

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

ASCENTCARE DENTAL PRODUCT, INC.,
Petitioner,

v.

SOLMETEX, LLC,
Patent Owner.

IPR2025-01104
Patent 12,011,329 B2

Before JAMES A. TARTAL, TIMOTHY G. MAJORS, and
CYNTHIA M. HARDMAN, *Administrative Patent Judges*.

TARTAL, *Administrative Patent Judge*.

DECISION
Denying Institution of *Inter Partes* Review
35 U.S.C. § 314

I. INTRODUCTION

Ascentcare Dental Products, Inc. (“Petitioner”)¹ filed a Petition to institute *inter partes* review of claims 1–25 and 27–30 (the “Challenged Claims”) of U.S. Patent No. 12,011,329 B2 (Ex. 1001, “the ’329 patent”). Paper 2 (“Pet.”). Solmetex, LLC (“Patent Owner”)² filed a Preliminary Response. Paper 10 (“Prelim. Resp.”).³

We have authority to determine whether to institute an *inter partes* review. 35 U.S.C. § 314(b) (2018); 37 C.F.R. § 42.4(a) (2025). An *inter partes* review may not be instituted “unless . . . the information presented in the petition . . . shows that there is a reasonable likelihood that the petitioner would prevail with respect to at least 1 of the claims challenged in the petition.” 35 U.S.C. § 314(a). Upon institution of *inter partes* review, the review proceeds “on all of the challenged claims and on all grounds of unpatentability asserted for each claim.” 37 C.F.R. § 42.108(a). Based on our consideration of the Petition, the Preliminary Response, and the evidence of record, we conclude that the information does not demonstrate a reasonable likelihood that Petitioner would prevail in showing the unpatentability of at least one of the Challenged Claims. Accordingly, we

¹ Petitioner identifies no additional real parties in interest. Pet. 18.

² Patent Owner identifies no additional real parties in interest. Paper 4 (Patent Owner’s Mandatory Notices), 1.

³ Patent Owner also filed a brief in support of discretionary denial of the Petition. Paper 6. Petitioner filed a brief in opposition to discretionary denial. Paper 8. After consideration of the Parties’ arguments, discretionary denial of institution was found not to be appropriate in this proceeding and the Petition was referred to the Board to determine whether Petitioner made a sufficient showing in the Petition to support institution. Paper 11 (the “Discretionary Denial Determination”).

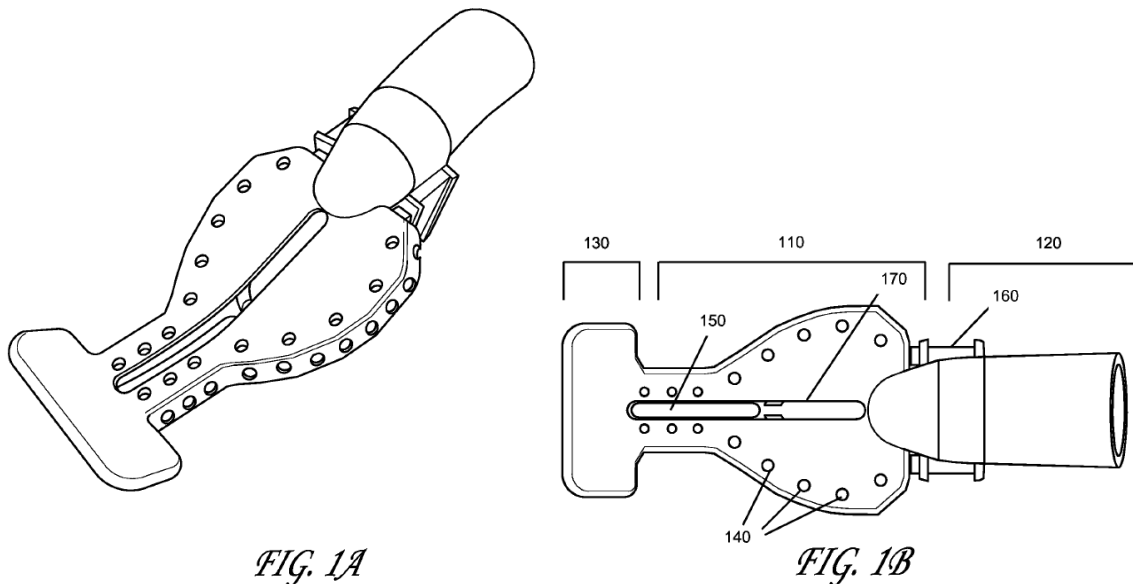
do not institute an *inter partes* review as to the Challenged Claims of the '329 patent and *deny* the Petition.

