

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

PEDIATRIC HAIR SOLUTIONS CORPORATION,
Petitioner,

v.

LARADA SCIENCES, INC.,
Patent Owner.

IPR2019-01231
Patent 8,475,510 B2

Before LINDA E. HORNER, JOHN G. NEW, and CARL M. DEFRANCO,
Administrative Patent Judges.

NEW, *Administrative Patent Judge*

JUDGMENT
Final Written Decision
Determining All Challenged Claims Unpatentable
Denying Patent Owner's Motion to Amend
35 U.S.C. § 318(a)

I. INTRODUCTION

We have jurisdiction to hear this *inter partes* review under 35 U.S.C. § 6, and this Final Written Decision is issued pursuant to 35 U.S.C. § 318(a) and 37 C.F.R. § 42.73. For the reasons set forth below, we determine that Petitioner Pediatric Hair Solutions Corporation (“Petitioner”) establishes by a preponderance of the evidence that claims 1–4, 6–8, and 10–19 of U.S. Patent No. 8,475,510 B2 (Ex. 1001, “’510 Patent”) are unpatentable. Furthermore, because we similarly find that Petitioner establishes by a preponderance of the evidence that proposed substitute claims 21–35 of Patent Owner Larada Sciences, Inc.’s (“Patent Owner”) Revised Contingent Motion to Amend (Paper 37) are unpatentable, we deny Patent Owner’s Revised Contingent Motion to Amend.

A. Procedural History

On June 20, 2019, Petitioner filed a Petition (Paper 1, “Petition”) seeking *inter partes* review of claims 1–4, 6–8, and 10–19 of the ’510 Patent.¹ Patent Owner timely filed a Preliminary Response. (Paper 8). Pursuant to 35 U.S.C. § 314, we instituted trial on January 14, 2020, upon all of the challenged claims of the ’510 Patent (Paper 9, “Institution Decision” or “Dec.”).

¹ The present proceeding was conducted in parallel with two other trials, *Pediatric Hair Sol’ns Corp. v. Univ. of Utah Res. Found*, IPR2019-01229, challenging U.S. Patent No. 7,789,902 B2, and *Pediatric Hair Sol’ns Corp. v. Univ. of Utah Res. Found*, IPR2019-01230, challenging U.S. Patent No. 8,162,999 B2 (the “related IPRs”).

After institution of trial, Patent Owner filed a Response (Paper 22, “PO Resp.”), to which Petitioner filed a Reply (Paper 26, “Pet. Reply”), and Patent Owner, in turn, filed a Sur-reply (Paper 35, “Sur-reply”).

Patent Owner also filed a Contingent Motion to Amend (Paper 31, “Mot. Amend”). In response to Patent Owner’s request (*see* Mot. Amend 1), we issued Preliminary Guidance (Paper 33) on Patent Owner’s Motion to Amend. Patent Owner subsequently filed a Revised Contingent Motion to Amend (Paper 37, “Rev. Mot. Amend.”), to which Petitioner filed an Opposition (Paper 40, “Opp.”), to which Patent Owner filed a Reply (Paper 41, “Opp. Reply”), and Petitioner filed a Sur-Reply (Paper 42, “Opp. Sur-Reply”).

Petitioner relies on a Declaration of Dr. Michael Potter (Ex. 1003) and a Declaration of Dr. James L. Mullins (Ex. 1010) to support its Petition.² Patent Owner relies on a Declaration of Dr. James F. Klausner (Ex. 2004), and a Declaration of Ian F. Burgess (Ex. 2006) to support its Response. Patent Owner relies on a second Declaration of Ian F. Burgess (Ex. 2020) in support of its Sur-reply, and a third Declaration of Ian F. Burgess (Ex. 2021) in support of its Reply to the motion to amend.

Oral argument was held on November 19, 2020. A transcript of the oral argument is included in the record. Paper 45 (“Tr.”).

² Petitioner also relies upon the Declarations of Dr. Potter (Ex. 1019) and Dr. Mullins (Ex. 1021) that were provided in the related IPR, IPR2019-01229.

B. Related Proceedings

The parties represent that the '510 Patent, together with the patents challenged in the related IPRs (*see n.1*), are involved in *Larada Sciences, Inc. v. Pediatric Hair Solutions Corporation*, No. 3:18-cv-00320 (W.D.N.C. June 20, 2018). Pet. 1; Paper 3, 2.

C. The '510 Patent (Ex. 1001)

The '510 Patent is directed to the delivery of hot air through an applicator to kill head lice. Ex. 1001, cols. 10–11, ll. 10–29, col. 12, ll. 1–29. Figures 1–6 of the '510 Patent depict an “[a]irflow applicator 100 includ[ing an] applicator base 110 and applicator tip 120.” Ex. 1001, col. 6, ll. 64–65. Figure 1 of the '510 Patent is reproduced below:

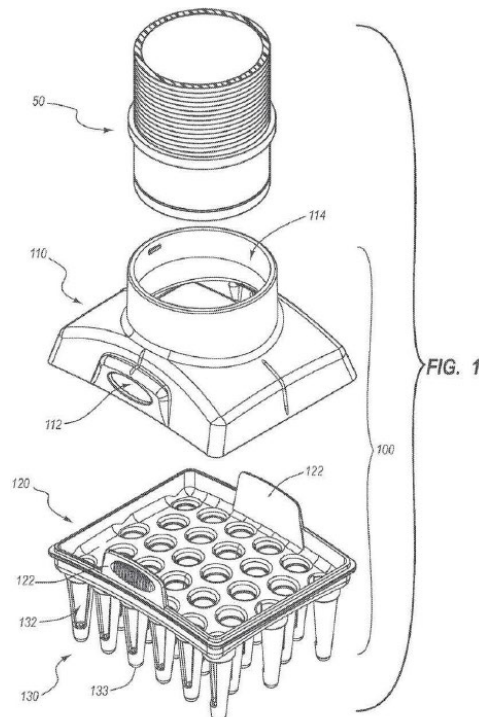


Fig. 1 of the '510 Patent illustrates an exploded perspective view of one embodiment of an airflow applicator system

The applicator tip includes “a plurality of elongated fingers 130. Each of the fingers 130 includes a port 132 that is configured to direct heated airflow from [a] blower in a specific, desired manner.” Ex. 1001, col. 7, ll. 24–27. In certain embodiments, and as recited in independent claim 12 and its dependent claims 13–19, “the airflow is delivered laterally of the applicator such that the treatment site extends from the applicator to only one side of the applicator.” Ex. 1001 col. 2, ll. 4–32, col. 7, ll. 61–63, col. 8, ll. 32–36, 56–58). Figure 1 of the ’510 Patent, depicted *supra*, shows that, to deliver the air laterally to only one side of the applicator, “substantially all of the ports [132] may open on the same side of the fingers.” Ex. 1001, col. 4, ll. 37–41.

Figures 4 and 5 of the ’510 Patent, depicted below, further illustrate that, in one embodiment, “each of the ports 132 open towards substantially the same direction such that the applicator tip 120 delivers substantially all of the airflow to a single side of the applicator.” Ex. 1001 col. 7, ll. 43–46.

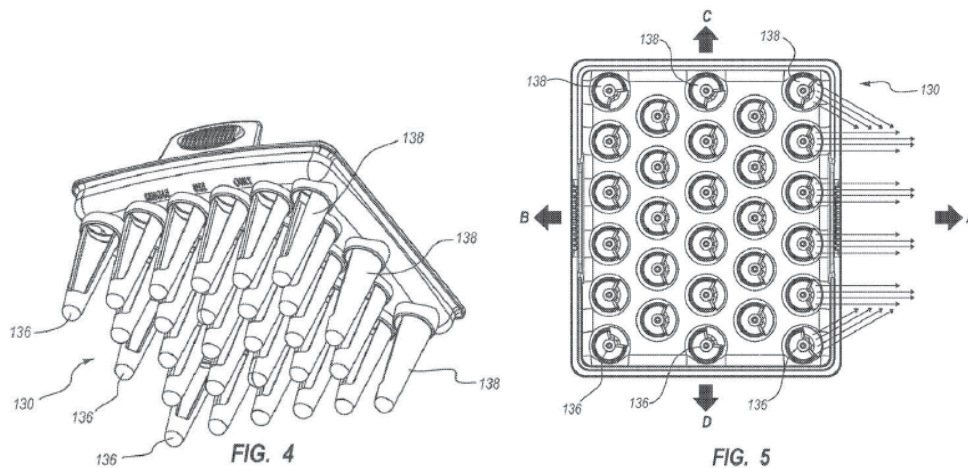


Fig. 4 of the ’510 Patent depicts a perspective view of the applicator tip of the airflow applicator system. Fig. 5 depicts top plan view of the applicator tip of Fig. 4.

The '510 Patent teaches that:

Such a configuration may be useful to help a practitioner avoid directing airflow onto sensitive areas such as eyes or ears, or to visualize each of a plurality of treatment areas in a treatment pattern to more effectively treat a patient suffering from an infestation of lice or another ectoparasite.

Ex. 1001 col. 7, ll. 52–56.

The '510 Patent further teaches that, in some embodiments, the applicator or a portion of the applicator (e.g., the tip) may be disposable, for example, “to avoid spreading disease, infestations, human tissue, and/or ectoparasite remnants from one patient to the next.” Ex. 1001, col. 3, ll. 48–52; col. 2, ll. 40–41, col. 3, ll. 10–14, cols. 3–4, ll. 53–29, col. 5, ll. 7–12, 30–32, 46–50. Independent claim 1 and its dependent claims 2–4 and 6–11 are directed to this embodiment where “at least a portion of the applicator is disposable.”

D. Illustrative Claim

Claims 1 and 12 are independent. Each of challenged claims 2–4, 6–8, 10, 11, and 13–19 depends, directly or indirectly, from either independent claims 1 and 12. Claim 1 is illustrative and recites:

1. A method for treating an animal having a lice infestation to substantially eliminate both lice and lice eggs from the animal, the method comprising:

obtaining an applicator, wherein at least a portion of the applicator is disposable, wherein the applicator comprises a plurality of elongated fingers, and wherein at least a subset of the plurality of elongated fingers comprise ports for delivering airflow, and wherein the applicator is configured for delivering heated airflow to a treatment site on the animal;

connecting the applicator to a heated airflow source;

delivering a heated airflow through the applicator to the treatment site to substantially eliminate the lice and lice eggs from the treatment site;

moving the applicator to a second treatment site;

delivering a heated airflow through the applicator to the second treatment site to substantially eliminate the lice and lice eggs from the second treatment site;

repeating the delivering and moving steps until substantially all lice and lice eggs have been eliminated;

removing at least a portion of the applicator from the heated airflow source;

disposing of at least a portion of the applicator; and

connecting a second applicator to the heated airflow source, wherein at least a portion of the second applicator is disposable, and wherein the second applicator is configured for delivering airflow to a treatment site on the animal.

Ex. 1001 col. 10, ll. 10–37. Independent claim 12 recites:

12. A method for treating a human patient having a lice infestation to substantially eliminate both lice and lice eggs from the patient, the method comprising:

obtaining an applicator comprising a plurality of fingers, at least a subset of the plurality of fingers comprising ports, wherein the ports are positioned on the fingers along substantially only one side of the fingers, and wherein the ports are configured for delivering airflow to a treatment site on the scalp of the patient;

connecting the applicator to a blower;

contacting the scalp of the patient with the applicator at the treatment site;

delivering a heated airflow through the ports to the treatment site to substantially eliminate the lice and lice eggs from the treatment site, wherein the airflow is delivered laterally of the applicator such that the treatment site extends from the applicator to only one side of the applicator;

moving the applicator to a second treatment site;

contacting the scalp of the patient with the applicator at the second treatment site;

delivering a heated airflow through the applicator to the second treatment site to substantially eliminate the lice and lice eggs from the second treatment site, wherein the airflow is delivered substantially laterally of the applicator such that the second treatment site extends from the applicator to substantially only one side of the applicator;

repeating the delivering and moving steps until substantially all lice and lice eggs have been eliminated from the patient.

Id. at col. 11–12, ll. 5–7.

E. Asserted Grounds of Unpatentability and Asserted Prior Art

Petitioner contends that claims 1–4, 6–8, and 10–19 of the '510 Patent are unpatentable based on the following grounds:

Claim(s) Challenged	35 U.S.C. §	Reference(s)
1–4, 7, 8, 10, 11	103(a) ³	Goates ⁴ , Pearlman ⁵ , Westerveld ⁶
12–15	103(a)	Goates, Westerveld, Hackl ⁷
6, 16–19	103(a)	Goates, Westerveld, Hackl, Pearlman

II. ANALYSIS

A. Level of Ordinary Skill in the Art

Both Petitioner and Patent Owner have expressly agreed to adopt the definition of the level of ordinary skill in the art that was set forth in the related district court litigation. *See* Pet. 11, PO Resp. 13, Reply 1. The district court found:

[A] person of ordinary skill in the art at the time of the invention

³ The Leahy-Smith America Invents Act, Pub. L. No. 112-29, 125 Stat. 284 (2011) (“AIA”), included revisions to 35 U.S.C. § 103 that became effective after the filing of the application that led to the ’510 Patent. Therefore, we apply the pre-AIA version of 35 U.S.C. § 103.

⁴ B.M. Goates et al., *An Effective Nonchemical Treatment for Head Lice: A Lot of Hot Air*, 118(5) PEDIATRICS 1962–70 (Nov. 2006) (“Goates”) (Ex. 1005).

⁵ Pearlman (US 6,350,734 B1, February 26, 2002) (“Pearlman”) (Ex. 1007).

⁶ Westerveld et al. (US 5,738,121, April 14, 1998) (“Westerveld”) (Ex. 1006).

⁷ Hackl et al. (US 2007/0068544 A1, March 29, 2007) (“Hackl”) (Ex. 1008).

would have at least a bachelor's degree in mechanical or biomechanical engineering, entomology, or equivalent coursework, at least a year of experience developing medical devices and/or personal care devices involving the delivery of heat and/or air flows to human and/or non-human animal patients, and at least a year of experience in developing and/or providing treatments to alleviate the effects of ectoparasite infestations in human and/or non-human animal patients. Alternatively, a person of having ordinary skill in the art may have 18 months of the stated work experience in the absence of a bachelor's degree in entomology. Also, less work experience may be compensated by a higher level of education, such as a Master's degree.

Ex. 2004, 4. There being no dispute between the parties on this issue, we adopt herein the district court's definition of the level of ordinary skill in this art.

B. Claim Construction

We construe claim terms so as to give the words in a claim their plain meaning, which is defined as the meaning understood by a person of ordinary skill in the art after reading the entire patent. *See* Changes to the Claim Construction Standard for Interpreting Claims in Trial Proceedings Before the Patent Trial and Appeal Board, 83 Fed. Reg. 51,340, 51,358 (Oct. 11, 2018) (amending 37 C.F.R. § 42.100(b) effective November 13, 2018) (now codified at 37 C.F.R. § 42.100(b) (2019)). 37 C.F.R. § 42.100(b); *see also Phillips v. AWH Corp.*, 415 F.3d 1303, 1312–13 (Fed. Cir. 2005) (en banc).

1. “Disposable” and “disposing”

Independent claim 1 recites “wherein at least a portion of the applicator is disposable” and “disposing of at least a portion of the applicator.” Ex. 1001, col. 10, ll. 13–14, 32, 34–35. Dependent claims 3 and 17–19 also use the terms “disposable” and “disposing.” *Id.* at col. 10, ll. 45–47, col. 12, ll. 18–25.

Petitioner contends that, to the extent that these phrases require construction, they should be construed to mean that a component of the applicator is “discarded after a single use.” Pet. 12–14 (citing Ex. 1003, ¶ 34).

Patent Owner notes that, in its Claim Construction Order, the district court construed “disposable” to mean “intended to be discarded after a single use” and construed “disposing” to mean “thrown away or discarded.” PO Resp. 14 (citing Ex. 2002, 21). Patent Owner acknowledges that, although it does not agree with the district court’s construction of “disposable,” for purposes of this IPR proceeding, it believes that these terms do not need to be construed differently. *Id.* at 14.

Because we discern no significant difference between the parties’ proposed construction of the terms, we accordingly adopt the district court’s construction of the claim term “disposable” as meaning “intended to be discarded after a single use” and the term “disposing” to mean “thrown away or discarded.”

2. “High-volume heated airflow”

Dependent claim 11 recites “wherein the heated airflow source is configured to deliver a high-volume heated airflow.” Ex. 1001, col. 11, ll. 3–4.

Petitioner argues that the ’510 Patent’s Specification defines “‘high-volume blowers,’ as this term is used herein” to mean “blowers capable of delivering between 45 and 200 cfm (cubic feet per minute) of airflow.” Pet. 14 (quoting Ex. 1001 col. 2, ll. 48–50). Petitioner therefore asserts that, based upon this definition, “high-volume heated airflow” should be construed to mean “heated airflow between 45 and 200 cfm.” *Id.* (citing Ex. 1003 ¶ 37).

Patent Owner does not contest Petitioner’s construction of this claim term. PO Resp. 14. We find that Petitioner’s proposal is supported by the cited portion of the Specification, and consequently construe the claim term “high-volume heated airflow” as meaning “heated airflow between 45 and 200 cfm.”

3. “The ports are positioned on the fingers along substantially only one side of the fingers”

Independent claim 12 recites “obtaining an applicator comprising a plurality of fingers, at least a subset of the plurality of fingers comprising ports, wherein the ports are positioned on the fingers along substantially only one side of the fingers.” Ex. 1001, col. 11, ll. 10–11.

