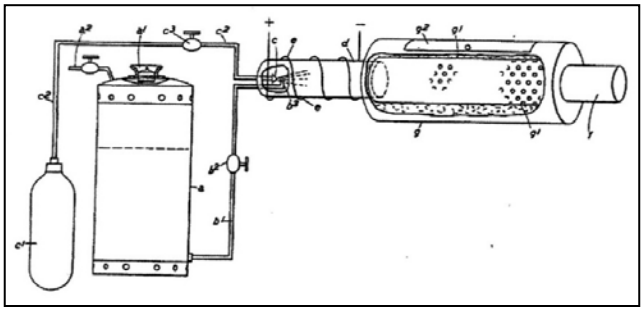


Id. fig.3.

"The fluid inlet means 14 are connected to a generator capable of producing a foam of oil and [CO_2] gas. The oil/gas mixture is forced into the space 7 and, passing through the gaps between the knurlings, eventually reaches the outlet means 10, where it emerges in the form of a mist or smoke." *Id.* p. 2 ll. 101–08. This allows for "a relatively large contact area for heating the oil/gas mixture[,] . . . [making] the heating very uniform and easy to control." *Id.* p. 2 ll. 109–11, 118–19. Additionally, this apparatus permits the "production of oil smokes and mists with a relatively lower proportion of gas in the mixture by comparison with other types of heater[s]." *Id.* p. 3 ll. 15–18.

C. Pauley

Great Britain Patent No. 640,266 ("Pauley") (J.A. 1010–15) describes an apparatus for generating an opaque fog, for use in theatrical work, that is "sufficiently heavy in weight by comparison with the surrounding air," Pauley p. 2 ll. 20–22, such that the fog can "'lay' conveniently without quickly melting or drifting away," *id.* p. 2 ll. 51–52. Figure 1 of Pauley is depicted below.



Id. fig.1.

"[G]lycerine, oil or other suitable liquid is sprayed in atomised form by means of a jet of [CO_2 or N_2 gas] under pressure on to a surface sufficiently heated as to cause an immediate vaporisation of the liquid." *Id.* p. 1 ll. 26–31. This "vapour . . . [is] propelled along . . . [and] cooled again by the expanding gas." *Id.* p. 1 ll. 31–34. The cooled liquid condenses to form a heavy fog or mist. *Id.* p. 2 ll. 37–38. Using inert gas to propel and cool the vaporized liquid is advantageous "because its presence greatly reduces any tendency to ignition of the vapour should the liquid medium be one of an inflammable nature." *Id.* p. 2 ll. 42–47.

D. 1999 Website

Applications for the Smoke Generator, published on the Internet in 1999, disclose potential uses of smoke generators sold by third party, Corona Integrated Technologies, Inc. J.A. 1038–41 ("the 1999 Website"). The 1999 Website discloses that smoke generators produce a non-hazardous, thermal fog, which could be used for leak testing. J.A. 1039–40. In particular, the 1999 Website explains that "[o]ur smoke machines have been used to detect leaks in a broad range of systems, including asbestos enclosures, flues and chimneys, luggage holds of aircraft and ships, freight containers, vehicles and drainage and fire sprinkler systems." J.A. 1039.

III. Proceedings

In January 2013, Redline filed a corrected IPR Petition with the PTAB, requesting review of claims 9 and 10 of the '808 patent.[1] This IPR was instituted on July 1,

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1 The '808 patent underwent two ex parte reexaminations. The first ex parte reexamination certificate issued in July 2011: (1) claim 9 was patentable as amended; (2) new claim 10 was added and determined to be patentable; and (3) claims 1–8 were not reexamined. The

2013. On July 30, 2013, Redline filed a Motion for Supplemental Disclosure of New Exhibits, requesting submission of four pieces of evidence. In August 2013, the PTAB denied Redline's request to submit supplemental information and expunged the submitted evidence from the record. The PTAB subsequently issued its Final Decision on June 30, 2014, finding Redline failed to prove by a preponderance of the evidence that claims 9 and 10 of the '808 patent would have been: (1) obvious over Gilliam and Stoyle; and (2) obvious over Gilliam, Pauley, and the 1999 Website. Redline timely appealed. Pursuant to 35 U.S.C. § 143 (2012), the Director of the USPTO intervened in March 2015. This court has jurisdiction to review the PTAB's Final Decision under 28 U.S.C. § 1295(a)(4)(A) (2012) and 35 U.S.C. § 141(c) (2012).

DISCUSSION

I. USPTO's Interpretation of its Regulations Accords With Law

On appeal, Redline argues the PTAB erred in denying its motion to submit supplemental information for three reasons. First, Redline argues the regulatory history of 37 C.F.R. § 42.123 demonstrates the USPTO has already incorporated its statutory mandate into the three tier scheme of subsections (a) through (c) of that regulation and, thus, the PTAB cannot "mix and match" these requirements at its discretion. Second, Redline argues the plain language of § 42.123(a) precludes the imposition of any additional criteria beyond the plain language of the regulation. Finally, Redline argues the PTAB's decision was arbitrary and capricious because Petitioners in other IPR proceedings were allowed to submit supplemental information. We address each argument in turn.

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second ex parte reexamination certificate issued in May 2012 with no amendments to the patent.

A. Deference Is Accorded to the PTAB's Interpretation of USPTO Regulations

This court accepts the PTAB's "interpretation of [USPTO] regulations unless that interpretation is 'plainly erroneous or inconsistent with the regulation,'" *In re Sullivan*, 362 F.3d 1324, 1326 (Fed. Cir. 2004) (citations omitted), or conflicts with the USPTO's "intent at the time of the regulation's promulgation," *Gardebring v. Jenkins*, 485 U.S. 415, 430 (1988). We review the PTAB's decision of how it manages its permissive rules of trial proceedings for an abuse of discretion. *Eli Lilly & Co. v. Bd. of Regents of Univ. of Wash.*, 334 F.3d 1264, 1266 (Fed. Cir. 2003). "An abuse of discretion occurs if the decision (1) is clearly unreasonable, arbitrary, or fanciful; (2) is based on an erroneous conclusion of law; (3) rests on clearly erroneous fact findings; or (4) involves a record that contains no evidence on which the Board could rationally base its decision." *Abrutyn v. Giovanniello*, 15 F.3d 1048, 1050–51 (Fed. Cir. 1994) (citing *Heat & Control, Inc. v. Hester Indus., Inc.*, 785 F.2d 1017, 1022 (Fed. Cir. 1986)).