II. BACKGROUND

A. The '329 Patent

The '329 patent, titled “Intraoral Device,” issued June 18, 2024, based on an application filed June 30, 2023, that asserts the benefit of a series of applications, the earliest of which was filed December 7, 2012. Ex. 1001, codes (22), (45), (54), (60). The '329 patent discloses “[a] dental mouthpiece” that “may be attached to a high-suction dental adapter for the purpose of assisting the dental staff during dental procedures through chair-side, hands-free suction, and isolation.” *Id.* at code (57).

Figures 1A and 1B, reproduced below, are a perspective view and a top view, respectively, “of an exemplary mouthpiece with a detachable mouth prop.” *Id.* at 2:30–33.



Figures 1A and 1B show a mouthpiece with main body portion 110, suction connector portion 120, cheek retractor portion 130, and attachable mouth prop 160. *Id.* at 3:22–28. Main body portion 110 includes mesh or

perforations 140, stability bar 150, and open slit 170. *Id.* at 3:29–31. “[M]ain body portion 110, when placed in a mouth, may include an anterior wall facing the front of the mouth (e.g., the side with slit 170) and a posterior wall facing the back of the mouth.” *Id.* at 3:46–51. The ’329 patent states that “cheek retractor portion 130 may be configured to press against and retract a patient’s cheek away from the patient’s teeth.” *Id.* at 3:33–35. The ’329 patent further explains that “[w]hen placed in a patient’s mouth, the suction connector portion 120 may protrude from one side of the patient’s mouth, while the main body portion 110 lies against the back of the patient’s mouth” and that “cheek retractor portion 130 retracts the patient’s cheek on the opposite side of the patient’s mouth.” *Id.* at 3:35–40.

“[T]he main body of the mouthpiece may include a bridge structure 180 on an interior surface to ensure that the anterior and posterior surfaces remain separated during suction.” *Id.* at 4:48–51. Figure 1E, reproduced below, illustrates a “cross-sectional view of the exemplary mouthpiece and detachable mouth prop” shown in Figure 1A. *Id.* at 2:38–39.

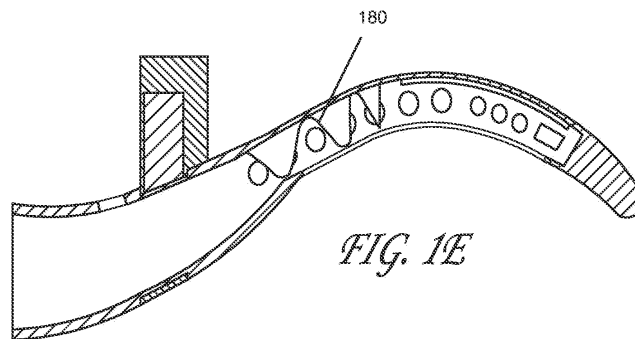


Figure 1E illustrates bridge structure 180. *Id.* at 4:51–52. “[B]ridge structure 180 may be formed as [a] wave-like protrusion that generally corresponds to the distance between the anterior and posterior walls extending substantially (e.g., within 1 mm) the full distance at its crest and

substantially flush to the surface at its trough.” *Id.* at 4:54–59. “The gaps (or troughs) between the waves of the bridge structure 180 assist in the suction-driven transfer of water and saliva to the suction connector portion 120 and ultimately, into a central suction vacuum,” and “[i]n some embodiments, the bridge structure 180 may follow the shape of a logo (e.g., an arrowhead or shield).” *Id.* at 4:61–67.