Patent Owner contends that, in the related district court litigation, the district court concluded that “there is no need to construe this term beyond

its ‘plain and ordinary’ meaning,” a conclusion with which Patent Owner agrees. PO Resp. 14–15 (quoting Ex. 2002, 28).

Petitioner does not address this issue. We determine, consistent with the district court’s conclusion, that there is no dispute of record that requires construing this term beyond its “plain and ordinary” meaning as would be understood by a person of ordinary skill in the art after reading the entire patent.

4. “The airflow is delivered laterally of the applicator such that the treatment site extends from the applicator to only one side of the applicator”

Independent claim 12 recites “delivering a heated airflow through the ports to the treatment site to substantially eliminate the lice and lice eggs from the treatment site, wherein the airflow is delivered laterally of the applicator such that the treatment site extends from the applicator to only one side of the applicator.” Ex. 1001, col. 11, ll. 18–23.

Patent Owner notes that, in the related district court litigation, the district court rejected Petitioner’s argument that this term should be construed to mean “the airflow is delivered laterally to only one side of the applicator such that the treatment site extends from the applicator to one, and only one, side of the applicator.” PO Resp. 15 (quoting Ex. 2002, 24). Patent Owner points out that the district court rejected this construction, explaining that “the language ‘only’ is clear on its own and does not require ‘clarification.’” *Id.* (quoting Ex. 2002, 26). Patent Owner agrees with the district court’s conclusion.

Petitioner does not argue the district court’s conclusion. We agree with the district court and accordingly construe this limitation to have its plain and ordinary meaning as would be understood by a person of ordinary skill in the art after reading the entire patent.

5. Other claim terms and phrases

As demonstrated in our analysis below, no other claim terms or phrases require an explicit construction. *See Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co. Ltd.*, 868 F.3d 1013, 1017 (Fed. Cir. 2017) (holding that “we need only construe terms ‘that are in controversy, and only to the extent necessary to resolve the controversy.’” (quoting *Vivid Techs., Inc. v. Am. Sci. & Eng’g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999))).

C. Principles of Law

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 the 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) if in evidence, so-called secondary considerations. *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966).

“In an [*inter partes* review], the petitioner has the burden from the onset to show with particularity why the patent it challenges is

unpatentable.” *Harmonic Inc. v. Avid Tech., Inc.*, 815 F.3d 1356, 1363 (Fed. Cir. 2016). Although the burden of production may shift, the burden of persuasion on the issue of patentability remains with Petitioner and does not shift to Patent Owner. *Dynamic Drinkware, LLC v. Nat’l Graphics, Inc.*, 800 F.3d 1375, 1378 (Fed. Cir. 2015). To prevail, Petitioner must support its challenge by a preponderance of the evidence. 35 U.S.C. § 316(e); 37 C.F.R. § 42.1(d). We analyze the challenges presented in the Petition in accordance with these principles.

D. Patentability of claims 1–4, 6–8, and 10–19

1. Overview of Goates (Ex. 1005)

Goates evaluates the effectiveness of several methods that use hot air to kill head lice and their eggs. Ex. 1005, 9 Abstr. Of relevance to this Decision is Goates’ development of a custom-built, high-volume, hot-air blower called the “LouseBuster.” *Id.* at 12. The LouseBuster is connected to a custom-made molded-plastic hand piece, which has coarse, solid teeth, and is pulled through the hair like a garden rake while hot air blows in the opposite direction. *Id.* The LouseBuster, and its use, are depicted in Figures 1A and 1B of Goates (*id.* at 13), which are reproduced below:

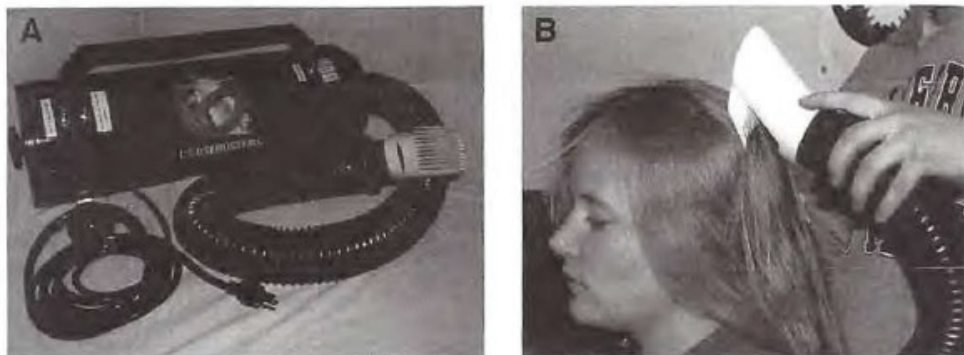


Fig. 1A of Goates depicts the LouseBuster, a custom-built, high-volume, hot-air blower with a molded plastic hand piece that supports coarse teeth. Fig. 1B shows the hand piece of the LouseBuster pulled through a patient's hair slowly while hot air blows opposite the direction of pulling.

Goates teaches that the LouseBuster's combination of high temperature, high air flow, and mechanical lifting of the hair leads to 98% mortality of louse eggs and 80% mortality of hatched lice, and that these mortality rates are sufficient to cure most patients of head lice. Ex. 1005 15, 16.

2. Overview of Westerveld

Westerveld relates to a hair styling brush for use in combination with a hot air source. Ex. 1006 col. 1, ll. 3–4. Westerveld's invention comprises an elongate hollow body having a row of hollow teeth, which extend substantially perpendicularly to the longitudinal axis of the hollow body. *Id.* at ll. 4–7. The interior of the hollow body is in open communication with the interior of each of the hollow teeth, which have outlet apertures through which, during operation, an air stream flows. *Id.* at ll. 7–10. The air stream is directed substantially perpendicular to the longitudinal axis of the hollow body. *Id.* at ll. 10–12. The stream of hot air produced by the hot-air source is thus guided to the outlet apertures through the hollow body and the hollow teeth. *Id.* at ll. 14–16. Westerveld teaches that an important aspect of this process is to give the hair more volume. *Id.* at ll. 16–17.

Figures 1 and 3 of Westerveld depict an embodiment of the claimed invention. Figure 1 depicts a perspective view of the hair styling brush and is reproduced below:

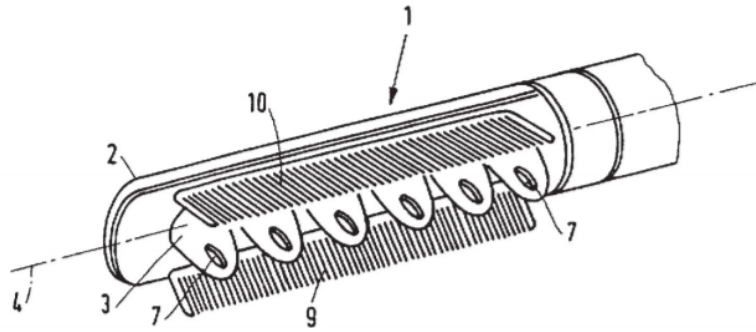


Fig. 1 of Westerveld depicts a perspective view of the hair styling brush

The hair styling brush 1 of Westerveld has an elongate hollow body 2 with a row of hollow teeth 3. Ex. 1006 col. 2, ll. 6–7. The hollow teeth 3 extend transversely from the longitudinal axis 4 of the hollow body 2. *Id.* at ll. 7–9. Combs 9 and 10 are situated each on one side of the row of hollow teeth 3. *Id.* at 13–14.

Figure 3 of Westerveld is reproduced below:

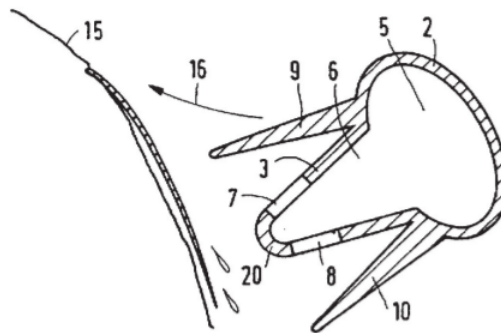


Fig. 3 of Westerveld is a diagrammatic, cross-sectional drawing illustrating use of the hairstyling brush

Figure 3 of Westerveld further illustrates the mechanism by which hot air arriving in the lumen of the hollow handle of the brush 5 is directed into the hollow teeth 3, and out through the outlet apertures 7, 8. Ex. 1006 col. 2, ll. 6–13. The interior 5 of the hollow body is in open communication with

the interior 6 of each hollow tooth, and each hollow tooth has outlet apertures 7, 8, which are disposed transversely of the longitudinal axis 4 of the hollow body. *Id.* at ll. 9–13.

3. Overview of Pearlman

Pearlman relates to methods and kits for the diagnosis, treatment, removal or prevention of pedicular parasite infestations (i.e., head lice). Ex. 1007 col. 1, ll. 18–20. Specifically, Pearlman teaches that its methods and kits relate to the use of nontoxic dryable agents that rapidly immobilize head lice and keep them immobilized when dried, in order to facilitate their removal from the hair and scalp. *Id.* at ll. 20–24.

Relevantly, Pearlman teaches that its kits can optionally include a comb for removing excess agent, or a delousing comb. Ex. 1007 col. 16, ll. 58–59. Pearlman teaches that:

The comb is preferably constructed of rigid material such as metal or plastic. In a preferred embodiment, the comb is inexpensive and designed to be disposable after a single use, in order to prevent contamination. In another embodiment the comb has a removable, and preferably disposable, piece having a plurality of teeth which attaches to a handle portion such as described in U.S. Pat. No. 5,636,646, incorporated herein by reference in its entirety.

Id. at col. 17, ll. 8–15. Zito (U.S. Patent No. 5,636,646, June 10, 1997) (“Zito” Ex. 1009), incorporated by reference into the teachings of Pearlman in the passage quoted *supra*, relates to a fine-tooth comb for treating pediculosis (i.e., lice infestation) and, in particular, for removing lice and lice eggs, and includes a removable piece and an elongated piece. Ex. 1009 Abstr. Figure 2 of Zito is reproduced below:

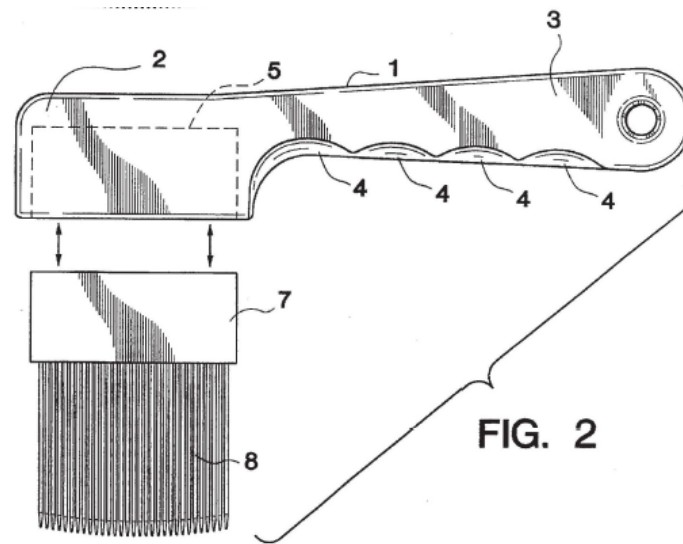


Fig. 2 of Zito is an exploded side view of the fine-tooth comb with the removable piece detached from the head of the elongated piece

In Figure 2 of Zito, the head portion 2 of the fine-tooth comb is hollow, and has an opening 5. Ex. 1009 col. 2, l. 44. This opening 5 has a generally rectangular shape, as indicated in dotted lines, to accept removable piece 7 with teeth 8. *Id.* at ll. 45–59. Pearlman teaches that such a removable piece 7 is preferably disposable. Ex. 1007 col. 17, ll. 11–15.

4. Overview of Hackl

Hackl is directed to a device to apply a flowable product to human scalp hair, with a product dispenser having prongs provided with multiple openings to dispense the product. Ex. 1008, Abstr. Figure 1 of Hackl is reproduced below:

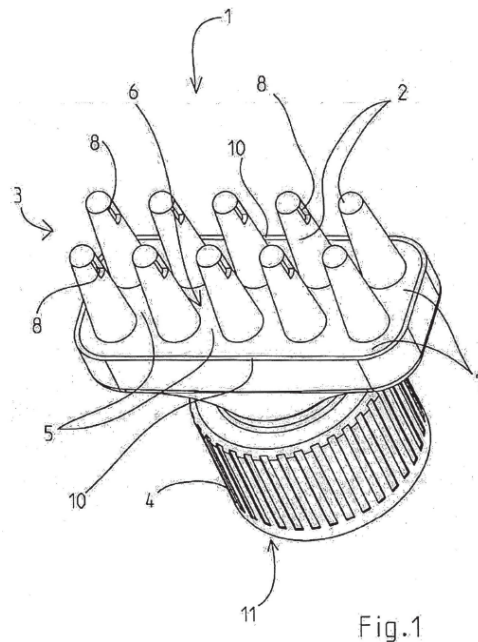


Fig. 1 of Hackl is a perspective view of an embodiment of the claimed device with two rows of prongs, with each prong having an opening to dispense a flowable hair conditioning product and no opening aligned from an inner space towards the outside

Figure 1 of Hackl depicts a product dispenser 3 that has multiple prongs 2. Ex. 1008 ¶ 18. The product dispenser 3 has a base 6 to accommodate the prongs 2, and consists of an inner area 5 extending between the prongs 2, which is bordered by an outer area 7 of the base 6. *Id.* The product dispenser 3 can be screwed onto a reservoir via a connection 4, which has an inner thread 11. *Id.* The prongs 2 have openings 8 for dispensing the product, all of which are aligned laterally with respect to an inner space 9 located above the inner area 5. *Id.* The prongs 2 are located in the inner space 9 and none of the openings 8 points towards the outer area 7, which is bordered by an edge 10 to wipe off excess product from the hair. *Id.*

5. Ground 1: Patentability of claims 1–4, 7, 8, 10, and 11 over Goates, Pearlman, and Westerveld

In our Decision to Institute, we concluded that “Petitioner has sufficiently demonstrated a reasonable likelihood of establishing that claims 1–4, 7, 8, 10, 11 are obvious over the combination of Goates, Westerveld, and Pearlman.” Dec. 30–31. We now consider Petitioner’s arguments and supporting evidence in light of the additional arguments and supporting evidence presented during the trial. *See* Pet. 20–52; PO Resp. 15–25. For this ground, we note that Patent Owner argues only Petitioner’s challenge of independent claim 1 and does not treat the challenged dependent claims separately from claim 1. *See* PO Resp. 15, 17.

We find that Petitioner points to sufficient content within Goates for teaching a “method for treating an animal having a lice infestation to substantially eliminate both lice and lice eggs from the animal” using an applicator.⁸ Pet. 20–25 (citing Ex. 1005, 9–17, Figs. 1, 2, Table 1; Ex. 1003 ¶¶ 39–53). We also find that Petitioner points to sufficient content within Pearlman to teach a disposable lice comb, and sufficient content within Westerveld to teach an applicator having openings for forcing hot air out laterally. Pet. 25–28, 35–37 (citing Ex. 1007, Abst., col. 2, ll. 49–51, col. 3, ll. 10–12, col. 4, ll. 25–28, col. 17, ll. 9–16; Ex. 1006, Abstr., col. 2, ll. 41–

⁸ “[W]here a patentee defines a structurally complete invention in the claim body and uses the preamble only to state a purpose or intended use for the invention, the preamble is not a claim limitation.” *Rowe v. Dror*, 112 F.3d 473, 478 (Fed. Cir. 1997). Here, we need not determine whether the preamble is limiting because Petitioner shows that the subject matter of the preamble is taught by the cited art.

43, col. 1, ll. 29–30, 36–39, col. 2, ll. 22–25, Fig. 4; Ex. 1003 ¶¶ 55–57, 69–70). We also find that Petitioner provides sufficient evidence and reasoning as to why one having ordinary skill in the art would have been led to modify the device of Goates with the teachings of Westerveld to deliver the hot air via ports on elongated fingers or comb teeth to use this device to eliminate the lice and lice eggs from the treatment site in the manner claimed.

Pet. 38–45 (citing Ex. 1003 ¶¶ 71–80).

a. *“wherein at least a portion of the applicator is disposable,”*

Petitioner acknowledges that the LouseBuster taught by Goates does not expressly teach the limitation of claim 1 reciting “wherein at least a portion of the applicator is disposable.” Pet. 25. Instead, Petitioner points to the teachings of Pearlman, which teaches a comb device for removing lice from the scalp, in which at least a portion of the comb attachment is disposable. *Id.* (see Ex. 1007 col. 17, ll. 9–15). Petitioner points out that Pearlman teaches that the comb is “designed to be disposable after a single use” and that either the entire comb or the detachable teeth portion may be disposable. *Id.* at 26–27 (citing Ex. 1007 col. 17, ll. 9–16).