B. Relevant Legal Authority

Congress's enactment of the Leahy-Smith America Invents Act ("AIA"), Pub. L. No. 112–29, § 6(a)–(c), 125 Stat. 284, 299–305 (2011) (codified in part at 35 U.S.C. §§ 311–319) replaced inter partes reexamination with IPR for requests filed on or after September 16, 2012. *Compare* 35 U.S.C. §§ 311–318 (2006), *with* 35 U.S.C. §§ 311–319 (2012).[2] The AIA authorized the USPTO to promulgate regulations governing the administration of IPR proceedings. *See* 35 U.S.C. § 316(a)(3)–(4) ("The Director

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[2] Any discussion in this opinion of IPRs, and corresponding citations to 35 U.S.C. §§ 311–319, shall refer to the statutory provisions effective on or after September 16, 2012.

shall prescribe regulations . . . establishing procedures for the submission of supplemental information after the petition is filed; [and] establishing and governing [IPR] under this chapter and the relationship of such review to other proceedings under this title."). The AIA also requires consideration of "the effect of any such regulation on," among other things, "the efficient administration of the Office[] and the ability of the Office to timely complete proceedings instituted under this chapter." *Id.* § 316(b).

Consistent with Congress's mandate, the USPTO promulgated general regulations governing the PTAB's trial practices, 37 C.F.R. Part 42, Subpart A, in addition to specific regulatory requirements for IPR proceedings, 37 C.F.R. Part 42, Subpart B. These regulations encourage Petitioners "to submit all of the evidence that supports the ground of unpatentability asserted in the petition" within the time period proscribed in 37 C.F.R. § 42.123(a), (b), or (c). *Changes to Implement Inter Partes Review Proceedings, Post-Grant Review Proceedings, and Transitional Program for Covered Business Method Patents*, 77 Fed. Reg. 48,680, 48,708 (U.S. Patent & Trademark Office Aug. 14, 2012) ("*Final Rule*") (to be codified at 37 C.F.R. pt. 42); *see also Office Patent Trial Practice Guide*, 77 Fed. Reg. 48,756, 48,763 (U.S. Patent & Trademark Office Aug. 14, 2012) ("[A] petitioner must identify each claim that is challenged and the specific statutory grounds on which each challenge to the claim is based, provide a claim construction for the challenged claims, and state the relevance of the evidence to the issues raised." (citing in part 37 C.F.R. § 42.104)).

The AIA authorizes the filing of supplemental information with the PTAB during the course of an IPR, 35 U.S.C. § 316(a)(3), and the USPTO promulgated regulations pursuant to that authority. In particular, Section 42.123(a) states:

> Motion to submit supplemental information. Once a trial has been instituted, a party may file a motion to submit supplemental information in accordance with the following requirements:
>
> (1) A request for the authorization to file a motion to submit supplemental information is made within *one month* of the date the trial is instituted.
>
> (2) The supplemental information must be *relevant* to a claim for which the trial has been instituted.

37 C.F.R. § 42.123(a) (emphases added). Subsection (b) provides for submitting supplemental information later than one month after the date the trial is instituted. *Id.* § 42.123(b). Subsection (c) provides for the submission of supplemental information that is not relevant to an instituted claim. *Id.* § 42.123(c). Under subsections (b) and (c), the party must show "why the supplemental information reasonably could not have been obtained earlier, and that consideration of the supplemental information would be in the interests-of-justice." *Id.* § 42.123(b), (c).

The PTAB's decision to admit supplemental information is also informed by 37 C.F.R. Part 42, Subpart A. *See* 37 C.F.R. § 42.100(a) ("An [IPR] is a trial subject to the procedures set forth in subpart A of this part."). Subpart A requires USPTO regulations "be construed to secure the just, speedy, and inexpensive resolution of every proceeding." 37 C.F.R. § 42.1(b); *see also* 35 U.S.C. § 316(b). Consistent with this regulation, the USPTO has authorized the PTAB to "determine a proper course of conduct in a proceeding for any situation not specifically covered by this part and may enter non-final orders to administer the proceeding." 37 C.F.R. § 42.5(a). The PTAB may also "waive or suspend a requirement of part[] . . . 42 [Trial Practice Before the PTAB] and may

place conditions on the waiver or suspension." *Id.* § 42.5(b).

C. The PTAB's Interpretation of 37 C.F.R. § 42.123 is Consistent with the Regulatory History and Is Not Plainly Erroneous

1. Section 42.123(a) Does Not Preclude Consideration of Additional Criteria Beyond Timing and Relevance

The PTAB found Redline's IPR Petition did not rely on an expert declaration in support of its position. J.A. 4 (PTAB Order–Conduct of the Proceeding); *see also* J.A. 1078–1142 (corrected petition to institute IPR). Rather, Redline's Motion for Supplemental Disclosure of New Exhibits sought to introduce *four new exhibits*: (1) a sixty-page declaration of Redline's expert, Dr. Michael St. Denis; (2) the resume of Dr. St. Denis; (3) U.S. Patent No. 3,250,723; and (4) U.S. Patent No. 3,432,439. J.A. 2. The PTAB denied Redline's Motion, noting Redline did not make "any attempt to justify the submission of an expert declaration after filing its petition and after a decision to institute has been made except to note that the move was cost effective . . . ."[3] J.A. 4. The PTAB also found that Redline did not allege "any of the arguments or evidence in the newly submitted declaration [was] information that reasonably could not have been submitted with the Petition." J.A. 4. "The [PTAB] chose two of twelve grounds proposed by Redline, thus Redline could have submitted expert opinion testimony to support those grounds with the petition itself." J.A. 4; *see also* J.A. 1431 (Redline

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[3] During oral argument, Redline reaffirmed nothing prevented it from submitting the supplemental information with its Petition. The "rationale was one of cost savings primarily the driving factor . . . ." Oral Argument at 2:25–42, http://oralarguments.cafc.uscourts.gov/default.aspx?fl=2015-1047.mp3 (Counsel for Redline).

admitted to the PTAB it intentionally delayed filing this information because "submission of the declaration at this point [after institution of the IPR] makes things far less complex than had [Redline] had an expert opine as to all 12 grounds as originally submitted in our petition"). The PTAB concluded Redline did not establish a sufficient basis for submitting new evidence and its "'supplemental evidence' is in essence something more than just supplemental evidence." J.A. 5.