B. Illustrative Claim

Petitioner challenges claims 1–25 and 27–30 of the ’329 patent. Pet. 20. Of these, claims 1, 9, 21, and 30 are independent. Ex. 1001, 6:14–11:8. Claim 1 is illustrative of the claimed subject matter and is reproduced below along with bracketed limitation identifiers referenced in the Petition:

[1(a)] 1. A mouthpiece comprising:

[1(b)] a main body having a first end opposite a second end that is narrower than the first end, the main body comprising:

[1(c)] a first wall having a plurality of first edges and extending from the first end to the second end,

[1(d)] a second wall having a plurality of second edges and located at a distance from the first wall, the distance corresponding to an interior space between the first wall and the second wall, wherein the second wall also extends from the first end to the second end,

[1(e)] a connecting wall that connects one of the first edges of the first wall to one of the second edges of the second wall across the distance between the first wall and the second wall, and

[1(f)] a bridge structure that includes a plurality of spaced protrusions protruding from an interior surface of the second wall, the bridge structure extending across the distance between the first wall and the second wall through the interior space towards the first wall; and

[1(g)] a cheek-retractor portion connected to the narrower second end of the main body portion and expanding outwardly away from the second narrower end, the first wall and the second wall of the main body transitioning into and being connected in the cheek-retractor portion to form the cheek-retractor portion, wherein the first wall and the second wall of the main body portion that transition into the cheek-retractor portion are spaced apart from each other for a distance within the cheek-retractor portion before being connected at the cheek-retractor portion.

Id. at 6:14–45; Pet. 10.

C. *Related Proceedings*

Petitioner and Patent Owner identify as a related proceeding *Solmetex, LLC v. Ascentcare Dental Products, Inc.*, Case No. 1:24-cv-00954 (W.D. Mich). Pet. 19; Paper 4, 1. Patent Owner also identifies *Cincinnati Insurance Company v. Ascentcare Dental Products, Inc.*, Case No. 1:25-cv-00590-JMB-PJG (W.D. Mich.) as related. Paper 4, 2. The Parties also identify several petitions for *inter partes* review challenging claims of related patents in IPR2025-01020 (Patent 11,589,969 B2), IPR2025-01057 (Patent 11,589,970 B2), IPR2025-01059 (Patent 11,744,686 B2), and IPR2025-01065 (Patent 11,826,217 B2). Pet. 19; Paper 4, 1–2. Patent Owner also identifies PGR2025-00058 (Patent 12,167,948 B2). Paper 4, 2. Patent Owner further identifies several pending patent applications. *Id.*

D. *Asserted Prior Art*

Exhibit	Reference
1005	U.S. Patent No. 8,029,280 B2, issued Oct. 4, 2011 (“Black”)
1006	Korean Patent No. 10-1082826, published Nov. 11, 2011 (“Park”)
1007	U.S. Patent No. 3,101,543, issued May 15, 1961 (“Baughan”)
1008	U.S. Patent No. 4,017,975, issued Apr. 19, 1977 (“Johnson”)
1012	U.S. Patent App. No. 2003/0134253 A1, published Jul. 17, 2003 (“Hirsch”)

1021	Chinese Patent Application 200420094338.X, Publication No. CN 2748045 Y, published Dec. 28, 2005 (“Zheng”)
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E. Asserted Grounds of Unpatentability

Petitioner asserts that the Challenged Claims are unpatentable on the following ten grounds:

Claims Challenged	35 U.S.C. §⁴	Reference(s)/Basis
1–5, 8	103(a)	Black
6, 7, 9–25, 27–30	103(a)	Black, Hirsch
1–4, 6, 8	103(a)	Park, Baughan, Johnson
5, 9–20, 30	103(a)	Park, Baughan, Johnson, Black
7, 21–25, 27–29	103(a)	Park, Baughan, Johnson, Hirsch
1–5, 8	103(a)	Black, Zheng
6, 7, 9–25, 27–30	103(a)	Black, Hirsch, Zheng
1–4, 6, 8	103(a)	Park, Baughan, Johnson, Zheng
5, 9–20, 30	103(a)	Park, Baughan, Johnson, Black, Zheng
7, 21–25, 27–29	103(a)	Park, Baughan, Johnson, Hirsch, Zheng

Pet. 24–25. Petitioner relies on the Declaration of Dr. Brian P. Black, dated June 6, 2025, as support for its contentions. Ex. 1003. Patent Owner relies on the Declaration of Michael Jobin, dated October 15, 2025, as support for its arguments in opposition. Ex. 2030.

III. ANALYSIS

A. Legal Standards

A patent claim is unpatentable for obviousness 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

⁴ The Leahy-Smith America Invents Act (“AIA”), Pub. L. No. 112-29, 125 Stat. 284, 285–88 (2011), revised 35 U.S.C. §§ 102, 103 effective March 16, 2013. Petitioner applies the earliest possible priority date of the Challenged Claims as December 7, 2012. Pet. 23–24. Because this date is before March 16, 2013, we refer to the pre-AIA version of §§ 102 and 103.

made to a person having ordinary skill in the art to which said subject matter pertains. *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 406 (2007). In *Graham v. John Deere Co. of Kan. City*, 383 U.S. 1 (1966), the Supreme Court set out a framework for assessing obviousness that requires consideration of four factors: (1) the “level of ordinary skill in the pertinent art,” (2) the “scope and content of the prior art,” (3) the “differences between the prior art and the claims at issue,” and (4) “secondary considerations” of nonobviousness such as “commercial success, long felt but unsolved needs, failure of others, etc.” *Id.* at 17–18; *KSR*, 550 U.S. at 406.

“Whether an ordinarily skilled artisan would have been motivated to modify the teachings of a reference is a question of fact.” *WBIP, LLC v. Kohler Co.*, 829 F.3d 1317, 1327 (Fed. Cir. 2016) (citations omitted). “[W]here a party argues a skilled artisan would have been motivated to combine references, it must show the artisan ‘would have had a reasonable expectation of success from doing so.’” *Arctic Cat Inc. v. Bombardier Recreational Prods. Inc.*, 876 F.3d 1350, 1360–61 (Fed. Cir. 2017) (quoting *In re Cyclobenzaprine Hydrochloride Extended-Release Capsule Patent Litig.*, 676 F.3d 1063, 1068–69 (Fed. Cir. 2012)).

B. Level of Ordinary Skill in the Art

Petitioner contends that a person of ordinary skill in the art at the time the ’329 patent was filed would have had “at least a B.S. degree in mechanical engineering or a related field with at least two years’ experience designing dental devices” and that “[l]ess work experience may be compensated by a higher level of education, such as a master’s degree, and vice versa.” Pet. 32. Patent Owner contends that Petitioner’s definition is overly narrow and argues that “[n]othing in the claims of the ’329 Patent

requires experience designing ‘dental devices.’” Prelim. Resp. 19. According to Patent Owner, “the claims are directed to the structural components of a dental isolation mouthpiece, and an individual with a mechanical engineering degree and experience designing medical devices would be a [person of ordinary skill in the art] for purposes of the ’329 Patent.” *Id.* (citing Ex. 2030 ¶ 83).

We adopt Patent Owner’s proposed level of skill for purposes of this Decision. We determine that this level of ordinary skill in the art—i.e., an individual with a mechanical engineering degree and experience designing medical devices—is consistent with the level of technical understanding and competence reflected in the ’329 patent Specification and the asserted prior art references, based on our review of the current record. Moreover, our determination in this Decision would be the same were we to adopt Petitioner’s proposed level of ordinary skill in the art.