Petitioner further contends that a person of ordinary skill in the art would have been motivated to apply Pearlman’s teaching to make an entire louse comb, or a portion of it, disposable to a portion of Goates’ LouseBuster, or to likewise make its hand piece with comb disposable after a single use. Pet. 27 (citing Ex. 1003 ¶ 59). Petitioner asserts that Pearlman provides express motivation to make this specific combination, e.g., by teaching that its louse comb, or at least the toothed portion of the comb,

should be made “disposable after a single use, in order to prevent contamination.” *Id.* (quoting Ex. 1007 col. 17, ll. 9–12). Petitioner notes that Pearlman calls disposability of the comb “a preferred embodiment,” and further explains that its techniques help with “certain populations where cross-contamination is known to occur, such as in a grade school setting.” *Id.* (quoting Ex. 1007 col. 17, ll. 9–10, col. 15, ll. 50–54). Petitioner argues that Pearlman would therefore have taught a skilled artisan that a louse comb, or at least the toothed portion of a louse comb, should be made disposable after one use, especially in environments like schools, where cross-contamination among patients easily occurs. *Id.* (citing Ex. 1003 ¶ 60).

Petitioner further notes that, whereas Goates focuses on the efficacy of different hot air-based lice treatments, including those using the LouseBuster and its louse comb hand piece, Goates does not directly address the hygienic aspects or concerns of such treatments. Pet. 27–28 (citing Ex. 1003 ¶ 61). Nevertheless, Petitioner argues, a skilled artisan would have been acutely aware of the need to make such treatments clean and hygienic for the subjects being treated, as is the case with virtually any medical treatment where the same equipment is used on multiple patients. *Id.* at 27.

Furthermore, argues Petitioner, Goates teaches that “[e]ach year millions of children are infested with head lice,” and “envision[s] the LouseBuster to be an institutionally based machine operated by health care providers, school administrators, or trained parents and other volunteers.” Pet. 28 (quoting Ex. 1005, 9, 16). Petitioner also observes that Goates recommends “that [the LouseBuster method] could be used to simultaneously treat all children with head lice, minimizing the problem of

re-infestation.” *Id.* (quoting Ex. 1005, 16). Petitioner argues that Goates thus envisions using the LouseBuster method on many schoolchildren at the same time, where cross-contamination poses a significant challenge. *Id.* (citing Ex. 1003 ¶ 62). Petitioner asserts that this is the precise environment/application Pearlman identifies as benefiting from its techniques, which is: “certain populations where cross-contamination is known to occur, such as in a grade school setting.” *Id.* (quoting Ex. 1007, col. 15, ll. 50–54); *see also* Ex. 1003 ¶ 62.

Petitioner therefore concludes that a person of ordinary skill in the art would have been motivated to make the hand piece of Goates, or the comb teeth thereof, disposable as taught by Pearlman, to reduce cross-contamination in environments like schools. Pet. 28 (citing Ex. 1003 ¶ 62). Petitioner also notes that a skilled artisan would have been motivated to combine Pearlman and Goates because they are both analogous art, and because both references seek to address the same chronic problem: the millions of school days that children miss every year due to lice infestations. Pet. 29 (citing Ex. 1003 ¶ 63). Goates explains that “[e]ach year millions of children are infested with head lice, ... which is responsible for tens of millions of lost school days.” *Id.* (quoting Ex. 1005, 9).

Similarly, Petitioner contends, Pearlman notes the problem that “schoolchildren ... are today forbidden in most jurisdictions from attending school with even a single nit,” and that “[c]urrent school policy is immediately to send children home who are discovered to have lice infestation.” Pet. 29 (citing Ex. 1007, col. 8, ll. 40–42, col. 21, ll. 47–78). Therefore, Petitioner argues, like Goates, Pearlman envisions using its techniques for “treatment at school.” *Id.* (citing Ex. 1007 col. 21, ll. 45–46).

Petitioner therefore argues that, because Goates and Pearlman propose solutions to the same problem, a person of ordinary skill in the art who was considering Goates, would also have looked to Pearlman for potential improvements to Goates' solutions. *Id.* at 29–30 (citing Ex. 1003 ¶ 63).

Petitioner next argues that an artisan would have been able to make the proposed combination using only ordinary skill in the art. Pet. 30 (citing Ex. 1003 ¶ 64). Petitioner notes that Goates teaches that its hand piece is “molded-plastic,” and that such molded plastic pieces are typically inexpensive and made of materials suitable for disposal. *Id.* (citing Ex.1005, 12, 13, 16; Ex. 1003 ¶ 64). Petitioner argues further that the Goates and Pearlman hand pieces also have a similar structure and attachment configuration. *Id.* (citing Ex. 1003 ¶ 65). Petitioner notes that Goates teaches that its hand piece has a cylindrical attachment that surrounds the cylindrical hose, whereas Pearlman teaches that “the comb has a removable, and preferably disposable, piece having a plurality of teeth which attaches to a handle portion such as described in [Zito] incorporated herein by reference in its entirety.” *Id.* (quoting Ex. 1005 Fig. 1; Ex. 1007 col. 17, ll. 12–15). Petitioner argues that Zito teaches that its disposable piece has, like Goates, a similar socket configuration that could be adapted to connect to the hose of the LouseBuster. *Id.*

Petitioner argues that the fact that the device taught by Pearlman does not apply hot air in conjunction with a disposable comb would not have deterred a person of ordinary skill in the art from applying its teachings regarding disposability to Goates. Pet. 34 (citing Ex. 1003 ¶ 67). According to Petitioner, a skilled artisan would have looked to devices and applicators used on the human head for teachings on how to prevent cross-

contamination. *Id.* Petitioner contends that the device of Pearlman contacts the hair and scalp of the subject in the same manner as the hand piece of the LouseBuster device, and could therefore introduce the risk of lice or other cross-contamination if used on multiple subjects. *Id.* (citing Ex. 1007 col. 17, ll. 9–12; Ex. 1005, 12).

Petitioner therefore argues that, given that principles of hygiene and avoiding cross-contamination apply equally in Pearlman and Goates, a skilled artisan would have consulted Pearlman in designing or improving a method using Goates' LouseBuster device. Pet. 34–35 (citing Ex. 1003 ¶ 67). Furthermore, argues Petitioner, a person of ordinary skill would have had a reasonable expectation of success in applying Pearlman's teachings to Goates in the way described above given the predictable functioning of the combined device. *Id.* (citing Ex. 1003 ¶ 68).

Patent Owner responds that there is no evidence that it would have been obvious to make the combined Goates-Westerveld applicator disposable, as required by claim 1. PO Resp. 16–17. Rather, Patent Owner contends, the evidence shows a person of ordinary skill in the art might have been motivated to make only the Goates applicator disposable. *Id.* Patent Owner argues that, in making its motivation argument, Petitioner relies upon the fact that “[t]he Goates and Pearlman hand pieces . . . have a similar structure” and that “[m]aking a louse comb attachment disposable was already known in the art.” *Id.* (quoting Pet. 30, 33).

However, Patent Owner asserts, the relevant device is the combined Goates-Westerveld applicator. PO Resp. 17. Patent Owner argues that Petitioner has not argued that the combined Goates-Westerveld applicator is similar in structure to Pearlman's louse comb, nor has it argued that making

an air applicator like the combined Goates-Westerveld applicator disposable was already known in the art. *Id.* Therefore, Patent Owner argues, Petitioner has not addressed or provided any evidence regarding the relevant question; *viz.*, whether a person of skill in the art would have been motivated to make the combined Goates-Westerveld applicator disposable. *Id.* at 17–18.

Patent Owner disputes Petitioner’s conclusion that a skilled artisan “would have been motivated to apply Pearlman’s teaching to make an entire louse comb, or a portion of it, disposable to Goates’ LouseBuster to likewise make its hand piece with comb disposable after a single use.” PO Resp. 18 (quoting Pet. 27). Patent Owner contends that Goates teaches using a custom-built, high-volume, hot-air blower (i.e., the LouseBuster), together with a custom designed hand piece, to facilitate exposure of the hair’s roots to hot air. PO Resp. 19 (citing Ex. 1005, 12). Patent Owner notes that Goates teaches that the hand piece “has coarse teeth” and “is pulled through the hair like a garden rake while hot air blows in the opposite direction,” and that the coarse teeth “were designed to lift the hair slightly, exposing the roots, where lice and eggs congregate.” *Id.* (citing Ex. 1005, 16). Patent Owner observes that Goates reports that “[t]his method proved to be the most successful, resulting in 98% mortality of eggs and 80% mortality of hatched lice.” *Id.*

Patent Owner asserts that, unlike Goates, Pearlman’s methods are not solely designed to kill lice and eggs, but are rather designed “for the treatment, removal and/or prevention of lice and/or nit infestations.” PO Resp. 19 (citing Ex. 2006 ¶ 30; Ex. 1007 cols. 4–5, ll. 66–3). Patent Owner argues that Pearlman’s methods particularly rely on the use of “a

pediculostatic agent . . . that elicits the ‘immersion reflex’ in lice.” *Id.* (quoting Ex. 1007 col. 5, ll. 4–5). Patent Owner states that the immersion reflex occurs when lice are immersed in water, causing them to “switch into a state of profound suspended animation,” and that, in such a state, the lice “become completely immobile.” *Id.* (citing Ex. 1007 col. 5, ll. 5–15). Patent Owner notes that, in one embodiment, Pearlman discloses the use of a “fine-toothed delousing comb” to remove lice and nits from the treated hair following application of the pediculostatic agent. *Id.* (citing Ex. 1007 col. 2, ll. 56–58). Patent Owner contends that, since Pearlman’s methods do not necessarily kill lice and nits, “[i]n a preferred embodiment, the comb is inexpensive and designed to be disposable after a single use, in order to prevent contamination.” *Id.* (citing Ex. 1007 col. 17, ll. 10–12; Ex. 2006 ¶ 30).

According to Patent Owner, a person of ordinary skill in the art would not have been motivated to make Goates’ coarse-tooth hand piece disposable based on the disposable “fine-tooth delousing comb” of Pearlman. PO Resp. 20 (citing Ex. 2006 ¶ 31). Patent Owner argues that, first, Goates’ and Pearlman’s methods for treating lice infestations are completely different: Goates’ methods are designed to kill lice and eggs using hot air, whereas Pearlman explains that although “it is desirable to kill at least some of the lice prior to removing the dried agent,” “killing the lice is not necessary for success of the methods described.” *Id.* (citing Ex. 2006 ¶ 31; Ex. 1007 col. 8, ll. 7–10). Therefore, argues Patent Owner, a skilled artisan, looking to improve Goates’ methods, which employ heated air to kill lice and eggs, would not look to Pearlman’s method, which use a pediculostatic agent to immobilize lice for removal. *Id.* (citing Ex. 2006 ¶ 31).

Second, Patent Owner asserts that Pearlman teaches away from the methods taught by Goates. PO Resp. 20 (citing Ex. 2006 ¶ 32). Patent Owner contends that Pearlman teaches using hot air via a blow- or hair-dryer to dry the pediculostatic agent, but explains that hot air alone is ineffective for treating a lice infestation “[s]ince lice will typically crawl away from heat applied by a blow-dryer or other hair implement.” *Id.* at 20–21 (citing Ex. 1007 col. 6, ll. 44–49; Ex. 2006 ¶ 32). Therefore, contends Patent Owner, a person of skill in the art, seeking to improve Goates’ method of using hot air to kill lice would not look to a reference such as Pearlman that dismisses the effectiveness of hot air alone to treat a lice infestation. *Id.* at 21 (citing Ex. 2006 ¶ 32; also citing *W.L. Gore & Assocs., Inc. v. Garlock, Inc.*, 721 F.2d 1540, 1550 (Fed. Cir. 1983) (holding that it is error to “disregard[] disclosures in the references that diverge from and teach away from the invention at hand”)).

Third, argues Patent Owner, Goates’ hand piece and Pearlman’s louse comb do not have similar structures. PO Resp. 21 (citing Ex. 2006 ¶ 33). According to Patent Owner, Goates’ hand piece has very wide, coarse teeth, whereas, Pearlman discloses the use of a fine-tooth louse comb, such as the one disclosed in Zito. *Id.* (citing Ex. 1005, 13, Ex. 1007 col. 17, ll. 17, ll. 12–16 (citing Ex. 1009)). Patent Owner rejects Petitioner’s argument that a louse comb, such as the one disclosed in Zito, “could be adapted to connect to the hose of the LouseBuster” and “could be made cylindrical instead and sized accordingly (and made hollow) to fit the LouseBuster hose.” *Id.* at 22 (quoting Pet. 30–31). However, argues Patent Owner, a person of ordinary skill in the art would not have been motivated to combine the Zito comb with the LouseBuster hand piece because Zito’s comb would render the

LouseBuster inoperable for treating a patient's head. *Id.* (citing Ex. 2006 ¶ 33). Patent Owner contends that a person of ordinary skill in the art would have understood that neither a flat fine-tooth comb nor a cylindrical fine-tooth comb would work with a device designed to blow air on a patient's head. *Id.* Patent Owner asserts that a fine tooth comb, such as the one disclosed in Zito, could not be easily pulled through hair, particularly if made cylindrical, as suggested by Petitioner's expert, Dr. Potter, and while air is blowing on the hair in the opposite direction. *Id.* at 22–23 (citing Ex. 2006 ¶ 33).

Finally, argues Patent Owner, the coarse-tooth hand piece of Goates has a much different function and operates much differently than the fine-tooth delousing comb of Pearlman. PO Resp. 23 (citing Ex. 2006 ¶ 34). Patent Owner argues that Goates teaches that its hand piece has coarse teeth that “were designed to lift the hair slightly, exposing the roots, where lice and eggs congregate.” *Id.* (quoting Ex. 1005, 16). Patent Owner argues that, given that the hand piece of Goates has coarse teeth and is being exposed directly to hot air at a high flow rate, the hand piece is unlikely to remove any dead lice or nits, let alone viable ones. *Id.* (citing Ex. 2006 ¶ 34). Thus, even though Goates “envision[s] the LouseBuster to be an institutionally based machine operated by health care providers, [and] school administrators,” Goates does not suggest that its hand piece be made disposable. *Id.* (citing Ex. 1005, 16; Ex. 2006 ¶ 34).

In contrast, argues Patent Owner, the fine-tooth louse comb in Pearlman is designed “for removing lice and nits.” PO Resp. 24 (quoting Ex. 1007 col. 4, ll. 27–28; and citing Ex. 2006 ¶ 34). Patent Owner contends that, because Pearlman's methods are not designed to necessarily kill lice, it

makes sense that its fine-tooth comb is preferably designed to be “disposable after a single use, in order to prevent contamination.” *Id.* (citing Ex. 1007 col. 17, ll. 10–12; Ex. 2006 ¶ 34). Patent Owner further contends that Pearlman explains that “the efficiency of nit and/or lice removal can be optionally increased by adding a combing step between applying and drying the pediculostatic agent.” *Id.* (quoting Ex. 1007 col. 3, ll. 4–7). Patent Owner asserts that, because the pediculostatic agent has not yet been dried in this method, the comb used in this method will likely come in contact with viable lice and nits, and it is therefore preferable that the comb is disposable. *Id.* (citing Ex. 2006 ¶ 34). Patent Owner points out that Pearlman also teaches an embodiment in which the teeth-portion of the comb is disposable, but the base of the handle is not disposable. *Id.* (citing Ex. 1007 col. 17, ll. 13–14). Therefore, Patent Owner argues, because Goates’ hand piece is not used to remove viable lice and nits—or even dead ones—a skilled artisan would not be motivated by the disposability of Pearlman’s comb. *Id.* (citing Ex. 2006 ¶ 34).

Petitioner responds that Patent Owner’s argument is irrelevant, because the combination satisfies the claim language whether one adds Pearlman to Goates before or after adding Westerveld. Pet. Reply 3. Petitioner relies on Westerveld for its applicator fingers having openings for forcing hot air out laterally and on Pearlman for the notion of making the applicator at least partially disposable. *Id.* (citing Pet. 25–42). Petitioner contends that adding Westerveld’s ported fingers to Goates’ applicator, and then making the resulting applicator at least partially disposable, meets the claim language, as equally does making Goates’ applicator disposable before adding the ported fingers. *Id.* Therefore, argues Petitioner, it makes no

difference whether one views the applicator of the proposed combination as the Goates applicator or the Goates-Westerveld applicator. *Id.*

With respect to motivation to combine the references, Petitioner relies on Pearlman for its disclosure that cross-contamination was a known problem when treating human scalp and hair for lice, and making at least a portion of the louse comb disposable helps rectify the issue. Pet. Reply 5 (citing Ex. 1007 col. 15, ll. 50–58, col. 17, ll. 11–12). Petitioner maintains that Pearlman’s teachings with respect to disposability of the comb portion would have commended themselves to an inventor’s attention in considering the problem of promoting hygiene and preventing cross-contamination when treating lice infestations on multiple patients using a single device. *Id.* (citing Ex. 1003 ¶ 67). Petitioner therefore argues that, because cross-contamination was well known in the art, a skilled artisan would have looked to devices and applicators used on the human head for teachings on preventing cross-contamination, particularly when such a device is to be used on multiple subjects. *Id.* (citing Ex. 1007 col. 17, ll. 9–12; Ex. 1005, 12).

Petitioner further disputes Patent Owner’s contention that Pearlman teaches away from Goates by stating that hot air alone is ineffective for treating a lice infestation “[s]ince lice will typically crawl away from heat applied by a blow-dryer or other hair implement.” Pet. Reply 7 (quoting PO Resp. 20–21; citing Ex. 1007 col. 6, ll. 47–49). Petitioner argues that Patent Owner incorrectly relies on aspects of the references (the type of agent used to kill/disable lice) that are irrelevant to the combination (disposability of the applicator). *Id.* at 8. Petitioner also notes that Goates agrees with Pearlman, because it expressly teaches that a blow dryer, alone, is relatively ineffective

in treating lice infestations. *Id.* (citing Ex. 1005, 13–16, Table 1). Petitioner argues that a person of ordinary skill in the art would understand that Pearlman’s teaching regarding disposability have value independent from its method for eradicating lice, because it teaches that it was well known to make at least a portion of a lice-treatment device disposable to prevent cross-contamination. *Id.* at 9 (citing Ex. 1003 ¶ 66).