The PTAB determined "nothing in 37 C.F.R. § 42.123 requires that a request to submit supplemental information satisfying these two criteria [,i.e., timeliness and relevance,] automatically be granted no matter the circumstance." J.A. 18 (citation omitted). Rather, the USPTO regulations dictate "[a] party filing a motion has the burden of proof to establish that it is entitled to the requested relief." J.A. 18 (citing 37 C.F.R. § 42.20). "*This is so, no matter the requested relief*." J.A. 18 (emphasis added). The PTAB emphasized "the Board decides such motions in view of its mandate to ensure the efficient administration of the Office and the ability of the Office to complete IPR proceedings in a timely manner." J.A. 18–19. The PTAB also stated whether the Board grants a motion to submit supplemental information also "depend[s] upon the Board's determination that, in its discretion, the action sought by the movant is consistent with the Board's statutory mandate." J.A. 19.

On appeal, Redline argues "the regulatory history of [37 C.F.R.] § 42.123 shows that the [USPTO] has already incorporated its statutory mandate into the three tier scheme of subsections (a)–(c)" of that regulation. Appellant's Br. 45 (capitalization and emphasis omitted). Redline contends the USPTO cannot consider factors articulated in subsections (b) and (c) if the timeliness and relevance conditions in subsection (a) are satisfied. According to Redline, this tiered rule "reflects a balance of interests expressed in agency notice-and-comment rule-

making." *Id.* at 45. Redline alleges Comments 91–93 of the regulatory history "presumptively established that the timeliness and relevance requirements of §42.123(a) alone were sufficient to meet the [PTAB's] statutory mandate for economy, integrity, efficient administration, and timely consideration of IPRs." *Id.* at 45–46 (citing 35 U.S.C. § 316(b)). Redline also argues the omission of the 37 C.F.R. § 42.123(b) and (c) limitations from § 42.123(a) offers further support for its hierarchical interpretation of the regulation. *Id.* at 46. According to Redline, this arrangement "clearly evidences an intent on the part of the rulemaking body that those factors were not meant to be considered for submissions under § 42.123(a), and instead the sole criteria for admission were those in the plain language of the regulation." *Id.* Because all three subsections were adopted in the same rulemaking session, Redline argues this lends "strength to the inference . . . [that] timeliness and relevance[] formed the sole basis for evaluating submissions under [§ 42.123(a)]." *Id.* at 48.

Redline's arguments rely, in part, on rules of statutory construction—e.g., (1) the exclusion of particular language from one subsection of a statute that was included in other subsections means "it is generally presumed that Congress acts intentionally and purposefully in the disparate inclusion or exclusion," *Keene Corp. v. United States*, 508 U.S. 200, 208 (1993) (internal quotation marks and citation omitted); and (2) words that appear in different statutes that are adopted during the same legislative session creates a negative implication that is "strongest when the portions of a statute treated differently had already been joined together and were being considered simultaneously when the language raising the implication was inserted," *Lindh v. Murphy*, 521 U.S. 320, 330 (1997) (citation omitted). The Supreme Court has found that canons of statutory construction "are not mandatory rules. They are guides that 'need not be

conclusive.'" *Chickasaw Nation v. United States*, 534 U.S. 84, 94 (2001) (quoting *Circuit City Stores, Inc. v. Adams,* 532 U.S. 105, 115 (2001)). Rather these guides "are designed to help judges determine the Legislature's intent as embodied in particular statutory language." *Id.*

The PTAB's interpretation of its governing regulations is not plainly erroneous. Its interpretation of § 42.123(a) is consistent with the regulation's plain language and the USPTO's intent in promulgating § 42.123. The plain language of § 42.123(a) does not exclude the application of other general governing regulations. The guiding principle for the PTAB in making any determination is to "ensure efficient administration of the Office and the ability of the Office to complete IPR proceedings in a timely manner." J.A. 18–19; *see* 35 U.S.C. § 316(b). Requiring admission of supplemental information so long as it was timely submitted and relevant to the IPR proceeding would cut against this mandate and alter the intended purpose of IPR proceedings.

Redline's interpretation of the regulatory history does not warrant a different conclusion. For example, Redline's reliance on the USPTO's response to Comments 91–93 is flawed. These responses do not conflict with the USPTO's intent at the time of the regulation's promulgation. Further, none of the USPTO's statements "presumptively established that the timeliness and relevance requirements of §42.123(a) alone were sufficient to meet the [PTAB's] statutory mandate for economy, integrity, efficient administration, and timely consideration of IPRs." Appellant's Br. 45–46 (citing 35 U.S.C. § 316(b)). The USPTO's statements suggest the PTAB *may* allow the submission of supplemental information if certain conditions are met. Comment 91 addresses the public's concern that "the petitioner may intentionally hold back some evidence which would be unfair to the patent owner." *Final Rule*, 77 Fed. Reg. at 48,707. In response, the USPTO said "the patent owner will have sufficient time to

address any new information submitted by the petitioner, except in the situation where the party satisfies the requirements of § 42.123(b) [within thirty days of the institution of the IPR] . . . ." *Id.* This statement does not connote the PTAB must accept supplemental information so long as it is timely and relevant. Comment 92 notes "Petitioners are encouraged to set forth their best grounds of unpatentability and supporting evidence in their petitions, lest the Board not to institute the review or deny the asserted grounds of unpatentability (§ 42.108(b))." *Id.* at 48,708. Similarly, Comment 93 says the final rule provides "that a party *may* seek authorization to file a motion to submit supplemental evidence relevant to a claim for which the trial has been instituted within one month of the date the trial is instituted." *Id.* (emphasis added). These statements do not indicate the PTAB must accept supplemental information if timely submitted and relevant.