C. Claim Construction

In an *inter partes* review, we apply the same claim construction standard as would be used by a district court to construe a claim in a civil action involving the validity or infringement of a patent. 37 C.F.R. § 42.100(b). Under that standard, claim terms are given their ordinary and customary meaning, as would have been understood by a person of ordinary skill in the art at the time of the invention, in light of the language of the claims, the specification, and the prosecution history of record. *Id.*; *see also Phillips v. AWH Corp.*, 415 F.3d 1303, 1312–19 (Fed. Cir. 2005) (en banc); *Thorner v. Sony Comput. Entm’t Am. LLC*, 669 F.3d 1362, 1365–66 (Fed. Cir. 2012).

Petitioner does not propose an express definition for any term. Pet. 32–33. Petitioner states that “[t]o the extent there is any departure from the plain and ordinary meaning, Petitioner adopted Patent Owner’s constructions implied from their overly broad infringement contentions to demonstrate invalidity.” *Id.* at 32 (citing Ex. 1011; Ex. 1003 ¶¶ 52–56). Petitioner, however, does not identify the claim terms it construes based on an “implied” and “overly broad” construction, and does not expressly set forth the “implied” construction it purports to have adopted. Further, according to Petitioner, “[t]he parties are likely to dispute the scope of several terms, such as ‘end,’ ‘edge,’ ‘corresponding shape,’ and ‘interior surface.’” Pet. 33 (citing Ex. 1011 (Patent Owner’s District Court Infringement Contentions)). Petitioner, however, does not otherwise address the meaning of any of the claim terms it suggests are likely to be in dispute. Petitioner’s approach draws into question whether Petitioner has complied with our requirement that a petition must identify “[h]ow the challenged claim is to be construed.”⁵ *See* 37 C.F.R. § 42.104(b)(3).

Patent Owner argues that “the Petition takes positions on the scope of certain claim terms that is far broader than the plain and ordinary meaning in view of the intrinsic record.” Prelim. Resp. 19. Patent Owner also states that, in the parallel district court litigation, the Parties have agreed to claim constructions for the terms “troughs” and “cutout has a shield shape.” *Id.* at 20. Patent Owner provides arguments for three claims terms, namely “protrusions,” “crests,” and “plurality of wave-like

⁵ We need not resolve whether the Petition complies with 37 C.F.R. § 42.104(b)(3), because we determine, as detailed below, that Petitioner has not established a reasonable likelihood of prevailing as to any of the Challenged Claims.

protrusions.” *Id.* at 20–36. Of these three, we focus our discussion below on “protrusions,” as it is a focus of our analysis that follows.

1. *“protrusions”*

Patent Owner first states that, in the parallel district court litigation, Patent Owner asserted “[p]lain and ordinary meaning” for “a plurality of protrusions” in claims 9 and 30, whereas Petitioner proposed “an internal structure attached to the second wall that prevents the collapse of the first and second wall during suction.” Prelim. Resp. 20 (citing Ex. 2039). Here, Patent Owner argues that “protrusion” should be construed to mean “a structure attached to the second wall but not the first wall,” with respect to claims 1, 9, and 30, and to mean “a structure attached to the first wall but not the second wall,” with respect to claim 21. *Id.* at 24. Patent Owner also argues that structure attached to both the first wall and the second wall is inconsistent with “the plain and ordinary meaning of ‘protrusions’ in light of the specification.” *Id.* at 21 (citing Ex. 2030 ¶¶ 111–112). We address Patent Owner’s arguments in the context of our analysis of Petitioner’s contentions below.

2. *Additional Claim Terms*

Patent Owner also provides a table of additional claims terms identifying Petitioner’s proposed construction in the parallel district court case along with Patent Owner’s assertion that “[p]lain and ordinary meaning” applies. Prelim. Resp. 36–37 (citing Ex. 2039).