Petitioner also disputes Patent Owner’s contention that, because the comb of Pearlman has fine teeth designed to remove lice and nits, whereas Goates discloses a coarse comb designed to lift hair, the two references would not be obvious to combine. Pet. Reply 9. Petitioner argues Pearlman need not be bodily incorporable into Goates for the combination to show that the challenged claims are obvious. *Id.* at 10 (citing *In re Keller*, 642 F.2d 413, 425 (C.C.P.A. 1981)). Petitioner contends that the proposed combination of Pearlman and Goates involves no more than making the louse comb attachment of Goates disposable like the louse comb attachment in Pearlman. *Id.* (citing Pet. 33; Ex. 1003 ¶ 66).

We do not find Patent Owner’s arguments persuasive. Goates’ LouseBuster has a comb attachment with coarse, solid teeth, pulled through the hair like a garden rake while hot air blows in the opposite direction. Ex. 1005, 12. Westerveld teaches a hair styling brush for use in combination with a hot air source, an elongate hollow body having a row of hollow teeth, which extend substantially perpendicularly to the longitudinal axis of the hollow body. Ex. 1006 col. 1, ll. 3–7. Each of the hollow teeth, have outlet apertures through which, during operation, an air stream flows in a direction that is substantially perpendicular to the longitudinal axis of the hollow body. *Id.* at ll. 7–12. Pearlman teaches a comb that is used for removing

head lice from hair in which the toothed portion of the comb is disposable.
Ex. 1007 col. 17, ll. 11–15.

Patent Owner first argues that Petitioner has failed to show that the combined Goates-Westerveld applicator is similar in structure to Pearlman's louse comb, nor has Petitioner shown that making an air applicator like the combined Goates-Westerveld applicator disposable was already known in the art. *See* PO Resp. 17. However, Petitioner relies upon the teaching of Pearlman that its comb portion is disposable to prevent cross-contamination. We find this teaching to be equally applicable to the comb portion taught by the LouseBuster of Goates, with or without the modification of the comb teeth as taught by the combination of Goates and Westerveld. Patent Owner argues that, because the comb of Goates-Westerveld is not used to remove live lice, there is no likelihood of cross-contamination and, therefore, no need to make the comb piece disposable. However, we find Petitioner's argument upon this point to be rational and persuasive, *viz.*, that a person of ordinary skill would understand anytime a comb device is used in a person's lice-infested hair, there exists a concurrent risk of lice being transferred, first to that device and then to another patient. *See* Pet. Reply 4; Ex. 1003 ¶¶ 62–63.

Nor are we persuaded by Patent Owner's argument that, because Goates and Pearlman teach different methods of treating hair lice infestations (application of hot air *versus* a pediculostatic agent), a person of ordinary skill would not have been motivated to combine the references. *See* PO Resp. 25–26. Petitioner relies upon Pearlman (*via* Zito) as teaching that the toothed portion of the comb is disposable:

The comb is preferably constructed of rigid material such as metal or plastic. In a preferred embodiment, the comb is inexpensive and designed to *be disposable after a single use, in order to prevent contamination*. In another embodiment the comb has a removable, and preferably disposable, piece having a plurality of teeth which attaches to a handle portion such as described in [Zito], incorporated herein by reference in its entirety.

Ex. 1007 col. 17, ll. 8–15 (emphasis added). Goates and/or Goates-Westerveld teach the use of a comb, combined with hot air. *See, e.g.*, Ex. 1005, 13, Figs 1A–1B; Ex. 1006, Figs. 1–5.

Goates further teaches:

We envision the LouseBuster to be an institutionally based machine operated by health care providers, school administrators, or trained parents and other volunteers. Although effective use of the LouseBuster is not difficult, it does require a little practice to perfect. The advantage of an institutionally based device, particularly for schools, is that it could be used to simultaneously treat all children with head lice, minimizing the problem of reinfestation.

Ex. 1005, 16.

It is evident from this passage that Goates envisions the use of its delousing device in multiple sessions with multiple individuals and, potentially, in an institutional setting. We are persuaded that, in using a device such as Goates' LouseBuster in an institutional setting where successive patients are treated for removal of a highly communicable ectoparasite, it would have been obvious, if not commonsensical, to a skilled artisan to have made the comb portion of the device, which comes into contact with the patients' hair, disposable, as taught by Pearlman. *See* Ex. 1003 ¶ 63. Furthermore, a skilled artisan would have been motivated to

follow the teachings of Pearlman, in this respect, to avoid communication of lice from one patient to the next, when used as taught by Goates. *See id.*

¶¶ 59–63.

We are similarly not persuaded by Patent Owner’s argument that Goates’ hand piece and Pearlman’s fine-toothed louse comb do not have similar structures, or that combining the devices would render the Goates’ LouseBuster inoperable, or that the references teach away from each other. *See* PO Resp. 20–21. First:

The test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference; nor is it that the claimed invention must be expressly suggested in any one or all of the references. Rather, the test is what the combined teachings of the references would have suggested to those of ordinary skill in the art.

In re Keller, 642 F.2d 413, 425 (C.C.P.A. 1981). Petitioner is not relying upon Pearlman for any structural or functional characteristic of its fine-toothed comb other than its *disposability*. We have explained why a person of ordinary skill in the art, understanding the combined teachings of Goates, Westerveld, and Pearlman, would have found it desirable for the comb portion of the Goates, or the combined Goates-Westerveld device, to be disposable, so as to prevent communicating the lice from one patient to the next.

For a reference to teach away, it must actually criticize, discredit, or otherwise discourage the claimed solution. *See In re Fulton*, 391 F.3d 1195, 1201 (Fed. Cir. 2004). Patent Owner points to no teaching of Pearlman or Goates that would discourage a combination of the references as argued by Petitioner.

For the same reasons, we are not persuaded by Patent Owner's argument that a person of ordinary skill in the art would not have been motivated to combine the teachings of the combined references, because "the coarse-tooth hand piece of Goates has a much different function and operates much differently than the fine-tooth delousing comb of Pearlman." *See* PO Resp. 23. Again, Petitioner is not proposing to physically combine the combs of Goates and Pearlman or that the functionality of the combs in removing/killing lice is different. Rather, Petitioner relies upon Pearlman for teaching disposability of the comb portion of the device to prevent communicating a louse infestation from one patient to another.

Consequently, we are persuaded that a person of ordinary skill in the art would have been motivated to combine the teachings of the references to make the comb portion of the Goates device or Goates/Westerveld combination disposable. Based on this same reasoning, we also find that Petitioner has pointed to sufficient evidence and reasoning that a person of ordinary skill in the art would have been motivated to use the modified device in the manner claimed, i.e., by removing at least a portion of the applicator from the heated airflow source, disposing of that portion, and connecting a second disposable applicator to the heated airflow source to deliver airflow to a treatment site on the animal. Pet. 45–46 (citing Ex. 1003 ¶ 81).

b. Objective indicia of nonobviousness

In its response, Patent Owner further argues that objective indicia, especially commercial success, prove that the subject claims are not obvious. *See* PO Resp. 35–46. Later in this proceeding, however, Patent Owner

expressly abandoned these arguments with respect to Grounds 1–3, as well as proposed New Grounds 4–7, submitted in response to Patent Owner’s Revised Contingent Motion to Amend. The following colloquy, from the transcript of the oral argument, makes clear Patent Owner’s intention in this respect:

JUDGE NEW: Thank you. I’d just like to circle back to something. You said that in view of *Fox Factory* you were withdrawing your secondary consideration arguments with respect to the ’510 Patent?

MR. SEREBOFF⁹: That’s correct. Yes, Your Honor.

JUDGE NEW: Does that apply to both the original and the amended claims, that is, the original Grounds 1, 2, and 3, as well as your new grounds?

MR. SEREBOFF: Yes, Your Honor.

JUDGE NEW: Okay. Thank you very much.

Tr. 56:22–57:7. In view of Patent Owner’s express abandonment, we do not reach these arguments.

c. Conclusion

For the foregoing reasons, and after having analyzed the entirety of the record and assigning appropriate weight to the cited supporting evidence, we determine that Petitioner has established by a preponderance of the

⁹ Counsel for Patent Owner.

evidence that claim 1 is unpatentable under 35 U.S.C. § 103(a) as being obvious over Goates, Pearlman, and Westerveld.

Patent Owner does not treat Petitioner's challenge of dependent claims 2–4, 7, 8, 10, and 11 separately from its arguments with respect to the challenged independent claim 1. *See* PO Resp. 17.¹⁰ We have reviewed Petitioner's evidence and arguments regarding unpatentability of the challenged dependent claims and find that the record evidence fully supports Petitioner's challenge. Pet. 46–52. Thus, for the reasons discussed above with respect claim 1, and the reasons outlined in Petitioner's Petition, we conclude that Petitioner demonstrates by a preponderance of the evidence that dependent claims 2–4, 7, 8, 10, and 11 are unpatentable over Goates, Pearlman, and Westerveld.

5. Grounds 2 and 3: Patentability of claims 12–15 over Goates, Westerveld, and Hackl (Ground 2), and claims 6 and 16–19 over Goates, Westerveld, Hackl, and Pearlman (Ground 3)

For these grounds, we note that Patent Owner argues only Petitioner's challenge of independent claim 12 and does not treat the challenged dependent claims separately. *See* PO Resp. 25.

To the extent claim 12 contains limitations similar to claim 1, for the reasons discussed above in relation to the first ground, we find that Petitioner points to sufficient disclosure within Goates and Westerveld for

¹⁰ We note here that Patent Owner was cautioned that arguments not made by PO will be deemed waived and, thus, are waived here. *See, e.g.*, Scheduling Order, Paper 10, 4. We similarly conclude that arguments concerning other matters not argued by PO are also waived.

teaching these overlapping limitations. Pet. 53–56. We also find that Petitioner points to sufficient disclosure within Goates to teach the steps of “contacting the scalp of the patient with the applicator at the treatment site” and “contacting the scalp of the patient with the applicator at the treatment site,” as recited in claim 12. Pet. 56–57 (citing Ex. 1005, 12–13, Figs. 1A, 1B; Ex. 1006, col. 1, ll. 18–25, 29–30; Ex. 1003 ¶ 99). We also find that Petitioner provides sufficient evidence and reasoning as to why one having ordinary skill in the art would have been led to modify the device of Goates with the teachings of Westerveld to deliver the hot air via ports on elongated fingers or comb teeth to use this device to eliminate the lice and lice eggs from the treatment site in the manner claimed. Pet. 38–45 (citing Ex. 1003 ¶¶ 71–80). We address the further limitations of claim 12 below.

- a. *“wherein the ports are positioned on the fingers along substantially only one side of the fingers” [12.3]*

Petitioner acknowledges that the combination of Goates and Westerveld does not have ports “positioned on the fingers along substantially only one side of the fingers,” as claimed. Pet. 58. However, Petitioner argues, Hackl remedies this shortcoming of the Goates-Westerveld combination. *Id.* at 59. Furthermore, Petitioner asserts, it would have been obvious to combine Hackl with Goates-Westerveld to arrive at the subject matter of element [12.3]. *Id.* at 61 (citing Ex. 1003 ¶ 107).

Specifically, Petitioner argues that Hackl teaches a hair product dispenser 3 having a base 6 that accommodates a series of prongs (2). Pet. 59 (citing Ex. 1008, Abstr). Petitioner notes that Hackl teaches that

“[t]he base 6 consists of an inner area 5 extending between the prongs,” and the “prongs 2 have openings 8 for dispensing the product.” *Id.* (citing Ex. 1008 ¶ 18). Specifically, argues Petitioner, Figure 1 of Hackl shows that the “[e]ight openings 8 point in the same direction,” and that “[b]ecause all openings are aligned with one another with respect to the inner space, hair lying between two prongs is always wetted with product.” *Id.* (quoting Ex. 1008 ¶¶ 19, 7). Figure 1 of Hackl is again reproduced below:

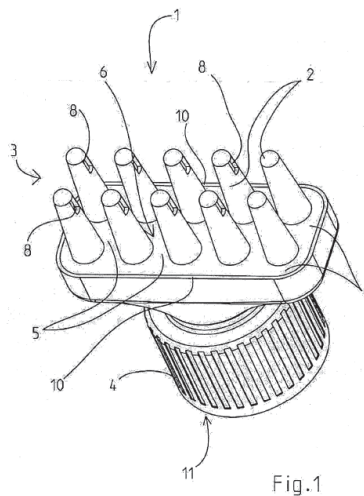


Figure 1 of Hackl depicts perspective view of an embodiment of the suggested device with two rows of prongs, wherein each prong has an opening to dispense a flowable hair conditioning product and no opening is aligned from an inner space towards the outside

Therefore, argues Petitioner, Hackl discloses applicator fingers 2 with openings 8 “positioned on the fingers along substantially only one side of the fingers” so that product “is delivered laterally of the applicator such that the ... treatment site extends from the applicator to only one side of the applicator,” as recited in element [12.3]. *Id.* at 60 (quoting Ex. 1003 ¶ 105).

Patent Owner disputes Petitioner’s interpretation, arguing that Petitioner does not account for *all* of the openings on each of the prongs

(fingers) of Hackl. PO Resp. 27 (citing Ex. 2004 ¶ 33). Patent Owner alleges that Petitioner's quotation of Hackl is misleading, because it excludes the description of all the openings in the Hackl dispenser. *Id.* Patent Owner points to the full quotation from Hackl, which provides that "[e]ight openings 8 point in the same direction; two openings 8 of two prongs 2 arranged on the side walls point in the opposing direction." *Id.* (quoting Ex. 1006 ¶ 19; also citing Ex. 2004 ¶ 33). Patent Owner also points to Figure 1 of Hackl, which shows that eight prongs on the left have openings on the right side of the prongs, and two prongs on the right have opening on the left side of the prongs. *Id.* at 28 (citing Ex. 2004 ¶ 34). According to Patent Owner, Hackl teaches that:

via each of the prongs **2**, a certain quantity of product is deposited onto a hair strand, if the product dispenser **3** is pulled through the hair strand in order to straighten the hair, e.g. using a straightening agent. ***No product is deposited to the outer area 7***, which means there is optimal use of the product.

Id. (quoting Ex. 1006 ¶ 19 (emphasis added)).

Therefore, Patent Owner argues, Hackl does not disclose openings that are positioned along substantially only one side of the prongs. PO Resp. 29 (citing Ex. 2004 ¶ 34). Rather, Patent Owner asserts, Hackl discloses a product dispenser that has openings on the opposite side of the prongs from one another. *Id.* And because Hackl's openings are on opposing sides of its prongs, argues Patent Owner, a skilled artisan would not have understood Hackl as teaching the limitation "wherein the ports are positioned on the fingers along substantially only one side of the fingers," but would rather understand Hackl as teaching an applicator that has prongs/fingers with openings/ports on opposite sides of the prongs/fingers. *Id.* (citing Ex. 1006

¶ 19; Ex. 2004 ¶ 35). Therefore, Patent Owner asserts Hackl in combination with Goates and Westerveld does not teach the disputed limitation. *Id.* (citing Ex. 2004 ¶ 35).

In reply, Petitioner contends that: (1) Patent Owner’s interpretation of the limitation is contrary to the limitation’s claim construction, as ordered by the district court and accepted by Patent Owner (citing PO Resp. 12–13); and (2) Patent Owner’s argument elevates the requirements of obviousness beyond what is prescribed by law. Pet. Reply. 13.

With respect to the first argument, Petitioner contends that, in the related district court litigation, Petitioner argued that this term was indefinite because the terms “substantially” and “only” contradict one another. Pet. Reply 13 (citing Ex. 2002, 27–28). However, Petitioner asserts, the district court ruled that the term was not indefinite and construed the term to have its plain and ordinary meaning, finding that a person of ordinary skill in the art “would read the claim language ‘only’ as merely emphasizing that the positioning of the ports relative to the fingers and the direction of the treatment site is to be on a single side of the application, with some flexibility in accordance with the word ‘substantially.’” *Id.* (quoting Ex. 2002, 27–28). Petitioner also points to the districts court’s finding that:

[A skilled artisan] would be able with reasonable certainty to interpret the “substantially only” claim language to mean that the ports are positioned largely but not entirely on one side of the applicator’s fingers and that the treatment site is similarly largely but not entirely on one side of the applicator.

Id. (citing Ex. 2002, 27).

However, Petitioner argues, Patent Owner presently interprets this claim language as requiring ports positioned exclusively on one side of the

applicator when discussing Hackl, contrary to the district court's claim construction. Pet. Reply 13–14 (citing PO Resp. 27–28).

With respect to its second argument, Petitioner argues that, even if Hackl did not embody a device that expressly satisfied this limitation, a person of ordinary skill in the art would have found this limitation obvious based on the teachings of Hackl. Pet. Reply 14 (citing Inst. Dec., 37–38). According to Petitioner, Hackl teaches positioning most of its openings on only one side of the fingers of its hair product applicator to provide more control over application of the product. *Id.* (citing Ex. 1003 ¶ 1008). Petitioner contends that a person of skill in the art would recognize that this same principle could be used to improve Westerveld's hair styling brush in the same way—to provide more control over the application of heated air. *Id.* (citing Pet. 62–63; Ex. 1003 ¶ 1008).