In sum, nothing in § 42.123 or its regulatory history expressly states or implies that all elements of the PTAB's mandate are incorporated into § 42.123(a) and that it must be read to the exclusion of the remaining subsections in that regulation and 37 C.F.R. Part 42, Subpart A.

2. Section 42.123(a) Does Not Prohibit the PTAB from Exercising Discretion

Redline next argues the plain language of 37 C.F.R. § 42.123(a) "establishes a comprehensive scheme that leaves no room for [the] PTAB to impose its own discretionary requirements." Appellant's Br. 41. Rather, it says, the regulation permits "consideration of two and only two requirements: timeliness and relevance. If the regulation permitted the Board to consider or impose additional criteria, it would by its plain language have said so." *Id.* at 41–42.

In support of this argument, Redline states "[i]t is a fundamental principle of administrative law that 'agen-

cies are bound to follow their own rules, even self-imposed procedural rules that limit otherwise discretionary decisions.'" *Id.* at 41 (quoting *Hernandez v. Dep't of Air Force*, 498 F.3d 1328, 1332 (Fed. Cir. 2007)). Redline proffers several IPR decisions where supplemental information was admitted, stating "[s]everal other [PTAB Panels], in deciding motions brought under § 42.123(a), have started and ended their analysis with the plain meaning of this regulation." *Id.* at 42. Redline relies primarily on *Pacific Market International*,[4] where the PTAB admitted "extensive expert declaration testimony submitted under § 42.123(a) and set[] forth reasons to combine particular prior art references that formed the underlying basis for instituting the IPR, precisely as Redline sought to do in submitting its own expert testimony." *Id.* at 43 (citing *Pac. Mkt. Int'l, LLC v. Ignite USA, LLC*, IPR2014-00561, Paper 23 at 3 (P.T.A.B. Dec. 2, 2014)). Redline asserts the Panel in *Pacific Market International* "was obligated under § 42.123(a) to allow the supplemental expert testi-

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[4] Redline also cites *Norman International, Inc. v. Toti Testamentary Trust*, IPR2014-00283, Paper 29 (P.T.A.B. Sept. 29, 2014) (addressing Petitioner's submission of supplemental information to confirm the accuracy of the translation of a Japanese Patent Application Publication that was submitted in the IPR Petition); *Brose North America v. UUSI, LLC*, IPR2014-00416, -417, Paper 16 (P.T.A.B. Sept. 16, 2014) (addressing Petitioner's submission of a U.S. patent and patent publications for claim construction); and *Palo Alto Networks, Inc. v. Juniper Network, Inc.*, IPR2013-00369, Paper 37 (P.T.A.B. Feb. 5, 2014) (addressing Petitioner's submission of supplemental information to establish that prior art cited in the IPR Petition qualified as a prior art printed publication). Appellant's Br. 42–43. However, *Pacific Market International* presents the scenario most similar to the present proceeding.

mony." *Id.* at 44. Redline also contends the rationale and application of § 42.123(a) in *Pacific Market International* "is incapable of being reconciled with the decision in this case." *Id.*

Redline's regulatory interpretation presents a new facet of the first argument it raised regarding § 42.123, and it fails for the same reasons discussed above. Its interpretation requires the PTAB to exclude all other regulations governing PTAB proceedings and admit supplemental information so long as the request was timely made and the information is relevant to the proceeding. The plain language of § 42.123(a) does not support such a reading. Nothing within subsection (a) excludes application of other PTAB regulations. Rather, timeliness and relevancy provide additional requirements that must be construed within the overarching context of the PTAB's regulations governing IPR and general trial proceedings.[5] Additionally, the PTAB has discretion to grant or deny motions as it sees fit. *See*, *e.g.*, 37 C.F.R. § 42.5(a), (b).

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[5] Redline's argument on appeal is also inapposite to its conduct throughout its IPR proceeding. Redline complied with the PTAB's general requirements without protest—i.e., demonstrating entitlement to relief within its Petition, 37 C.F.R. § 42.20, and providing assurances to the PTAB that its motion was consistent with the regulations allowing for further evidence before deposition or testimony is taken, *id.* § 42.53(d)(2). *See* J.A. 1430 (transcript from conference call with the PTAB discussing Redline's Motion).

3. The PTAB's Decision Comports with Other PTAB Decisions Allowing Supplemental Information and Is Not Arbitrary and Capricious

Redline next argues "[t]he arbitrary-and-capricious standard requires an agency to provide an adequate explanation to justify treating similarly situated parties differently." Appellant's Br. 49 (internal quotation marks omitted) (quoting *In re FCC*, 753 F.3d 1015, 1142 (10th Cir. 2014)). Without an adequate explanation, Redline contends the PTAB's decision deviates from its previous decisions allowing supplemental information. *Id.* In support of its argument, Redline relies on *Palo Alto Networks* and *Pacific Market International*. These decisions do not support Redline's argument that the PTAB must accept supplemental information so long as it is timely and relevant.

In *Palo Alto Networks*, the Petitioner sought to submit supplemental information that would establish the cited prior art within the Petition did in fact qualify as a prior art printed publication. The PTAB found the information was not intentionally withheld nor did allowing this information limit the PTAB's ability to timely complete the proceeding. *Palo Alto Networks*, Paper 37 at 4. The PTAB did agree that it must decide this Motion not solely on § 42.123 requirements, but also in light of 37 C.F.R. § 42.1(b) (i.e., the just, speedy, and inexpensive resolution of proceedings). *Id.* Redline relies on this case because the PTAB determined whether information could have been obtained earlier was a requirement under § 42.123(b) and (c), not (a). Appellant's Br. 43; *see id.* at 49–50. Redline also relies on this case because the PTAB found the submission of the supplemental information would not prevent the PTAB from satisfying its mandate under § 42.1(b). *Id.* at 43.