3. *Claim Construction Determinations*

We address whether Petitioner sufficiently shows how the asserted prior art teaches the limitations of the Challenged Claims in our discussion below, which focuses on the recited “protrusions.” We determine we need

not expressly construe any claim terms to determine whether Petitioner shows a reasonable likelihood that Petitioner would prevail with respect to at least one of the claims challenged in the Petition. *See Realtime Data, LLC v. Iancu*, 912 F.3d 1368, 1375 (Fed. Cir. 2019) (“The Board is required to construe ‘only those 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))).

D. Alleged Obviousness Over Black, Alone, or in Further Combination with Hirsch and Zheng

Across four grounds, Petitioner contends the subject matter of claims 1–25 and 27–30 of the ’329 patent would have been obvious over either Black, alone, or in combinations with Hirsch and Zheng. Specifically, Petitioner contends that the subject matter of claims 1–5 and 8 would have been obvious over Black, alone, or in combination with Zheng. Pet. 39–53, 119–120. Petitioner also contends that the subject matter of claims 6, 7, 9–25, and 27–30 would have been obvious over the combination of Black and Hirsch, or in further combination with Zheng. *Id.* at 53–81, 119–120.

In each of the four grounds, Petitioner relies only on Black as teaching or suggesting the “protrusions” recited in each of independent claims 1, 9, 21 and 30. For the reasons provided below, we determine that Petitioner has not made a sufficient showing for purposes of institution that Black teaches or suggests the “protrusions” recited in any of the independent claims under any of the four asserted grounds.

1. Overview of Black (Ex. 1005)

Black, titled “Intra-oral Device and Method,” describes an intra-oral device that includes a tongue shield aspirator, a bite member, a bite grip, and an evacuation tube. Ex. 1005, codes (54), (57).). Black is a U.S. Patent filed

cheek.” *Id.* at 14:5–9. “[T]he tongue shield aspirator 340 may be manufactured as a one-piece, or unitary, component, or the two flaps 340a, 340b may be manufactured separately, and then coupled to one another at the transition section 349.” *Id.* at 14:14–20.

Black further states as follows:

the proximal flap 340a and/or the distal flap 340b of the tongue shield aspirator 340 may be formed from a first (posterior) layer 348a and a second (anterior) layer 348b which are connected to, but spaced apart from, one another by transverse walls 348c (shown in phantom in FIG.23A). As shown, e.g., in FIG. 23C, each set of two consecutive walls 348c that are disposed above the longitudinal lumen forms an upper channel 342 which extends from the longitudinal lumen towards the top edge 340c of the proximal flap 340a. Similarly, each set of two consecutive walls 348c that are disposed below the longitudinal hollow lumen forms a lower channel 343 which extends from the longitudinal lumen towards the bottom edge 340d of the proximal flap 340a. With this construction, the longitudinal hollow lumen itself is formed as an axial passageway having intermittent boundary sections that are defined by the ends of the transverse walls 348c that are closest to the longitudinal lumen. In this way, the channels 342, 343 provide a plurality of conduits for debris and fluid evacuation, thereby allowing for simultaneous aspiration of debris and fluid from top (palate of mouth) to bottom (floor of mouth), and through the passageway, during dental procedures.

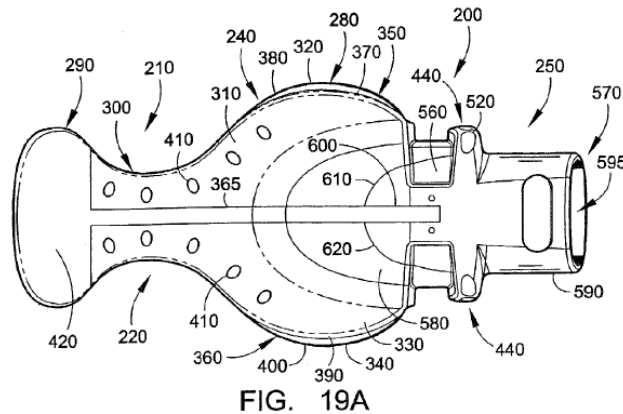
Id. at 14:25–47.