Petitioner further argues that a skilled artisan would have been motivated to make this modification so the combined device would not blow air outside the intended target area upon reaching the edge of the target area, and would have recognized that directing heated air in two directions simultaneously might be more likely to cause lice to escape, compared to an applicator focused on emitting heated air in one direction. Pet. Reply 14 (citing Pet. 62–63; Ex. 1003 ¶ 1008).

Petitioner concludes that Patent Owner allegedly imposes a requirement that the claimed invention must be expressly suggested in any one or all of the references, which conflicts with the case law in *Keller*. *Id.* at 14–15 (citing *Keller*, 642 F.2d at 425).

Patent Owner replies that the claim language tolerates some variation in the placement of the ports on the fingers, as the district court appreciated,

but the claim language does not allow for ports positioned on opposite sides. Sur-Reply 2. Patent Owner argues that Hackl has openings on opposite sides of the prongs, and that this is not what is claimed. *Id.*

According to Patent Owner, Hackl's oppositely disposed openings do not provide the advantages of having fingers and ports that allow the airflow to be "delivered laterally of the applicator (when viewed from overhead the applicator on the treatment site) such that the treatment site extends from the applicator to only one side of the applicator." Sur-Reply 2. In this manner, Patent Owner asserts, a user may be able to more easily visualize a treatment area and move the applicator through a desired treatment pattern on the skin of an animal, such as the scalp of a human patient, to complete a full treatment of the area infested with lice or other ectoparasites. *Id.* (citing Ex. 1001 col. 2, ll. 13–21).

Patent Owner notes that Hackl uses a principle of operation that requires some of the ports to be facing the opposite direction so that "hair can be wetted with a flowable product if the device is pulled through the hair like a comb ... Because all openings are aligned with one another with respect to the inner space, hair lying between two prongs is always wetted with product." Sur-Reply 2 (quoting Ex. 1008 ¶ 7). According to Patent Owner, a person of ordinary skill in the art would not change this design because it would ruin the operation of Hackl, and force product in directions other than to the "inner space, hair lying between two prongs." *Id.* at 2–3 (citing *In re Ratti*, 270 F.2d 810, 813 (C.C.P.A. 1959)).

We find the Petitioner's argument to be more persuasive. Hackl teaches, with respect to its Figure 1:

There are two rows of prongs **2**, each prong **2** being rounded off like a knob in the area facing the head. Each opening **8** is the same height as the other openings **8**. Eight openings **8** point in the same direction; two openings **8** of two prongs **2** arranged on the side walls point in the opposing direction. Thus, via each of the prongs **2**, a certain quantity of product is deposited onto a hair strand, if the product dispenser **3** is pulled through the hair strand in order to straighten the hair, e.g.[,] using a straightening agent.

Ex. 1008 ¶ 19. Hackl thus teaches that each of the fingers/prongs on its applicator head has a single port, with 8 of 10 fingers/prongs (i.e., a subset) in this embodiment having ports pointing in the same direction, i.e., “the ports are positioned on the fingers along substantially only one side of the fingers.”

We acknowledge Patent Owner’s argument that the claim language tolerates some variation in the placement of the ports on the fingers, as the district court appreciated, but the claim language does not allow for ports positioned on opposite sides. *See* Sur-Reply 2. We are not persuaded by this argument, because the language of the claims requires only that “the ports are positioned on the fingers along substantially only one side of the fingers.” We agree with the district court’s conclusion that a person of ordinary skill in the art “would read the claim language ‘only’ as merely emphasizing that the positioning of the ports relative to the fingers and the direction of the treatment site is to be on a single side of the applicator, with some flexibility in accordance with the word ‘substantially.’” Ex. 2002, 27–28.

In the case of Hackl, the position of the ports relative to the fingers is on a single side of the fingers in 80% of the fingers and are positioned in the opposite direction in 20% of the fingers. We find that having the ports on

the same side of 80% of the fingers satisfies the claim term “substantially.” Patent Owner’s argument that the claim language somehow excludes a minority of the ports being positioned in the opposite direction from the significant majority of ports is without evidentiary support. The claim term “substantially,” as used in the limitation expressly allows for the fact that some of the ports will not be facing in the same direction as the majority, but places no specific qualifier on the direction in which those minority of ports will face.

Patent Owner also argues that a person of ordinary skill in the art would not change this design because it would ruin the operation of Hackl, and force product in directions other than to the “inner space, hair lying between two prongs.” Sur-Reply 2–3 (citing *Ratti*, 270 F.2d at 813). We do not find this argument persuasive.

The predecessor to our reviewing court held in *Ratti* that when a “combination of references would require a substantial reconstruction and redesign of the elements shown in [one reference] as well as a change in the basic principles under which [that reference] was designed to operate,” then the combination of references was improper. *Ratti*, 270 F.2d at 813. We are not persuaded that the invention taught by Hackl, in which the substantial majority of the delivery ports on the fingers face in the same direction is such that a person of ordinary skill would find that it would require a “substantial reconstruction and redesign” of the elements of Hackl to combine it with the teachings of Goates and Westerveld and arrive at the claimed invention. Hackl is expressly designed to deliver its products in a directional manner through the ports located on the fingers. *See* Ex. 1008 ¶ 6. We conclude that it would be within the ordinary skill of an artisan in

the field to alter the positioning of the nozzles on the fingers to optimize the flow direction to achieve a desired end. *See In re Aller*, 220 F.2d 454, 456 (C.C.P.A. 1955) (holding that “where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation”); *see also KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 420 (2007) (“A person of ordinary skill is also a person of ordinary creativity, not an automaton”).

More importantly, the test for obviousness:

is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference; nor is it that the claimed invention must be expressly suggested in any one or all of the references. Rather, the test is what the combined teachings of the references would have suggested to those of ordinary skill in the art.

Keller, 642 F.2d at 425. We are not persuaded by Patent Owner that the embodiment of Hackl depicted in its Figure 1 must therefore teach precisely the disputed limitation of claim 12; rather, it is what the combined teachings of the cited prior art references would have suggested to a skilled artisan.

Hackl teaches an array of finger-like processes with ports opening at their tips, and that the majority of those ports face a single lateral direction. We conclude that a person of ordinary skill in the art would have recognized that Hackl teaches that the direction of flow from the ports could thus be directionally controlled, and that it would have been a matter well within the skill of the art to modify the invention of Hackl to achieve the limitation recited in claim 12. Moreover, we conclude that a person of ordinary skill in the art would have been motivated to do so, so as to optimize the flow of hot air in a single direction.

We therefore find that Hackl teaches the functional limitation of claim 12 reciting: “a subset of the plurality of fingers comprising ports, wherein the ports are positioned on the fingers along substantially only one side of the fingers.”

b. *“wherein the airflow is delivered laterally of the applicator such that the treatment site extends from the applicator to only one side of the applicator” [12.7]*

and

“wherein the airflow is delivered laterally of the applicator such that the second treatment site extends from the applicator to only one side of the applicator” [12.10]

Patent Owner argues that, because Hackl does not disclose an applicator for delivering product “laterally of the applicator such that the treatment site extends from the applicator to only one side of the applicator,” Petitioner has failed to establish obviousness of challenged claim 12 and its dependents. PO Resp. 31–32 (citing Ex. 2004 ¶¶ 37–44). Patent Owner points to Hackl’s teaching that: “No product is deposited to the outer area 7, which means there is optimal use of the product,” as evidence Hackl does not teach the limitation of claim 12 reciting “laterally of the applicator such that the treatment site extends from the applicator to only one side of the applicator.” *Id.* at 33 (quoting Ex. 1008 ¶ 19 and citing Ex. 2004 ¶¶ 41–42). Rather, argues Patent Owner, Hackl designed its prongs (fingers) to ensure that product does not extend from its dispenser at all. *Id.* Therefore, Patent Owner argues, a person of ordinary skill in the art would not have understood Hackl as teaching an applicator for delivering product “laterally

of the applicator such that the treatment site extends from the applicator to only one side of the applicator.” *Id.* (citing Ex. 2004 ¶ 42).

Patent Owner argues that Hackl’s design would not work to deliver airflow “laterally of the applicator such that the treatment site extends from the applicator to only one side of the applicator.” PO Resp. 33–34 (citing Ex. 2004 ¶ 43). Patent Owner asserts that, if airflow is put through Hackl’s applicator, the air would exit Hackl’s prongs in opposing directions, and result in airflow extending to more than one side of the applicator. *Id.*

Finally, Patent Owner contends that neither Goates nor Westerveld cure the alleged deficiencies of Hackl. PO Resp. 34.

Petitioner replies that Patent Owner, in arguing construction of the limitations before the district court, asserted that “the plain and ordinary meaning of the phrase ‘delivered laterally of the applicator’ does not restrict the airflow to ‘only one side of the applicator.’” Reply 15 (quoting Ex. 1013). However, Petitioner asserts, Patent Owner now argues this language as requiring that airflow be restricted to only on side of the applicator when discussing Hackl. *Id.* at 15–16.

Petitioner argues further that Patent Owner’s argument also requires that Hackl embodies the port configuration recited in claim 12 in order to render the claim obvious. Reply 16. According to Petitioner, this creates a burden beyond the established test of obviousness, which is determined by what the combined teachings of the references would have suggested to one of ordinary skill in the art. *Id.* (citing *Keller*, 642 F.2d at 425). Petitioner asserts that it is therefore not required that the claimed invention be expressly disclosed in any one or all of the references. *Id.*

Petitioner contends that Hackl teaches that its port arrangement prevents the device from depositing product outside the intended treatment area. Reply 16 (citing Ex. 1003 ¶ 106). Petitioner argues that a skilled artisan would have found it obvious to use the teaching of Hackl, rather than its precise embodiment to modify the hand piece of the Goates-Westerveld combination. *Id.* (citing Ex. 1003 ¶ 107). Petitioner asserts that a person of ordinary skill in the art would have recognized that, with openings on two lateral sides of the fingers in Westerveld, the combined device would blow air outside of the intended target area, and that by adopting Hackl's teachings, and accordingly modifying the direction of the ports, the Goates-Westerveld hand piece would result in greater control and less patient discomfort. *Id.*

We agree with Petitioner, for much of the same reasons we have explained *supra*, that a person of ordinary skill in the art would have understood that Hackl teaches that the flow of product from the ports in the fingers could be controlled by the directional position of the ports at the tips of the fingers. *See* Ex. 1008 ¶ 6. Understanding this teaching, we conclude that it would have been well within the skill of those with knowledge of the art to modify the teachings of Hackl to optimize the flow of hot air from the ports to achieve a desired direction of flow. It is not necessary to a conclusion of obviousness that a skilled artisan use the precise embodiment of the device taught by Hackl or another reference. It is, rather, what the combined teachings of the references would have suggested to those of skill in the art. *See Keller*, 642 F.2d at 425. Hackl's teaching that the directional flow of product from the ports can be controlled by the directional facing of

the ports, would directly suggest to a person of skill that the facing of the ports on the fingers could be modified to reach a desired direction of flow.

We also note that, although Patent Owner argues that the configuration of the ports in the embodiment of Hackl depicted in its Figure 1 would prevent airflow from being “delivered laterally of the applicator such that the treatment site extends from the applicator to only one side of the applicator,” Patent Owner offers no physical evidence of record that such is actually the case. As such, Patent Owner’s arguments in this respect, unsupported by evidence of record, constitute attorney argument, to which we accord little probative weight. *See Icon Health and Fitness, Inc. v. Strava, Inc.*, 849 F.3d 1034, 1043 (Fed. Cir. 2017).

c. Conclusion

For the foregoing reasons, and after having analyzed the entirety of the record and assigning appropriate weight to the cited supporting evidence, we determine that Petitioner has established by a preponderance of the evidence that claim 12 is unpatentable under 35 U.S.C. § 103(a) as being obvious over Goates, Westerveld, and Hackl (Ground 2).

Patent Owner does not treat Petitioner’s challenges of dependent claims 13–15 (Ground 2) and claims 6 and 16–19 (Ground 3) separately from its arguments with respect to the challenged independent claim 12. *See* PO Resp. 25. We have reviewed Petitioner’s evidence and arguments regarding unpatentability of the challenged dependent claims and find that the record evidence fully supports Petitioner’s challenges. Pet. 64–67. Thus, for the reasons discussed above with respect claim 12, and the reasons outlined in Petitioner’s Petition, we conclude that Petitioner demonstrates by

a preponderance of the evidence that dependent claims 13–15 are unpatentable over Goates, Westerveld, and Hackl (Ground 2), and that claims 6 and 16–19 are unpatentable under 35 U.S.C. § 103(a) as being obvious over Goates, Westerveld, Hackl, and Pearlman (Ground 3).

III. PATENT OWNER’S CONTINGENT MOTION TO AMEND

A. Introduction

Contingent on the determination that claims 1–4, 6–8, and 10–19 are unpatentable, Patent Owner requests that we replace some of these claims with proposed corresponding substitute claims 21–35, and that we additionally cancel original claims 5, 6, 8, 9, and 20.¹¹ *See* Rev. Mot.

Amend 1–2. As discussed *supra* in Section II, we determine that Petitioner has demonstrated by a preponderance of the evidence that claims 1–4, 6–8, and 10–19 are unpatentable. We therefore consider Patent Owner’s Revised Motion to Amend.

¹¹ Patent Owner seeks cancellation of claims 5, 6, 8, 9, and 20 with no corresponding proposed substitute claims. Rev. Mot. Amend 1 (“Five claims are canceled”), 15–16 (Claims Appendix). 35 U.S.C. § 316(d)(1)(A), however, contemplates only cancellation of challenged claims. *See also* 37 C.F.R. 42.121(a)(3) (“A motion to amend may cancel a challenged claim . . .”). These claims are either unchallenged claims or claims that have already been found unpatentable as discussed above. Thus, we do not consider Patent Owner’s request for cancellation.

B. Pilot Program Participation

A pilot program for motion to amend practice and procedures became available to all proceedings instituted on or after March 15, 2019. *See Notice Regarding a New Pilot Program Concerning Motion to Amend Practice and Procedures in Trial Proceedings Under the America Invents Act Before the Patent Trial and Appeal Board*, 81 FED. REG. 9497 (March 15, 2019) (the “Pilot Program”). Pursuant to the Pilot Program, a patent owner may request, in its motion to amend, that the Board issue preliminary guidance after the petitioner files its opposition to the motion to amend. *See id.* at 9499, 9500. Preliminary guidance on a motion to amend is not binding on the Board. *See id.* at 9500. After receiving preliminary guidance from the Board, a patent owner may elect to file a revised motion to amend, file a reply to petitioner’s opposition and/or the preliminary guidance, or take no action. *See id.*

C. Principles of Law

In an *inter partes* review, amended claims are not added to a patent as a matter of right, but rather must be proposed as a part of a motion to amend. 35 U.S.C. § 316(d). “Before considering the patentability of any substitute claims, . . . the Board first must determine whether the motion to amend meets the statutory and regulatory requirements set forth in 35 U.S.C. § 316(d) and 37 C.F.R. § 42.121.” *Lectrosonics, Inc. v. Zaxcom, Inc.*, IPR2018-01129, Paper 15 at 4 (PTAB Feb. 25, 2019) (precedential). Accordingly, we must consider whether: (1) the amendment proposes a reasonable number of substitute claims; (2) the proposed claims are supported in the original disclosure (and any earlier filed disclosure for

which the benefit of filing date is sought); (3) the amendment responds to a ground of unpatentability involved in the trial; and (4) the amendment does not seek to enlarge the scope of the claims of the patent or introduce new subject matter. *See* 35 U.S.C. § 316(d); 37 C.F.R. § 42.121.

The Board must assess the patentability of proposed substitute claims “without placing the burden of persuasion on the patent owner.” *Aqua Prods., Inc. v. Matal*, 872 F.3d 1290, 1328 (Fed. Cir. 2017) (en banc); *see also Lectrosonics, Inc. v. Zaxcom, Inc.*, IPR2018-01129, Paper 15 at 3–4 (PTAB Feb. 25, 2019) (precedential). Subsequent to the issuance of *Aqua Products*, the Federal Circuit issued a decision in *Bosch Automotive Service Solutions, LLC v. Matal*, 878 F.3d 1027 (Fed. Cir. 2017) (“*Bosch*”), as well as a follow-up Order amending that decision on rehearing. *See Bosch Auto. Serv. Sols., LLC v. Iancu*, Order on Petition for Panel Rehearing, No. 2015-1928 (Fed. Cir. 2018).

In accordance with *Aqua Products*, *Bosch*, and *Lectrosonics*, Patent Owner does not bear the burden of persuasion to demonstrate the patentability of the substitute claims presented in the motion to amend. Rather, ordinarily, “the petitioner bears the burden of proving that the proposed amended claims are unpatentable by a preponderance of the evidence.” *Bosch*, 878 F.3d at 1040 (as amended on rehearing); *see Lectrosonics*, Paper 15 at 3–4. In determining whether a petitioner has proven unpatentability of the substitute claims, the Board focuses on “arguments and theories raised by the petitioner in its petition or opposition to the motion to amend.” *Nike, Inc. v. Adidas AG*, 955 F.3d 45, 51 (Fed. Cir. 2020).

D. Analysis

We consider Patent Owner's Revised Motion to Amend and Petitioner's Opposition, along with the subsequently filed Reply and Sur-reply. We begin our analysis by addressing the statutory and regulatory requirements for a motion to amend, followed by addressing the Petitioner's assertions of unpatentability of proposed substitute claims 21–35.