Redline's reliance is misplaced. The PTAB in *Palo Alto Networks* found the supplemental information would

not prevent it from fulfilling its mandate since the "Patent Owner already [had] possession of the supplemental information" because it was served "in response to Patent Owner's objections" and it is "the same supplemental information that Petitioner now seeks to submit under § 42.123(a)." *Palo Alto Networks*, Paper 37 at 5. Redline has not provided any evidence to indicate STAR possessed the supplemental information it seeks to admit.[6] The PTAB in *Palo Alto Networks* also determined the supplemental information "Petitioner seeks to submit does not change the grounds of unpatentability authorized in this proceeding, nor does it change the evidence initially presented in the [IPR] Petition to support those grounds of unpatentability." *Id.* at 3. That is not what Redline did. The PTAB determined, in its Decision on Redline's Request for Rehearing, that Redline's supplemental information "relates to a *ground* for which the trial was instituted, rather than only to a *claim* of the patent, for which the trial was instituted." J.A. 19.

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[6] Redline failed to follow the proper procedure during the IPR proceeding. Once the Petition is filed, the Petitioner may reply: 1) after institution of the proceeding; and 2) after the patent owner has filed an opposition to the Petition. *See Final Rule*, 77 Fed. Reg. at 48,766 (citing 35 U.S.C. § 316(a)(8)). At that time, a petitioner "may only respond to arguments raised in the corresponding opposition." *Id.* at 48,768 (citing 37 C.F.R. § 42.23). Any new issues raised in the reply will not be considered. "Examples of indications that a new issue has been raised in a reply include new evidence necessary to make out a prima facie case for the patentability or unpatentability of an original or proposed substitute claim, and new evidence that could have been presented in a prior filing." *Id.*

In *Pacific Market International*, the Petitioner sought to submit its expert's supplemental declaration in support of its claim of obviousness. *Pac. Mkt. Int'l*, Paper 1 (IPR Petition); *id.* Ex. 1014 (expert declaration relied on in IPR Petition). The IPR Petition itself was a sixty-page document, *id.* Paper 1, that relied heavily on its expert declaration, which was a separate sixty-eight page document with claim charts comparing the claims to prior art, *id.* Ex. 1014. The Supplemental Declaration was a ten-page declaration that supplements the Petitioner's claim of obviousness that was first argued in its IPR Petition. *Id.* Ex. 1021. The PTAB accepted the supplemental information as evidence within the proceeding and determined the Patent Owner had sufficient time to address the new information submitted by the Petitioner in its request made one month from the institution date. *Id.* Paper 23 at 3. This information was also found not to change grounds instituted on nor did it change evidence presented in the IPR Petition. *Id.* at 4.

However, the PTAB stated "[a]lthough a party may meet the [37 C.F.R. § 42.123] requirements . . . *that does not, itself, guarantee that the motion will be granted*." *Id.* at 3 (emphasis added). This provision does not offer "a routine avenue for bolstering deficiencies in a petition raised by a patent owner in a Preliminary Response. . . . Petitioner should not expect . . . a 'wait-and-see' opportunity to supplement a petition after initial comments or arguments have been laid out by a patent owner." *Id.* The PTAB, in *Pacific Market International*, explicitly relied on § 42.1(b) when conducting its § 42.123(a) analysis, emphasizing that the PTAB's mandate "is to interpret our Rules 'to secure the just, speedy, and inexpensive resolution' to this proceeding." *Id.* at 4 (quoting 37 C.F.R. § 42.1(b)).

Here, Redline asserts its submission of Dr. St. Denis's sixty-page declaration was identical to the type of evidence submitted in *Pacific Market International* and the

Panel in this instance reached an opposite conclusion, thus acting in an arbitrary and capricious manner. Appellant's Br. 50–51. Redline's opening brief presents *Pacific Market International* as the case that is most similar to its case because the PTAB admitted "extensive expert declaration testimony submitted under § 42.123(a) and set[] forth reasons to combine particular prior art references that formed the underlying basis for instituting the IPR, precisely as Redline sought to do in submitting its own expert testimony." *Id.* at 43 (citing *Pac. Mkt. Int'l*, Paper 23 at 3). Redline asserts the Panel in *Pacific Market International* "was obligated under § 42.123(a) to allow the supplemental expert testimony." *Id.* at 44. Further, Redline contends, the rationale and application of § 42.123(a) in *Pacific Market International* "is incapable of being reconciled with the decision in this case." *Id.*

Redline's characterization of *Pacific Market International* is inaccurate and misleading. The Panel's decision expressly stated 37 C.F.R. § 42.123(a) is not a routine avenue to pursue, nor does the regulation require an automatic acceptance of, supplemental information. *See Pac. Mkt. Int'l*, Paper 23 at 3. This is the exact opposite of having an obligation to allow the supplementary information. Redline fails to appreciate the stark difference between the short, supplemental expert report, which the PTAB reasonably permitted in *Pacific Market International*, and its de novo expert report submitted for the first time. *Pacific Market International* is inapposite.

II. The PTAB Did Not Err in Finding that Redline Failed to Prove the '808 Patent Would Have Been Obvious over the Cited Prior Art

A. Standard of Review and the Legal Standard for Obviousness

We review the PTAB's factual findings for substantial evidence and its legal conclusions de novo. *Rambus Inc. v. Rea*, 731 F.3d 1248, 1251 (Fed. Cir. 2013). "A finding is

supported by substantial evidence if a reasonable mind might accept the evidence to support the finding." *K/S Himpp v. Hear-Wear Techs., LLC*, 751 F.3d 1362, 1364 (Fed. Cir. 2014) (citation omitted); *see also In re Gartside*, 203 F.3d 1305, 1312 (Fed. Cir. 2000). "If the evidence in [the] record will support several reasonable but contradictory conclusions, we will not find the Board's decision unsupported by substantial evidence simply because the Board chose one conclusion over another plausible alternative." *In re Jolley*, 308 F.3d 1317, 1320 (Fed. Cir. 2002).

A patent claim should be held to have been obvious and therefore invalid "if the differences between the subject matter sought to be patented 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 [("PHOSITA")] to which said subject matter pertains." 35 U.S.C. § 103(a).[7] Whether a claimed invention is unpatentable as obvious is a question of law that is reviewed de novo, based on underlying findings of fact reviewed for substantial evidence. *In re Gartside*, 203 F.3d at 1316. These underlying factual inquiries include: (1) the scope and content of the prior art; (2) differences between the prior art and the claims at issue; (3) the level of ordinary skill in the pertinent art; and (4) secondary considerations of nonobviousness, such as commercial success, long felt but unsolved needs, failure of others, and unexpected results. *Graham v. John Deere Co. of Kan. City*, 383 U.S. 1, 17–18, 30 (1966).

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[7] In passing the AIA, Congress amended section 103. *See* Pub. L. No. 112-29, § 3(c), 125 Stat. at 287. However, because the '808 patent application was filed before March 16, 2013, the pre-AIA § 103(a) applies. *See id.*, § 3(n)(1), 125 Stat. at 293.

When asserting that a claimed invention would have been obvious, that party "must demonstrate by clear and convincing evidence that a skilled artisan would have had reason to combine the teaching of the prior art references to achieve the claimed invention, and that the skilled artisan would have had a reasonable expectation of success from doing so." *PAR Pharm., Inc. v. TWI Pharm., Inc.*, 773 F.3d 1186, 1193 (Fed. Cir. 2014) (internal quotation marks and citations omitted). "Whether such a motivation has been demonstrated is a question of fact" reviewed for substantial evidence. *Medichem, S.A. v. Rolabo, S.L.*, 437 F.3d 1157, 1164–65 (Fed. Cir. 2006).

B. Redline Waived Its Arguments Regarding PTAB's Determination of the PHOSITA's Skill Level

The PTAB rejected Redline's unsupported oral argument that a PHOSITA "must have experience, education, and knowledge specific to the United States." Final Decision at 16. Instead, the PTAB adopted the PHOSITA definition offered by STAR's expert, Dr. M. David Checkel, who explained that a PHOSITA in the area of "motor vehicle engine diagnosis and repair, including [evaporative emission control ("EVAP")] system leak detection methods, at the time of the filing of the '808 patent[] possessed a range of educational and professional experience, with more education demanding less professional experience."[8] *Id.* at 17. Redline declined to rebut STAR's

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[8] Dr. Checkel's declaration stated that, at the time the '808 patent was filed, not many technicians

> focused solely on evaluating and developing diagnostic systems for the EVAP systems, [such that] the person of ordinary skill would have had experience developing diagnostic and repair tools for engine systems in general. . . . The professional experience possessed by the ordinary artisan

definition of a PHOSITA by submitting rebuttal expert testimony in its reply, after it reviewed STAR's expert declaration. *See* 37 C.F.R. §§ 42.23 (opposition and replies), 42.53(b)(1) (taking testimony).

On appeal, Redline argues the PTAB did not "apply [the PHOSITA] definition in the context of an obviousness analysis . . . [and did not] consider the *common sense or creativity* of a person skilled in the art." Appellant's Br. 54. However, STAR correctly notes the PTAB "spent a considerable amount of time at the Oral Hearing, as well as several pages of its Final Decision, [defining a PHOSITA]." Appellee's Br. 48 (citing Final Decision at 14–17). The PTAB noted Redline argued for a different PHOSITA standard, but "provide[d] no persuasive alternative." Final Decision at 16. Now on appeal, Redline is arguing for the application of a different PHOSITA standard. These arguments are based upon information appended to Redline's Motion for Supplemental Disclosure of New Exhibits that the PTAB excluded. They were

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> would thus have included experience in engine diagnosis and repair, including at least some experience with EVAP systems and other emission systems. . . . The ordinary artisan would also have had a limited understanding of the chemistry of combustion and the characteristics of hydrocarbon based fuel.
>
> According to Dr. Checkel, for the person of ordinary skill who held a high school diploma, the amount of relevant professional experience would be seven to ten years, while those with more educational experience would require correspondingly less years of professional experience.

Final Decision at 15 (quoting *Redline Detection*, Paper 41 at 29).

thus not made to the PTAB and are improper on appeal. Because this court's review of the PTAB's decision "is confined to the 'four corners' of that record[,] . . . it is important that the applicant challenging a decision not be permitted to raise arguments on appeal that were not presented to the [PTAB]." *In re Watts*, 354 F.3d 1362, 1367 (Fed. Cir. 2004). We hold Redline's arguments waived and need not address them.

C. Substantial Evidence Supports the PTAB's Determination of the Scope and Content of the Prior Art

1. The PTAB Considered the Prior Art as a Whole

Redline argues on appeal that the PTAB failed to consider the prior art as a whole, but rather considered teachings from only four references. Redline contends the Board failed to consider the following submitted prior art references: (1) *Research and Testing*, Aircraft Engineering & Aerospace Tech., Jan. 1969, Vol. 41, Issue 1, p. 44 ("AE Article") (J.A. 1002) and (2) T. Dunnington, *High Temperature Smoke Training—the Way Forward*, Indus. Fire J., 56 (Dec. 1995–Jan. 1996) ("IJF Article") (J.A. 1009). Appellant's Br. 57.

The PTAB, in fact, considered these references. In its decision to institute the IPR, the PTAB rejected redundant grounds. It noted that Redline "acknowledge[d] that the teachings of some of these additional references are themselves redundant." J.A. 1294. The sentence immediately following this statement discussed prior art references submitted by Redline, including the "'IFJ Article describing the ViCount smoke system of the AE Article[].'" J.A. 1294; *see* J.A. 110.

What is more, Redline raised these prior art references during oral argument at the PTAB while discussing other alleged prior art and cited them in its reply brief to the PTAB during its discussion of the prior art. *See* J.A. 3757 (oral argument), 3500 (reply). The PTAB also cited

to the portion of Redline's reply brief in its Final Decision. Final Decision at 24. Thus, the record demonstrates the references certainly were considered by the PTAB.