1. Patent Owner's Substitute Claims 21–35

Patent Owner proposes changes to claims 1 and 12 in substitute independent claims 21 (corresponding to claim 1) and 28 (corresponding to claim 12). Rev. Mot. Amend. 1–8. Proposed substitute claims 21 and 28 are reproduced below. New limitations are italicized.

21. A method for treating an animal having a lice infestation to substantially eliminate both lice and lice eggs from the animal, the method comprising: [21.0]

obtaining an applicator, wherein at least a portion of the applicator is disposable [21.1], wherein the applicator comprises a plurality of elongated fingers [21.2], and wherein at least a subset of the plurality of elongated fingers comprise ports for delivering airflow, *wherein each of the ports open toward substantially the same direction such that the applicator delivers substantially all of the airflow to a single side of the applicator*, [21.3] and wherein the applicator is configured for delivering heated airflow to a *first* treatment site on the animal [21.4];

connecting the applicator to a heated airflow source [21.5];

delivering a heated airflow through the applicator to the *first* treatment site *of from about 54°C to about 65°C for at least thirty seconds* to substantially eliminate the lice and lice eggs from the treatment site [21.6];

moving the applicator to a second treatment site [21.7];

delivering a heated airflow through the applicator to the second treatment site *of from about 54° C to about 65° C for at least thirty seconds* to substantially eliminate the lice and lice eggs from the second treatment site [21.8];

repeating the delivering and moving steps *to additional treatment sites* until substantially all lice and lice eggs have been eliminated [21.9];

removing at least a portion of the applicator from the heated airflow source [21.10];

disposing of at least a portion of the applicator [21.11]; and

connecting a second applicator to the heated airflow source, wherein at least a portion of the second applicator is disposable, and wherein the second applicator is configured for delivering airflow to a treatment site on the animal [21.12].

Rev. Mot. Amend. 3–5.

Proposed substitute claim 28 recites:

28. A method for treating a human patient having a lice infestation to substantially eliminate both lice and lice eggs from the patient, the method comprising [28.0]:

obtaining an applicator comprising a plurality of fingers [28.1], at least a subset of the plurality of fingers comprising ports, wherein the ports are positioned on the fingers along substantially only one side of the fingers, *wherein each of the ports open toward substantially the same direction such that the applicator delivers substantially all of the airflow to a single side of the applicator*, [28.2] and wherein the ports are configured for delivering airflow to a *first* treatment site on the scalp of the patient [28.3];

connecting the applicator to a blower [28.4];

contacting the scalp of the patient with the applicator at the first treatment site [28.5];

delivering a heated airflow through the ports to the first treatment site of *from about 54° C to about 65° C for at least thirty seconds* to substantially eliminate the lice and lice eggs from the treatment site [28.6], wherein the airflow is delivered laterally of the applicator such that the treatment site extends from the applicator to only one side of the applicator [28.7];

moving the applicator to a second treatment site [28.8];

contacting the scalp of the patient with the applicator at the second treatment site [28.9];

delivering a heated airflow through the applicator to the second treatment site of *from about 54° C to about 65° C for at least thirty seconds* to substantially eliminate the lice and lice eggs from the second treatment site [28.10], wherein the airflow is delivered substantially laterally of the applicator such that the second treatment site extends from the applicator to substantially only one side of the applicator; *and* [28.11]

repeating the delivering and moving steps *to additional treatment sites* until substantially all lice and lice eggs have been eliminated from the patient. [28.12]

Id. at 5–8.

2. Reasonable Number of Proposed Substitute Claims

We determine that Patent Owner’s proposal to substitute a single claim for each of challenged claims 1–4, 7, and 10–19, with amendments only to independent claims 1 and 12 (*see* Rev. Mot. Amend 1–8), meets the requirement for a reasonable number of substitute claims. *See* 37 C.F.R.

§ 42.121(a)(3) (establishing a rebuttable presumption that only one substitute claim is needed to replace each challenged claim).

3. Enlargement of Claim Scope

Patent Owner asserts that proposed substitute claims 21–35 do not seek to enlarge the scope of the originally issued claims because each substitute claim retains all of the elements of the corresponding original claim and, in the independent claims, limitations have been added that do not broaden the scope. *See* Rev. Mot. Amend 2. Petitioner does not dispute Patent Owner’s contention that the proposed substitute claims do not seek to enlarge the scope of the claims of the ’510 Patent. *See generally* Opp.

Based on the record before us, we agree with Patent Owner, and determine that the proposed substitute claims meet the requirements of 37 C.F.R. § 42.121(a)(2). The claims add additional limitations that significantly narrow the scope of the substitute claims. *See* III.D.1 *supra*.

4. New Matter / 35 U.S.C. § 112 Written Description Support

Patent Owner asserts that the narrowing limitations of the proposed substitute claims are supported by the Specification of the ’510 Patent, either expressly or by reference. *See* Rev. Mot. Amend 2–8.

Petitioner argues that the limitation reciting “delivering heated airflow ... *of from about 54° C to about 65° C for at least thirty seconds*” is not supported by the written description. Opp. 1. Petitioner asserts that Patent Owner cites only to an incorporation by reference of a prior art patent application to support the added limitation. *Id.* at 2 (citing Rev. Mot. Amend 3–4, 6). Specifically, argues Petitioner, the Motion points to language

incorporating U.S. Application Serial No. 2006/0130393 A1 (the “’393 Application”) by reference for written description support. *Id.* Petitioner acknowledges that the ’393 Application, published on June 22, 2006, is prior art to the ’510 Patent under Section 102(b). *Id.* (citing Ex. 1022, 1). Petitioner also acknowledges that none of the inventors of the ’510 Patent were inventors of the ’393 Application. *Id.* at 2–3 (citing Ex. 1022, 1; Ex. 1001, 1).

Petitioner contends that Patent Owner does not provide any explanation as to why a person of ordinary skill in the art would have recognized that the inventor possessed the claimed subject matter—as a whole—based on the incorporation of the ’393 Application. Opp. 3 (citing Rev. Mot. Amend 3–4, 6). According to Petitioner, listing independent citations in the incorporated reference for the temperature range recited in the substitute claims is insufficient because, at best, it shows the inventors’ possession of the original ’510 Patent claims and the “54°C to about 65°C” temperature range separately. *Id.* However, argues Petitioner, the ’393 Application lists a number of very broad, applicable temperature ranges, including from about 50°C to 100°C, from about 54°C to 59°C, and about 59°C. *Id.* (citing Ex. 1022 ¶ 26).

Petitioner asserts that Patent Owner provides no explanation of how the inventors of the ’510 Patent were in possession of the specific “about 54°C to about 65°C” range for use with their device to the exclusion of other temperature ranges shown be effective in the ’393 Application. Opp. 3. Petitioner contends that Patent Owner must show support for the entire claim as a whole, i.e., combining the original ’510 Patent claims with a specific

temperature range disclosed in the '393 Application to the exclusion of other disclosed effective temperature ranges. *Id.*

Patent Owner points to our Preliminary Guidance on this point, which finds that the Specification discloses that “[m]ore information regarding preferred airflow rates and heat ranges can be found in U.S. Patent Application Publication No. 2006/0130393 ... which is hereby incorporated by reference in its entirety.” Opp. Reply 1 (citing Paper 33, 6 (quoting Ex. 1001, col. 2, ll. 56–60)). Therefore, argues Patent Owner, because the Specification expressly directs a skilled artisan to the incorporated reference for the preferred airflow parameters, a person of ordinary skill in the art would have recognized that the inventor possessed the claimed subject matter as a whole. *Id.* at 1–2 (citing Paper 33, 6).

We do not find Petitioner’s arguments persuasive. The Specification of the '510 Patent discloses:

Preferably, the applicator is configured for delivering airflow to a treatment site on the animal. The applicator may be connected to an airflow supply.... Depending upon the design of the applicator, standard hair blowers may be unable to generate a sufficient volume of airflow to perform an effective treatment. As such, “big-volume blowers,” as this term is used herein, refer to blowers capable of delivering between 45 and 200 cfm (cubic feet per minute) of airflow. However, other airflow rates are also contemplated, and the efficacy of particular airflow rates may depend on the design of the applicator.... More information regarding preferred airflow rates and heat ranges can be found in [the '393 Application] titled “Ectoparasite eradication method and device,” which is hereby incorporated by reference in its entirety.

Ex. 1001 col. 2, ll. 41–60. In respect to airflow rates, the '393 Application teaches:

The method may include steps of defining a target area on a human having an ectoparasite infestation, heating a volume of air to a temperature of from about 50° C. to about 100° C. to form heated air, applying the heated air to the target area with an airflow of from about 45 ft³/min to about 365 ft³/min, such that the heated air impinges directly on substantially all ectoparasites located within the target area, and maintaining the heated air at the target area for from about 5 seconds to about 1 hour.

Ex. 1022 ¶ 7. The '393 Application further teaches:

Heating a volume of air to a temperature to form heated air **14** may be accomplished by any means known to one skilled in the art, as long as sufficient heat can be maintained in an airflow of heated air to allow the eradication of head lice. Any temperature of heated air that is effective at eliminating head lice is considered to be within the scope of the present invention. In one embodiment, the temperature of the volume of air is at least 50° C. An upper limit for temperature may be dependent on the heat endurance of the infested animal.... In one embodiment, the temperature of the volume of air can be from about 50° C to about 100° C. In another embodiment, the temperature of the volume of air can be from about 54° C, to about 65° C. In another embodiment, the temperature of the volume of air can be from about 54° to about 59° C. In yet another embodiment, the temperature of the volume of air can be about 59° C.

Id. at ¶ 26. The '393 Application further teaches that:

Heating a volume of air to a temperature of from about 50° C, to about 100° C. to form heated air **24** may be accomplished by any means known to one skilled in the art, as long as sufficient heat can be maintained in an airflow of heated air to allow the eradication of head lice.... In one embodiment, the temperature of the volume of air can be from about 54° C. to about 65° C. In another embodiment, the temperature of the volume of air can be from about 54° C. to about 59° C. In yet another embodiment, the temperature of the volume of air can be about 59° C.

Id. at ¶ 36.

“Incorporation by reference provides a method for integrating material from various documents into a host document ... by citing such material in a manner that makes clear that the material is effectively part of the host document as if it were explicitly contained therein.” *Cook Biotech Inc. v. Acell, Inc.*, 460 F.3d 1365, 1376 (Fed. Cir. 2006) (quoting *Adv. Display Sys., Inc. v. Kent State Univ.*, 212 F.3d 1272, 1282 (Fed. Cir. 2000)) (citations omitted)). “To incorporate material by reference, the host document must identify with detailed particularity what specific material it incorporates and clearly indicate where that material is found in the various documents.” *Id.* (citations omitted). Whether and to what extent material has been incorporated by reference into a host document is a question of law. *Id.*

The ’510 Patent identifies with particularity the specific material it incorporates, *viz.*, the ’393 Application, and indicates clearly where the material is found, *viz.*, in the entire document, which deals with eradicating head lice with hot air, and in particular those disclosures expressly addressing “preferred airflow rates and heat ranges.”¹² *See* Ex. 1001 col. 2, ll. 56–60. Moreover, the passages of the ’393 Application quoted *supra* expressly disclose, *inter alia*, the claimed temperature range “of from about 54° C to about 65° C for at least thirty seconds.”

¹² We note here that the ’393 Application is not a lengthy document, consisting of 13 pages, 62 numbered paragraphs, and 35 claims. We conclude that it would be well within the capabilities of a skilled artisan to locate the relevant passages quoted *supra* within the text of the ’393 Application.

Petitioner points to the Board's nonprecedential decision *Nichia Corp. v. Emcore Corp.*, in which the Board recognized that, although proposed substitute claims need not be described explicitly in the original disclosure to satisfy the written description requirement, "a mere citation to the original disclosure without any explanation as to why a person of ordinary skill in the art would have recognized that the inventor possessed the claimed subject matter as a whole may be similarly inadequate." Opp. 2 (quoting IPR2012-00005, Paper 27 at 4 (PTAB June 11, 2013)). We are not persuaded by the relevance of this argument. In *Nichia*, the Board held that:

[M]erely indicating where each claim limitation individually described in the original disclosure may be insufficient to demonstrate support for the claimed subject matter as a whole. For instance, the statement "Proposed claim 21: *See, e.g.* existing claims 6, 14, and 15" without any explanation is on its face inadequate for the patent owner to meet its burden, as each of claims 6, 14, and 15 separately depends from claim 1.

Nichia, Paper 27 at 4. In other words, the Board in *Nichia* was explaining that using multiple original dependent claims as providing support for a proposed substitute claim was insufficient because each of the dependent claims cited depended individually from an independent claim.

Such is not the case here. Patent Owner's Revised Motion to Amend is unambiguous in describing the source of support for the proposed amendment. For example, with respect to proposed substitute claim 21, the Revised Motion discloses:

[Ex. 1001] 1:49-59; 2:4-32, 41-43 and 36-39; 2:61-3:9 ("A heated airflow may then be delivered through the applicator to the treatment site to substantially eliminate the lice and lice eggs from the treatment site.... the treatment at each treatment site is performed for at least thirty seconds"); and Fig. 17A and 9:24-

35. Incorporated by [the '393 Application], paragraph 26 (“the temperature of the volume of air can be from about 54.degree. C. to about 65 degree. C”).

Rev. Mot. Amend. 3–4. We conclude that this is a sufficiently definite description of the source of the proposed amendment to the claim to satisfy the written description requirement.

Petitioner does not object to the other limitations of proposed substitute claims 21 and 28. We conclude that the proposed substitute claims do not add new matter, and that the Specification of the '510 Patent provides sufficient written description support for the limitations of proposed substitute claims 21 and 28, as well as the other proposed substitute claims.

5. Responding to a Ground of Unpatentability

Patent Owner contends that the proposed substitute claims are responsive to the Grounds at issue in this proceeding because they allegedly further distinguish the claims from the art of record. Rev. Mot. Amend 9. Petitioner does not dispute Patent Owner’s contentions that the proposed substitute claims are responsive to the grounds of unpatentability in the Petition. *See generally* Opp. Based on the entirety of the record, we determine that Patent Owner has sufficiently articulated its position for why the added limitations are responsive to the grounds of unpatentability raised in the Petition. *See* Rev. Mot. Amend 9–13.

6. Patentability of the Proposed Substitute Claims

In view of Patent Owner's proposed substitute claims, Petitioner contests the claims based on the same Grounds 2 and 3 as presented in the Petition and proposes New Grounds of unpatentability (New Grounds 4 through 7) for the amendments to proposed substitute claims 21–35, as follows.

Claim(s) Challenged	35 U.S.C. §	Reference(s)
21–27, 32–35	103(a)	Goates, Westerveld, Pearlman, Hackl (Ground 3)
28–31	103(a)	Goates, Westerveld, Hackl (Ground 2)
21–27, 32–35	103(a)	Goates, '393 Application, Westerveld, Pearlman, Hackl (New Ground 4)
28–31	103(a)	Goates, '393 Application, Westerveld, Hackl (New Ground 5)
21–27, 32–35	103(a)	Goates, Kobayashi ¹³ , Westerveld, Pearlman, Hackl (New Ground 6)
28–31	103(a)	Goates, Kobayashi, Westerveld, Hackl (New Ground 7)

¹³ M. Kobayashi et al., *Thermotolerance of Human Body Louse, Pediculus humanus corporis, II. Preliminary Evaluation of Hot Air for Killing Adults and Eggs*, 46(1) JAPAN J. SANIT. ZOOL. 83–86 (1995) (Ex. 1020).

7. Grounds 2 and 3: Obviousness of Proposed Substitute Claims 21–35 over Goates, Westerveld, and Hackl and over Goates, Westerveld, Pearlman, and Hackl

We first address Petitioner’s arguments regarding the proposed substitute claims. Then we turn to Patent Owner’s response before analyzing the parties’ arguments and evidence.

a. Proposed substitute claim 21

Petitioner argues that the combination of Goates, Westerveld, Hackl, and Pearlman (Ground 3 in the Petition) renders obvious proposed substitute claim 21. Opp. 4.

i. Limitations [21.0]–[21.2], [21.4], [21.7]

Petitioner notes that Patent Owner has not amended these limitations of original claim 1 and maintains its contention that the limitations are obvious over the combination of Goates, Westerveld, and Pearlman. Opp. 4 (citing Pet. 20–46; Ex. 1003 ¶¶ 39–81).

ii. Limitation [21.3]

Patent Owner has amended this limitation to include language reciting “wherein each of the ports open toward substantially the same direction such that the applicator delivers substantially all of the airflow to a single side of applicator.” Petitioner disputes Patent Owner’s contention that, because Hackl provides an example of an applicator with most (eight of ten) of its ports positioned on the same side of the fingers, it does not teach or suggest this claim limitation. Opp. 4 (citing Rev. Mot. Amend 9–12). Petitioner

contends that: (1) Patent Owner’s arguments rest on incorrect claim construction; and (2) Hackl suggests the limitation, even under the claim construction applied by Patent Owner. *Id.* at 4–5.

Petitioner argues that, in the embodiment of Hackl depicted in its Figure 1, *supra*, Hackl teaches two rows of prongs 2 each having an opening 8; with eight of the openings 8 pointing in the same direction, and two openings 8 of two prongs arranged on the side walls pointing in the opposite direction. Opp. 5 (citing Ex. 1008 ¶ 19). Petitioner notes that Patent Owner argues that, because only eight of the ten ports in Hackl are on one side of the fingers, Hackl does not disclose this limitation. Opp. 6 (citing Rev. Mot. Amend 10–12). Petitioner also notes that Patent Owner states that it agrees with the district court’s construction of the relevant term “substantially” and claims its construction applies to the proposed substitute claims. *Id.* (citing Rev. Mot. Amend 10).