2. Substantial Evidence Supports the PTAB's Analysis of Gilliam, Stoyle, Pauley, and the 1999 Website

On appeal, Redline contends the PTAB improperly excluded its supplemental information and therefore its motivation to combine analysis, and ultimate obviousness determination, is incomplete and, therefore, improper. The PTAB's "findings could not be made if the excluded declaration of Dr. St. Denis was entered." Appellant's Br. 51. Redline also argues that the PTAB otherwise erred in its motivation to combine analysis. *Id.* at 58–60. We address each argument in turn.

a. The PTAB's Factual Findings for Gilliam, Stoyle, Pauley, and the 1999 Website

The grounds on which the PTAB instituted the IPR were based on Redline's assertions that independent claim 9 and dependent claim 10 were unpatentable under 35 U.S.C. § 103(a) over: (1) Gilliam and Stoyle, Final Decision at 17; and (2) Gilliam, Pauley, and the 1999 Website, Final Decision at 27. Based on the record before it, the PTAB determined what each reference taught and determined whether a PHOSITA would have been motivated to combine these references. Substantial evidence supports the PTAB's factual findings.

The PTAB found "Gilliam does not teach or suggest the use of inert gas to create an inert environment in the closed smoke-producing chamber, as a combustion-prevention alternative." Final Decision at 21. In reaching this finding, the PTAB stated Gilliam preferably uses a smoke-producing fluid that is non-flammable and non-toxic. *Id.* at 19 (citing Gilliam col. 5 ll. 67–68). "When the smoke-producing fluid comes in contact with ceramic heating element 11, the smoke-producing fluid vaporizes

within the chamber 30." *Id.* (citing Gilliam col. 6 ll. 34–36). The PTAB further noted, "[s]moke generated within chamber 30 is then conveyed via conduit 22 to a particular automotive system for leak testing." *Id.* (citing Gilliam col. 8 ll. 8–13). Additionally, Gilliam "includes at least three ways to prevent combustion of a flammable, smoke producing fluid . . . ." *Id.* at 20 (citation omitted).

The PTAB found that Stoyle does not "disclose or suggest creating an inert environment during leak-testing of a closed vacuum system in a motor vehicle, such as an EVAP system including a fuel tank." *Id.* at 25. "Stoyle does not teach generation of smoke in an inert environment within a closed smoke-producing chamber, as recited in claim 9 of the '808 patent." *Id.* at 24 (citation omitted). Rather, the PTAB found "the generation of smoke using inert gas in Stoyle is different in type and location than recited in claim 9 of the '808 patent." *Id.* (citation omitted). Smoke in Stoyle is generated "when a heated mixture of oil and CO_2 is combined with air and that smoke is not produced within a closed smoke producing chamber." *Id.* at 25 (citation omitted). Additionally, the PTAB agreed with Dr. Checkel that smoke produced by flash evaporation and pressure would be inappropriate and dangerous to use in a closed EVAP system. *Id.* at 25–26 (citing J.A. 2055–56).

The PTAB found that Pauley "teaches the use of [CO_2 or N_2 gas] as a medium for atomizing and propelling fog, smoke, or mist forming liquid in order to reduce, but not necessarily to prevent, any risk of ignition." *Id.* at 27 (citation omitted). Relying on Dr. Checkel's testimony, the PTAB found that "Pauley does not teach or suggest creating an inert environment within a *closed* smoke-producing chamber, but rather teaches combining an inert gas with air to generate smoke in an *open* tube." *Id.* at 30 (citation omitted). While "Pauley teaches the presence of inert gases 'reduces to a *minimum* any tendency to ignition of the vapour should the liquid employed be of an

inflammable nature,'" this in itself "does not prevent ignition of the flammable fluid, 'as would be the case in an *inert* environment within a closed chamber.'" *Id.* (citations omitted).

The PTAB determined that the 1999 Website suggests "only that vehicles may be leak tested using the Corona smoke machine described therein." *Id.* at 27 (internal quotation marks and citation omitted).

b. Motivation to Combine Gilliam and Stoyle

The PTAB determined a PHOSITA would have had no reason "to substitute Stoyle's use of inert gas, forced into the narrow compressed space between a bore and a plug, in place of the air used in Gilliam's temperature-regulated, spark arrestor-governed system to generate smoke in a closed smoke-producing chamber." *Id.* at 22 (citation omitted). The PTAB found there was no rational underpinning to combine Gilliam and Stoyle to achieve the invention recited in claim 9 of the '808 patent. *Id.* The PTAB also noted that its analysis is applicable to both independent claim 9 and dependent claim 10 of the '808 patent. "Claim 10 recites that the method of claim 9 comprises 'the additional step of regulating the pressure at which the smoke is carried by said non-combustible gas from said closed smoke producing chamber to the closed system undergoing testing.'" *Id.* at 26 (quoting '808 patent col. 2 ll. 28–31); *see also* J.A. 158 (ex parte reexamination certificate adding claim 10 to the '808 patent).

Redline argued to the PTAB that Gilliam teaches all limitations of claims 9 and 10 of the '808 patent, "except [that Gilliam uses] air instead of inert gas to generate smoke and carry that smoke to the systems being tested." *Id.* at 17 (alteration in original) (internal quotation marks and citation omitted). Redline argued the reason to combine these references is the "disclosure of the safety advantages of Stoyle's mist or smoke produced with an inert gas, i.e., [CO_2 gas], and Gilliam's cautions about the

dangers of the introduction of flammable smoke into tested systems." *Id.* at 23 (citation omitted).

The PTAB rejected Redline's arguments because it found they were not supported with declaration testimony, "and the inferences [Redline] attempt[ed] to draw from statements made in Gilliam and Stoyle [were] rebutted effectively by [STAR's expert] . . . ." *Id.* at 24 (citations omitted). After reviewing the record and the unrebutted testimony of STAR's expert, the PTAB determined Redline failed to provide sufficient evidence to show a PHOSITA would "have had reason to *substitute* the air used in Gilliam with inert gas *alone* from the mixture disclosed in Stoyle to achieve the invention recited in claim 9." *Id.* at 25.

On appeal, Redline argues a PHOSITA "would be familiar with Gilliam's smoke machines to test for EVAP system leaks and the risks associated therewith." Appellant's Br. 58 (capitalization and emphasis omitted). It contends that a PHOSITA would have understood the teachings of Gilliam, such that smoke could be created and used to test systems for leaks. *Id.* Redline further argues a PHOSITA would have understood that Gilliam's prior art "expressly warns of the potential for gasoline vapors to explode." *Id.* As such, a "skilled artisan would also know that at least as early as 1950[] it was known that one could generate a non-flammable smoke that eliminates the risk of explosion by vaporizing an oil with an inert gas . . . ." *Id.* at 59. Thus, Redline contends "[a]s a matter of common sense, [a PHOSITA as defined by the PTAB] . . . would [have] unquestionably [understood] the risk of explosion inherent to gasoline vapors, and would [have] be[en] motivated to exercise ordinary creativity and common sense to minimize such risk" and combine known and readily available alternatives. *Id.* at 58–59.

Substantial evidence supports the PTAB's determination that there was no motivation to combine Gilliam and

Stoyle. The PTAB determined that Gilliam teaches the combustion of a smoke producing fluid in an oxygen environment. Final Decision at 19. Dr. Checkel's declaration supports this finding, demonstrating that Gilliam's combustion does not work without oxygen. "Based on the education and experience of the person of ordinary skill in the field in July 1999, this person would have understood that smoke is generally the product of combustion." J.A. 2049 ¶ 123. "And the teachings of Gilliam would confirm to this person that Gilliam's methods involved at least some combustion" through the vaporization of smoke-generating fluid. J.A. 2049. During IPR proceedings, Redline acknowledged that Gilliam does not disclose the use of inert gas to create an inert environment for preventing ignition within the smoke producing chamber. Final Decision at 20.

The PTAB also determined that Stoyle uses high pressure and temperature to flash evaporate oil to generate smoke. *Id.* at 25 (quoting J.A. 2054–55 ¶ 136). Stoyle's high pressure is achieved using CO_2 gas that is forced through narrow passages in the heated assembly. J.A. 2055 ¶ 136. The superheated oil is "released to ambient conditions where it undergoes flash evaporation, forming oil vapor which is condensed to form a mist of droplets." J.A. 2055 ¶ 136 (footnote omitted). A PHOSITA "would not look to Stoyle to supply any missing features" because "the smoke-generating methods are materially different and are used for materially different purposes." J.A. 2054 ¶ 135.

The PTAB properly found that Gilliam and Stoyle, taken together, generate smoke via differing methods and thus, could not be combined to achieve the claimed invention recited in claims 9 and 10 of the '808 patent. A PHOSITA in July 1999 would have no reason to remove the ambient air from Gilliam and replace it with inert gas from Stoyle. Stoyle relies on high temperature and pressure. Gilliam relies on vaporizing fluid in an oxygen

environment. Both of these methods can damage closed EVAP systems with volatile compounds.

c. Motivation to Combine Gilliam, Pauley, and the 1999 Website

The PTAB determined that a PHOSITA would have had no "reason to *substitute* the air used in Gilliam with the inert gas from the mixture of air and inert gas disclosed in Pauley's open-tube, theatrical effects system for generating smoke in air to achieve the invention recited in claim 9 [of the '808 patent]." Final Decision at 31.

On appeal, Redline argues Pauley "shows that it was known well before July 1999 that an inflammable smoke may be created by vaporizing an oil in an inert gas environment, and that inflammable smoke may be used in a wide variety of commercial applications . . . ." Appellant's Br. 59. Redline states the smoke in Pauley can be used in theatrical effects, firefighter training, and even "automotive leak detection systems." *Id.* (citation omitted). Redline's previously discussed arguments on appeal regarding Gilliam are also applicable under this motivation to combine argument. Redline does not offer any arguments on appeal regarding the motivation to combine the 1999 Website. Thus, the PTAB's determination that "[t]he 1999 Website adds little to the asserted combination of Gilliam and Pauley," is uncontested. Final Decision at 27.

Substantial evidence supports the PTAB's determination that there was no motivation to combine Gilliam, Pauley, and the 1999 Website. Dr. Checkel's declaration stated "the inert gas [in Pauley] is only provided to atomize the glycerine or oil, propel it against the heating element and reduce the tendency to ignition in the region of the hot element." J.A. 2066 ¶ 160. "[U]se of an inert gas 'reduces to a minimum' the tendency to ignition—rather than eliminating the tendency—suggest[ing] to a person of ordinary skill that the smoke generation method

is not in an inert environment and needs some ambient air or oxygen." J.A. 2066 ¶ 161 (footnote omitted). Pauley requires ambient air to work for its intended purpose, otherwise "[a] purely inert smoke mixture, produced without entraining ambient air[,] would produce an anoxic environment . . . present[ing] a hazard to the actors and audience." J.A. 2067 ¶ 163 (footnote omitted). The PTAB accordingly determined "the use of inert gas in Pauley is different in type and location from that recited in claim 9 of the '808 patent." Final Decision at 31.

Both Pauley and Gilliam require air to produce smoke in accordance with their disclosed inventions. But, "neither Pauley nor Gilliam disclose using an inert gas . . . to prevent ignition and thereby avoid the possibility of an explosion" when using the smoke to test closed EVAP systems that contain volatile compounds. J.A. 2068 ¶ 165. Further, Dr. Checkel's declaration noted the 1999 Website references "'vehicle' in a list including large, open objects such as chimneys, luggage holds of aircraft and ships . . . [which] would confirm to a [PHOSITA] that the smoke machines discussed were intended for large open objects . . . not the sensitive, hazardous EVAP system in a vehicle engine." J.A. 2070 ¶ 169. Based on this testimony, the PTAB properly determined the 1999 Website did not teach the use of smoke machines for leak testing closed EVAP systems. Substantial record evidence supports the PTAB's finding there was no motivation to combine Pauley, Gilliam, and the 1999 Website.

CONCLUSION

Redline's remaining arguments are unpersuasive. Accordingly, the decision of the United States Patent and Trademark Office's Patent Trial and Appeal Board is

AFFIRMED