However, Petitioner argues, the district court construed the original limitation reciting “wherein the ports are positioned on the fingers along substantially only one side of the fingers” as meaning “the positioning of the ports relative of the fingers and the direction of the treatment site is to be on a single side of the applicator, with some flexibility in accordance with the word ‘substantially.’” *Id.* (quoting Ex. 2002, 27–28). According to Petitioner, the district court also stated that a person of ordinary skill in the art “would be able to understand with reasonable certainty to interpret the ‘substantially only’ claim language to mean that the ports are positioned largely, but not entirely on one side of the applicator’s finger and that the treatment is similarly largely but not entirely on one side of the applicator.” *Id.* at 6–7 (quoting Ex. 2002, 27).

Petitioner argues that Patent Owner now interprets this claim language as requiring all ports positioned exclusively on one side of the applicator, arguing that Hackl does not disclose this claim element because most, but not all, of its ports are positioned along only one side of the fingers. *Id.* at 7 (reciting Rev. Mot. Amend 11–12).

Furthermore, Petitioner argues, the Specification of the '510 Patent contradicts Patent Owner's construction that "[t]he claim language tolerates some variation in the placement of the ports of the fingers ... but does not allow for ports positioned on *opposite* sides." Opp. 7 (citing Rev. Mot. Amend 11). Petitioner points to the Specification's disclosure that, "as shown in FIG. 5, substantially all of the airflow is directed in direction 'A' from the overhead perspective shown in this figure. It can also be seen that, substantially no airflow is directed toward the other three sides of the device." *Id.* (quoting Ex. 1001 col. 7, ll. 43–50). According to Petitioner, the Specification does not treat the direction opposite direction "A" any differently than the directions to the side of "A." *Id.* Petitioner argues, by way of example, that the Specification does not state that some airflow is directed towards directions "C" and "D," but none is directed in direction "B." *Id.* Petitioner contends that Patent Owner does not provide support for its contention that the claim language stating that "the ports open toward substantially the same direction" requires that no ports open in a direction opposite the airflow. *Id.* at 7–8.

Furthermore, Petitioner contends, Hackl teaches positioning most of its openings on only one side of the fingers of its hair product application to provide more control over application of the product. Opp. 8 (citing Pet. 62–63; Exs. 1003, 1008). Petitioner contends that a skilled artisan

would have recognized that the same principle could be used to improve Westerveld's hair styling brush in the same way—to provide more control over the application of heated air. *Id.* (citing Pet. 62–63; Exs. 1003, 1008). Petitioner further contends that a person of skill in the art would have been motivated to make this modification so the combined device would not blow air outside the intended target area upon reaching the edge of the target area. *Id.* (citing Pet. 62–63; Exs. 1003, 1008). Furthermore, argues Petitioner, a skilled artisan would also have recognized that directing heated air in two directions simultaneously might be more likely to cause lice to escape treatment compared to when the full attention of the applicator is focused on emitting heated air in just one direction. *Id.*

Petitioner alleges that Patent Owner imposes an incorrect requirement that the claimed invention must be expressly suggested in any one or all the references, which conflicts with established case law. Opp. 8 (citing *Keller*, 642 F.2d at 425). However, Petitioner argues, Hackl teaches the disclosed port arrangement to prevent the device from depositing product outside the intended treatment area. *Id.* at 8–9 (citing Ex. 1003 ¶ 106). Petitioner asserts that a person of ordinary skill in the art would have found it obvious to use the teachings of Hackl, rather than an exact embodiment, to modify the device of other prior art. *Id.* According to Petitioner, a skilled artisan would have recognized that the fingers with openings on two lateral sides, as taught by Westerveld, could be combined with the teachings of Hackl so as to have ports only on one side of the fingers, would result in greater control and less patient discomfort. *Id.* (citing Ex. 1003 ¶ 107). Thus, contends Petitioner, the combined teaching of Goates, Westerveld, and Hackl would

have suggested to a person of skill in the art the port configuration of substitute Claim 21. *Id.*

iii. Limitations [21.5] and [21.6]

Patent Owner has substantially amended these limitations to include language reciting heated airflow “of from about 54° C to about 65° C for at least thirty seconds.” Petitioner argues that Goates expressly discloses a mean temperature range of 58° C to 59° C, which falls within the temperature range added to the substitute claims. Opp. 9 (citing Ex. 1005, 12, Table 1). Petitioner points out that Goates also teaches that “each region of the scalp was exposed to hot air for at least 30 seconds.” *Id.*

Petitioner disputes Patent Owner’s argument that a skilled artisan would not have combined Hackl with the other prior art references because it does not explicitly disclose using heated air. Opp. 10 (citing Rev. Mot. Amend 12–13). Petitioner argues, rather, that a person of ordinary skill in the art would have sought references teaching applicators whose designs would deliver hot air closer to the scalp and/or hair bases, such as Westerveld and Hackl. *Id.* (citing Pet. 38; Ex. 1003 ¶ 72). According to Petitioner, a person of skill in the art would have been motivated to combine Westerveld and Hackl, even though Hackl relates to applying a flowable hair product, because, Petitioner argues, heated air is a flowable product. *Id.* Petitioner asserts that heated air, like hair product, flows and otherwise behaves as a fluid, moving from one area to another due to pressure gradients. *Id.* (citing Pet. 63; Ex. 1003 ¶ 109). Petitioner asserts that a skilled artisan would have recognized that the configuration of the prongs and openings in Hackl, which are configured to deliver a flowable product to

human scalp hair, would also deliver heated air in substantially the same way. *Id.*

Petitioner contends that Patent Owner's argument that the applicator of Hackl would be structurally incapable of delivering heated air is contrary to the findings of the Office with regard to Hackl. Opp. 10 (citing Rev. Mot. Amend 12–13). Petitioner notes that the examiner of a subsequent divisional application of the '510 Patent application applied Hackl in a rejection of claims reciting the one-sided ports and treatment site features, finding that there was no structural difference between the applicator disclosed in Hackl and the one recited in the claims. *Id.* (citing Ex. 1011, 108–111). Petitioner notes that the examiner found that, because the features of Hackl's applicator were capable of the use of the applicator claimed in the divisional, Hackl rendered the divisional claims obvious. *Id.* Petitioner further notes that the applicant never overcame the examiner's conclusion, and abandoned the application. *Id.*

b. Proposed substitute claims 22–27

Petitioner argues that these claims are substantially identical to claims 2–4, 7, and 10–11, respectively, and that, for the reasons argued *supra*, the combination of Goates, Westerveld, and Pearlman renders obvious these claims. Opp. 11 (citing Pet. 46–50, 51–52; Ex. 1003 ¶¶ 84–89, 91–93).

c. Proposed substitute claim 28

- i. Limitations [28.0]–[28.1], [28.3]–[28.5], [28.7], and [28.9]–[28.10]

Petitioner contends that Patent Owner did not substantially amend these claim limitations from original claim 12 and, for the reasons summarized *supra*, the combination of Goates, Westerveld, and Hackl renders obvious these limitations. Opp. 11 (citing Pet. 53–64; Ex. 1003 ¶¶ 98–110).

- ii. Limitation [28.2]

The substantive amendment to this claim element is adding a limitation reciting “wherein each of the ports open toward substantially the same direction such that the applicator delivers substantially all of the airflow to a single side of the applicator.”

Petitioner repeats the argument, presented with respect to claim 21 *supra*, that Hackl teaches and suggests this port configuration. Opp. 11.

- iii. Limitations [28.6] and [28.8]:

The substantive amendments to these claim elements are adding a limitation of delivering heated airflow “of from about 54° C to about 65° C for at least thirty seconds.”

Petitioner repeats the argument, presented *supra*, that Goates explicitly discloses temperatures and application durations within these claimed limitations. Opp. 12 (citing Ex. 1005, 12, Table 1).

d. Proposed substitute claims 29–31

Petitioner argues that these claims are substantially identical to claims 13–15, respectively, and that the combination of Goates, Westerveld, and Hackl renders obvious the limitations of these claims. Opp. 12 (citing Pet. 64–66; Ex. 1003 ¶¶ 111–112).

e. Proposed substitute claims 32–35

Petitioner argues that these claims are substantially identical to claims 16–19, respectively, and that the combination of Goates, Westerveld, Pearlman, and Hackl (Ground 3 in the Petition) renders obvious these claims. Opp. 12 (citing Pet. 66–67; Ex. 1003 ¶¶ 114–116).

f. Patent Owner’s response

Patent Owner argues that Petitioner misrepresents Patent Owner’s position, and that Patent Owner in fact argues that some variation in the placement of the ports being positioned exclusively on one side does not include 20 percent of the openings on opposite sides of the prongs. Opp. Reply 2–3 (citing Rev. Mot. Amend 10–11). Patent Owner again argues that having 20 percent of the openings on opposite sides from the majority is not what is claimed. *Id.* at 3.

Patent Owner also disputes Petitioner’s contention that the limitation allows for ports positioned on opposite sides of the fingers, because the Specification of the ’510 Patent discloses that, “substantially all of the airflow is directed in direction ‘A’ from the overhead perspective shown in this figure. It can also be seen that, substantially no airflow is directed toward the other three sides of the device.” Opp. Reply 3 (citing Opp. 7).

Patent Owner asserts that Petitioner's argument fails because: (1) the issue is where the ports are placed not where the air flows, as Petitioner argues; and (2) the only ports in Figure 5 of the '510 Patent that are not all in the same direction are at an angle of 45 degrees (e.g., some variation); none of the ports in Figure 5 is in the opposite direction. *Id.* (citing Ex. 1001 col. 7, ll. 43–50; Fig. 5). Patent Owner asserts that, whereas “some variation” may include a variation of up to 45 degrees, as shown in Figure 5, it does not include an “opposite” direction. *Id.*

Patent Owner further disputes Petitioner's contention that, even if Hackl did not embody a device that expressly satisfied this limitation, a person of ordinary skill in the art would have found this limitation obvious, based upon the teachings of Hackl combined with Westerveld. Opp. Reply 3 (citing Opp. 8). Patent Owner argues that, first, a skilled artisan would not have changed the Hackl design to focus instead “on emitting heated air in just one direction,” because to do so would have ruined the operation of Hackl and forced product in directions other than to the “inner space, hair lying between two prongs.” Opp. Reply 3–4 (citing Mot. 12, and quoting Ex. 2020 ¶¶ 8–9; also citing *Ratti*, 270 F.2d at 813).

Second, Patent Owner argues, a skilled artisan would not have changed the Westerveld design to focus instead “on emitting heated air in just one direction,” because to do so would ruin the operation of Westerveld by increasing the drying time of the hair and by failing to increase the volume of the hair. Opp. Reply 4 (citing Ex. 2021 ¶¶ 3–4). According to Patent Owner, Westerveld's hair styling brush is used to deliver hot air for the purpose of increasing hair volume by drying it while twisting the brush. *Id.* (citing Ex. 2021 ¶¶ 2–3). Patent Owner contends that the hollow teeth 3

of the brush each have outlet apertures 7, 8 disposed transversely to the longitudinal axis for applying streams of heated air to the hair. *Id.* (citing Ex. 2021 ¶ 2).

Patent Owner reasons that Westerveld’s operation for increasing hair volume relies upon a combination of hot air being applied from apertures 7 and 8. *Id.* (citing Ex. 2021 ¶ 4). Consequently, argues Patent Owner, a person of skill in the art would not have changed the Westerveld design to focus instead “on emitting heated air in just one direction” such as by plugging one side of the apertures 7 or 8, because that would have prohibited the hair from being dried by the hot air being applied from the apertures, and would have ruined the operation of Westerveld by increasing the drying time and failing to increase the volume of the hair. *Id.* at 4–5 (citing Ex. 2021 ¶ 4).

g. Petitioner’s reply

Petitioner replies, *inter alia*, that Patent Owner improperly considers Westerveld and Hackl in isolation from the other cited prior art of record, including Goates, which is also included in each obviousness ground. Opp. Sur-Reply 3. Petitioner repeats that a person of ordinary skill in the art would have recognized that adopting Hackl’s teachings and modifying the direction of the ports of the Goates-Westerveld hand piece would result in greater control of the flow of heated air, and less patient discomfort. *Id.* (citing Pet. 61; Ex. 1003 ¶ 107). Petitioner asserts that the combined teachings of Goates, Westerveld, and Hackl would have suggested the port configuration of proposed substitute claims 21 and 28 to a person of ordinary skill in the art. *Id.* at 3–4.

h. Analysis

Having reviewed the parties' arguments and weighed the evidence of record, we conclude that the preponderance of the evidence supports Petitioner's claims that the proposed substitute claims would have been obvious over the combined prior art cited in Grounds 2 and 3. As an initial matter, we note that Patent Owner does not dispute Petitioner's argument that Goates teaches the limitations of proposed substitute claims 21 and 28 reciting "from about 54° C to about 65° C for at least thirty seconds." Table 1 of Goates teaches a range of temperatures for the LouseBuster (the embodiment that Petitioner relies upon) of between 56°C and 60°C. Ex. 1005, Table 1. Goates thus teaches using a range of temperatures that is within the range of "about 54° C to about 65° C" recited in the proposed substitute claims. We consequently conclude that the claimed temperature range is taught or suggested by the teachings of Goates. *See In re Peterson*, 315 F.3d 1325, 1329 (Fed. Cir. 2003) (holding that "[i]n cases involving overlapping ranges, we and our predecessor court have consistently held that even a slight overlap in range establishes a prima facie case of obviousness"); *see also DuPont de Nemours & Co. v. Synvina C.V.*, 904 F.3d 996, 1006, 1008 (Fed. Cir. 2018) (applying the prima facie case and burden-shifting framework for overlapping ranges in the context of an *inter partes* review).

Moreover, Goates teaches that the temperature employed is an important factor in killing lice. *See* Ex. 1005, 15 ("All 6 treatment methods had a minimum mean temperature of 55°C (Table 1), which is the temperature that Buxton and Kobayashi et al. found to be lethal to body lice *in vitro*" (internal references omitted)). We consequently conclude that the

temperature range is a result-effective variable, and that it would have been within the skill of an artisan to optimize to the claimed range. *See In re Boesch*, 617 F.2d 272, 276 (C.C.P.A. 1980) (holding that “discovery of an optimum value of a result effective variable ... is ordinarily within the skill of the art”).

Goates also expressly teaches that, in using the LouseBuster, “[w]e slowly combed the entire scalp with the hand piece, ensuring that each region of the scalp was exposed to *hot air for at least 30 seconds*.” Ex. 1005, 12 (emphasis added). We consequently agree with Petitioner that this limitation is expressly taught by Goates.

With respect to the amended limitation reciting “wherein each of the ports open toward substantially the same direction such that the applicator delivers substantially all of the airflow to a single side of the applicator” in proposed substitute claims 21 and 28, we also conclude that the preponderance of the evidence supports that the limitation is taught or suggested by the cited prior art, and particularly Hackl. Although Patent Owner may be correct that the embodiment depicted in Figure 1 of Hackl, in which two of the ten port openings are described as facing in a direction opposite to the remaining eight ports, does not depict an embodiment in which “each of the ports open toward substantially the same direction,” that argument alone is unpersuasive for the simple reason that this not an anticipation challenge under 35 U.S.C. § 102, but an obviousness challenge under 35 U.S.C. § 103.

As we have previously explained:

The test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference; nor is it that the claimed

invention must be expressly suggested in any one or all of the references. Rather, the test is what the combined teachings of the references would have suggested to those of ordinary skill in the art.

Keller, 642 F.2d at 425.

Grounds 2 and 3 are based upon the combined teachings of at least Goates, Westerveld, and Hackl. It is not required or necessary that the embodiment taught in Figure 1 of Hackl be bodily incorporated into the proposed, combined Goates-Westerveld combination. *Keller*, 642 F.2d at 425. Westerveld teaches finger-like projections, with opening ports for hot air to pass through into the hair. *See* Ex. 1006, Figs. 1, 3. Hackl teaches single ports at the base of the fingers that can be positioned in one direction or another, with the majority pointing in a single direction. We conclude, as we did *supra*, that a person of ordinary skill in the art would have understood from these teachings that the position of the ports can be situated in such a manner as to provide an optimal flow direction of hot air for the purpose of killing lice. Indeed, Goates suggests that, in using the LouseBuster, the direction of airflow with respect to the comb is an important factor:

In this case we did not section the hair but simply pulled the hand piece slowly through the hair like a garden rake *while the air blew in the opposite direction*. Each region of hair was exposed to the airflow for a minimum of 60 seconds. This method proved to be the most successful, resulting in 98% mortality of eggs and 80% mortality of hatched lice. Ten of 11 subjects were also cured of head lice when examined 1 week after treatment.

Ex. 1005, 16 (emphasis added).

We conclude that a person of ordinary skill in the art would have understood that the embodiment depicted in Figure 1 of Hackl could be modified, without substantial reconstruction or redesign of its structure, such that the 20% of the ports facing in a direction opposite to the 80% opened in the same direction as the 80%, such that all of the ports “open toward substantially the same direction,” as recited in proposed substitute claims 21 and 28. *See Ratti*, 270 F.2d at 813; *see also KSR*, 550 U.S. at 420 (“A person of ordinary skill is also a person of ordinary creativity, not an automaton”). We further conclude that a person of ordinary skill in the art would have been motivated to modify the structure to optimize the direction of flow of the hot air.

Finally, Patent Owner argues, in effect, that a port that is oriented at an angle of 45° away from the direction of the majority of the remaining ports is oriented in a direction such that it is “open toward substantially the same direction,” whereas one that opens in a direction opposite to the majority does not. Opp. Reply 3. We do not find this argument persuasive. Rather, such an argument simply begs the question, because it provides no criterion as to what angle of port opening constitutes “substantially the same direction” and what angle does not. We find nothing in the language of the proposed substitute claims that defines what is meant by this claim term; it could be just as plausibly argued that a difference of 45° in the angle of aperture opening is not “substantially the same.”

In summary, having reviewed the parties’ arguments and weighed the evidence of record, we conclude that a preponderance of that evidence favors Petitioner’s position that, for Grounds 2 and 3, proposed substitute claims 21–35 are unpatentable as obvious over the combined cited prior art.

8. New Grounds 4 and 5: Obviousness of Proposed Substitute Claims 21–35 over Goates, the '393 Application, Westerveld, and Hackl and over Goates, the '393 Application, Westerveld, Pearlman, and Hackl

a. *Overview of the '393 Application*

The '393 Application, published on June 22, 2006, indisputably is prior art under Section 102(b) to the '510 Patent. Ex. 1022, 1. The '393 Application describes using a hot air device to kill head lice. *Id.* (see also Ex. 1019¹⁴ ¶ 29). Figure 5 of the '393 Application is reproduced below.

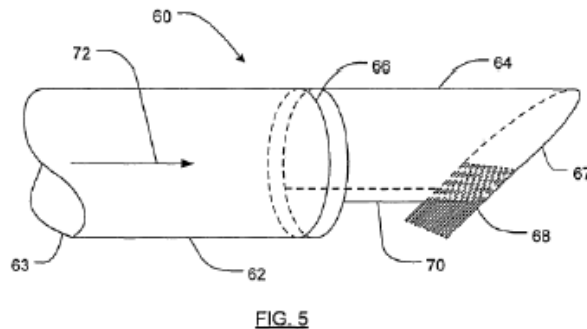


Figure 5 of the '393 Application is a perspective view of a comb device for lifting and separating hair

The '393 Application teaches that “the treatment can be performed with a blow dryer having an attached comb device,” such as “the device 60 as shown in FIG. 5.” Opp. 13 (quoting Ex. 1022 ¶ 48).

The '393 Application identifies several ranges of air temperature that are lethal to lice, including 54°C–64°C and 54°C–59°C. Opp. 13 (citing

¹⁴ The Declaration of Dr. Michael Potter (Ex. 1019) addresses US 7,789,902, which issued from the '393 Application. Opp. 12 n.1. Petitioner asserts that Dr. Potter’s testimony in this respect applies equally to the '393 Application. *Id.*

Ex. 1022 ¶¶ 36, 48). It was well known in the art at the time of invention of the '393 Application that conventional hair dryers produced such temperatures and, indeed, such hair dryers were used in the '393 Application. Pet. 13–14 (citing Ex. 1020, 5 (Table 1); Ex. 1019 ¶ 30; Ex. 1022 ¶¶ 47–48).

The '393 Application also identifies several application-duration times, including five seconds to one hour, ten seconds to thirty minutes, and twenty seconds to sixty seconds. Opp. 14 (citing Ex. 1022 ¶ 31). In other embodiments, the '393 Application teaches that the heated air should be applied such “that substantially all areas of the scalp are exposed for at least 30 seconds.” *Id.* (quoting Ex. 1022 ¶ 42).

b. Reason to combine Goates and the '393 Application

Petitioner contends that a person of ordinary skill in the art would have been motivated to apply the teachings of the '393 Application to Goates' LouseBuster to further inform the ideal temperature ranges and application time of the heated air. Opp. 14. According to Petitioner, Goates teaches that its authors had pending domestic and international patents for methods of using heat to treat head lice, and the '393 Application is similarly directed to such methods. *Id.* (citing Ex. 1005, 9). Moreover, Dale S. Clayton, Joseph S. Atkin, and Kevin G. Wilding, the named inventors of the '393 Application, are also co-authors of the Goates reference. *Id.* (see Ex. 1022, 1; Ex. 1005, 1).

Petitioner argues that a skilled artisan, seeking to treat head lice, would have sought other references or information to verify the appropriate air temperatures and application times for killing lice. Opp. 14 (citing Ex.

1019 ¶ 65). Petitioner reasons that, because Goates refers to the '393 Application, or at least the patent that resulted from the '393 Application, it would have been easy for a person of skill in the art to locate the '393 Application and use its disclosure to confirm the teachings of Goates regarding effective air temperature and application duration. *Id.* at 14–15.

c. Proposed substitute claims

Petitioner notes that the substantive amendments to limitations [21.6], [21.8], [28.6] and [28.10] each add language reciting delivering heated airflow “of from about 54° C to about 65° C for at least thirty seconds.” Opp. 15 (citing Rev. Mot. Amend, 3–4, 6). Petitioner argues that both Goates and the '393 Application expressly teach these temperature ranges and application durations. *Id.* Petitioner asserts that Patent Owner acknowledges that the '393 Application discloses the limitations added to its proposed substitute claims, because it cites incorporation by reference of the '393 Application as its support for these amendments. *Id.* (citing Rev. Mot. Amend 4, 6–7). Petitioner argues that, because Patent Owner’s only written descriptive support for its added claim limitations is a prior art reference, the material is not novel and does not resolve the issue of invalidity in the '510 Patent claims. *Id.*

d. Remaining limitations and claims

Petitioner repeats the arguments presented *supra* that the remaining limitations of the proposed substitute claims would have been obvious in view of the prior art cited in the Petition. Opp. 15. Petitioner repeats the contention that it would have been obvious to a person of ordinary skill in

the art to combine the teachings of the '393 Application with Goates and, by extension, Westerveld, Pearlman and/or Hackl for the same reasons outlined in the Petition. *Id.* Therefore, Petitioner argues, the combination of Goates, the '393 Application, Westerveld, Pearlman, and Hackl (Ground 4) renders obvious proposed substitute claims 21–27 and 32–35, and the combination of Goates, the '393 Application, Westerveld, and Hackl (Ground 5) renders obvious proposed substitute claims 28–31. *Id.* at 15–16.

e. Patent Owner's response

Patent Owner argues that, with respect to Grounds 4 and 5, Petitioner does not address the added limitations of proposed substitute claims 21 and 28 reciting “wherein the ports are positioned on the fingers along substantially only one side of the fingers, wherein each of the ports open toward substantially the same direction such that the applicator delivers substantially all of the airflow to a single side of the applicator.” Opp. Reply 5. Therefore, argues Patent Owner, Petitioner has not shown that proposed substitute claims 21–38 would not have been obvious under Grounds 4 or 5. *Id.*

f. Petitioner's reply

Petitioner replies that, for the reasons argued *supra*, the combination of Westerveld and Hackl—relied upon in each of the grounds of obviousness presented in the Petition and in Petitioner's Opposition teach and suggest this claim language. Opp. Sur–Reply 2.

g. Analysis

We find Petitioner has met its burden to show unpatentability of the proposed substitute claims for these grounds, and we do not find Patent Owner's arguments persuasive. Ground 4 relies upon the combination of Goates, the '393 Application, Westerveld, Pearlman, and Hackl, with Petitioner relying upon Goates and the '393 Application as teaching the added limitation reciting "of from about 54° C to about 65° C for at least thirty seconds" to limitations [21.6], [21.8], [28.6] and [28.10]. *See* Sections III.D.8.c–d, *supra*. Ground 5 similarly relies upon the combination of Goates, the '393 Application, Westerveld, and Hackl as teaching the same limitations.

We have explained *supra* why we are persuaded by Petitioner's arguments that it would have been obvious to a person of ordinary skill in the art that the combination of Westerveld and Hackl teach or suggest the added limitation reciting "wherein the ports are positioned on the fingers along substantially only one side of the fingers, wherein each of the ports open toward substantially the same direction such that the applicator delivers substantially all of the airflow to a single side of the applicator" in proposed substitute claims 21 and 28. *See* Section III.D.7.g, *supra*.

Having reviewed the parties' arguments, and analyzed the evidence of record, we conclude that the preponderance of the evidence demonstrates that a person of ordinary skill in the art would have found it obvious to combine the cited prior art references cited in Grounds 4 and 5 to arrive at the proposed substitute claims.

8. New Grounds 6 and 7: Obviousness of Proposed Substitute Claims 21–35 over Goates, Kobayashi, Westerveld, and Hackl, and over Goates, Kobayashi, Westerveld, Pearlman, and Hackl

a. *Overview of Kobayashi*

Kobayashi teaches a study to “evaluate the effectiveness of a stream of hot air from a hair dryer for killing eggs and adults of human body lice, *Pediculus humanis corporis*.” Ex. 1020, Abstr. Kobayashi teaches using a conventional, off-the-shelf hair dryer to measure the lethality of applying heat to head lice in an *ex situ* study. *Id.* at 5. Kobayashi teaches several combinations of air temperatures and exposure times that resulted in a 100% mortality rate of the lice and their eggs, as shown in Table 1, reproduced below:

Table 1 Effect of hot air on the mortality of adult human body lice.*

	Control	0.5 min	1.0 min	1.5 min	2.0 min	5.0 min
50° C	0/20** (0.0%)	0/30 (0.0%)	1/30 (3.3%)	1/30 (3.3%)	0/30 (0.0%)	30/30 (100%)
55° C	0/20 (0.0%)	6/30 (20%)	30/30 (100%)	30/30 (100%)	30/30 (100%)	30/30 (100%)
60° C	0/20 (0.0%)	30/30 (100%)	30/30 (100%)	30/30 (100%)	30/30 (100%)	30/30 (100%)

* The mortality was calculated by the data of duplicated experiments. ** Lice of control experiment were treated with air of room temperature (27–28°C) for 5 min.

Kobayashi further teaches that:

In the exposure of hot air at 55°C for 1 min or more all adults died. The stream of hot air at 60°C also killed all adults even when exposure was brief (for 30 sec). Louse eggs treated with hot air at 55°C for more than 90 sec never hatched.

Id. at 6.

b. Reason to combine Goates and Kobayashi

Petitioner argues that a skilled artisan would have been motivated to apply the teachings of Kobayashi to Goates’ LouseBuster to further verify

the temperature range and application time of the heated air. Opp. 18. Goates cites the Kobayashi study as a verification of the efficacy of its heated air temperatures. *Id.* (citing Ex. 1005, 15) (“All 6 treatment methods had a minimum mean temperature of 55°C (Table 1), which is the temperature that Buxton and Kobayashi et al. found to be lethal to body lice *in vitro*” (internal references omitted)). Petitioner asserts that a person of ordinary skill in the art, considering a reference like Goates and looking to treat head lice, would have sought other references, such as Kobayashi, for information to confirm the appropriate air temperatures for killing head lice. *Id.* (citing Ex. 1019 ¶ 65).

Petitioner points out that Kobayashi identifies ten air temperature and exposure length combinations that were found to be 100% effective for killing adult lice and preventing their eggs from hatching. Opp. 18 (citing Ex. 1020, Abstr., 5 (Table 1); Ex. 1019 ¶ 66). Petitioner argues that nine of the ten of the combinations use 55°C or 60°C air, which falls within the claimed temperature range. *Id.* (citing Ex. 1020, 5 (Table 1); Ex. 1019 ¶ 66).

Petitioner therefore asserts that person of ordinary skill in the art, in considering a reference like Goates, would have been motivated and found it obvious to use each of Kobayashi’s temperature/exposure time combinations that were shown to be 100% effective for treating lice. Opp. 19 (citing Ex. 1019 ¶ 67). According to Petitioner, it would have been obvious to combine the references because the skilled artisan would have wanted to reliably eliminate lice infestations, which is the stated aim of both references. *Id.*

c. Proposed substitute claims

Petitioner contends that the substantive amendments to claim limitations [21.6], [21.8], [28.6] and [28.10] each add language reciting the addition of a limitation of delivering heated airflow “of from about 54° C to about 65° C for at least thirty seconds.” Opp. 19. Petitioner argues that both Goates and Kobayashi explicitly teach these temperature ranges and application durations, as noted *supra*. *Id.* (citing Ex. 1019 ¶ 64; Ex. 1020, 5; Ex. 1005, 12 (Table 1)). Petitioner asserts that it would therefore have been obvious to a person of ordinary skill in the art to apply air heated to a temperature “of from about 54° C to about 65° C for at least thirty seconds” to kill head lice. *Id.*

d. Remaining limitations and claims

Petitioner repeats the arguments, presented *supra*, that the remaining limitations of the proposed substitute claims would have been obvious in view of the prior art cited in the Petition. Opp. 19–20. Petitioner contends that it would have been obvious to combine the teachings of Kobayashi with Goates and, by extension, Westerveld, Pearlman and/or Hackl, for the same reasons outlined in the Petition. *Id.* at 20. Therefore, asserts Petitioner, the combination of Goates, Kobayashi, Westerveld, Pearlman, and Hackl (Ground 6) render obvious substitute proposed claims 21–27 and 32–35, and the combination of Goates, Kobayashi, Westerveld and Hackl (Ground 7) render obvious proposes substitute claims 28–31. *Id.*

e. Patent Owner's response

Patent Owner argues that, for Grounds 6 and 7, Petitioner does not address the limitation, “wherein the ports are positioned on the fingers along substantially only one side of the fingers, wherein each of the ports open toward substantially the same direction such that the applicator delivers substantially all of the airflow to a single side of the applicator,” as recited in claims 21 and 28. Opp. Reply 5. Therefore, argues Patent Owner, Petitioner has not shown that proposed substitute claims 21–38 are obvious under Grounds 6 or 7. *Id.*

f. Analysis

We find Petitioner has met its burden to show unpatentability of the proposed substitute claims for these grounds, and we do not find Patent Owner's arguments persuasive. Ground 6 relies upon the combination of Goates, Kobayashi, Westerveld, Pearlman, and Hackl, with the Petitioner relying upon Goates and Kobayashi as teaching the added limitation reciting “of from about 54° C to about 65° C for at least thirty seconds” to limitations [21.6], [21.8], [28.6] and [28.10]. *See* Sections III.D.8.c–d, *supra*. Ground 7 similarly relies upon the combination of Goates, Kobayashi, Westerveld and Hackl as teaching the same limitations.

We have explained *supra* why we are persuaded by Petitioner's arguments that it would have been obvious to a person of ordinary skill in the art that the combination of Westerveld and Hackl teach or suggest the added limitation reciting “wherein the ports are positioned on the fingers along substantially only one side of the fingers, wherein each of the ports open toward substantially the same direction such that the applicator delivers

substantially all of the airflow to a single side of the applicator” in proposed substitute claims 21 and 28. *See* Sections III.D.7.g, *supra*.

Having reviewed the parties’ arguments, and analyzed the evidence of record, we conclude that the preponderance of the evidence demonstrates that a person of ordinary skill in the art would have found it obvious to combine the cited prior art references cited in Grounds 6 and 7 to arrive at the proposed substitute claims 21–35.

IV. CONCLUSION¹⁵

For the foregoing reasons, and after having analyzed the entirety of the record and assigning appropriate weight to the cited supporting evidence, we determine that Petitioner has established, by a preponderance of the evidence, that claims 1–4, 6–8, and 10–19 of the ’510 Patent are unpatentable. Additionally, for the foregoing reasons, and after having analyzed the entirety of the record and assigning appropriate weight to the cited supporting evidence, we determine that Petitioner has established, by a preponderance of the evidence, that proposed substitute claims 21–35 are

¹⁵ Should Patent Owner wish to pursue amendment of the challenged claims in a reissue or reexamination proceeding subsequent to the issuance of this decision, we draw Patent Owner’s attention to the April 2019 *Notice Regarding Options for Amendments by Patent Owner Through Reissue or Reexamination During a Pending AIA Trial Proceeding*. *See* 84 Fed. Reg. 16654 (Apr. 22, 2019). If Patent Owner chooses to file a reissue application or a request for reexamination of the challenged patent, we remind Patent Owner of its continuing obligation to notify the Board of any such related matters through updated mandatory notices. *See* 37 C.F.R. § 42.8(a)(3), (b)(2) (2019).

unpatentable, and, therefore, we deny Patent Owner's Revised Motion to Amend.

V. ORDER

Accordingly, it is

ORDERED that Petitioner has shown by a preponderance of the evidence that claims 1–4, 6–8, and 10–19 of the '510 Patent are unpatentable;

ORDERED that Petitioner has shown by a preponderance of the evidence that substitute claims 21–35 are unpatentable;

ORDERED that Patent Owner's Revised Motion to Amend is denied;

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

In summary:

Claims	35 U.S.C. §	Reference(s)/Basis	Claims Shown Unpatentable	Claims Not Shown Unpatentable
1–4, 7, 8, 10, 11	103	Goates, Westerveld, Pearlman	1–4, 7, 8, 10, 11	
12–15	103	Goates, Westerveld, Hackl	12–15	
6, 16–19	103	Goates, Westerveld, Pearlman, Hackl	6, 16–19	
Overall Outcome			1–4, 6–8, 10–19	

Motion to Amend Outcome	Claims
Substitute Claims: Proposed in the Amendment	21–35
Substitute Claims: Revised Motion to Amend Granted	
Substitute Claims: Revised Motion to Amend Denied	21–35

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