2. Overview of Hirsch (Ex. 1012)

Hirsch, titled “Intraoral Device,” describes an intra-oral device that includes a one-piece, flexible, injection molded body made of a single homogeneous material. Ex. 1005, codes (54), (57). Hirsch is a U.S. Patent filed on February 27, 2003, and issued on July 17, 2003, that further refers

back to an application filed on November 17, 1998. *Id.* at codes (22), (43), (63).

Hirsch's Figure 19A, reproduced below, is a front elevational view of an intraoral illumination device. Ex. 1012 ¶ 32.



Hirsch describes an “intraoral device 200” that “preferably has a single-piece, integrated, homogenous-material, injection-molded construction” and “preferably injection molded out of a translucent (e.g., transparent), flexible, soft, elastic, resilient, biocompatible thermoplastic elastomer.” *Id.* ¶ 74. The single-piece intraoral device 200 generally includes integrated tongue and cheek retractor 240, bite piece 250, and connection section 570. *Id.* ¶ 76. The tongue and cheek retractor 240 has inner surfaces 260 and outer surfaces 270 and includes an incurved main body portion 280 and a forwardly angled cheek retractor (or “whale tail”) portion 290 joined by isthmus portion 300. *Id.* ¶ 77.

Hirsch's cheek retractor 240 includes an upper front flap 310, an upper rear flap 320, a lower front flap 330, and a lower rear flap 340. *Id.* ¶ 78. The front flaps 310, 330 and rear flaps 320, 340 are separated by upper gap 350 and lower gap 360, respectively. *Id.* The flaps 320, 330, 340, 350 all extend from and share a common, central spine 365. *Id.* The spine 365 extends longitudinally a majority of the length of the retractor 240 and

divides the upper half 210 from the lower half 220 of the intraoral device 200.

3. *Overview of Zheng (Ex. 1021)*

Zheng, titled “Oral Moisture Barrier Device,” describes an oral moisture barrier device comprising an occlusal pad and a moisture barrier plate integrally connected with the occlusal pad. Ex. 1021, codes (54), (57). Zheng is a Chinese patent filed on October 25, 2004, and published on December 28, 2005. *Id.* at codes (22), (45).

Zheng’s Figure 2, reproduced below, is a stereoscopic structural schematic view. Ex. 1021, 7.

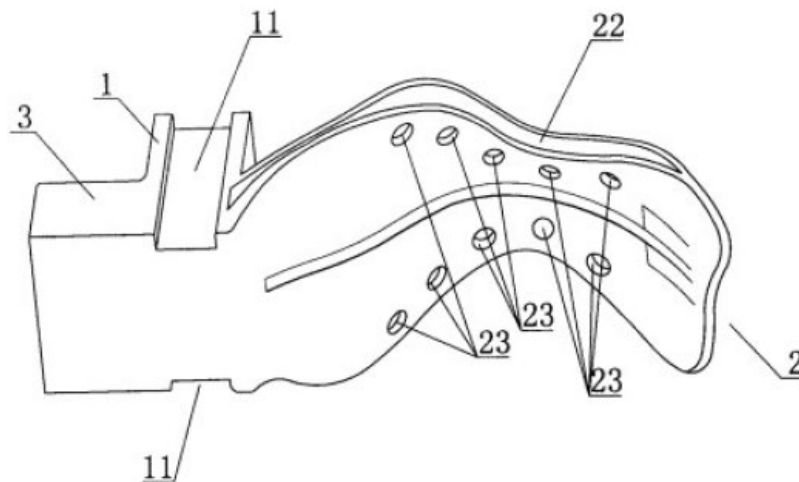


Figure 2

Zheng describes an occlusal pad 1 and a moisture barrier plate 2 integrally connected with the occlusal pad 1. *Id.* The moisture barrier plate 2 is a vaguely tongue-shaped separator plate, and the upper/lower sides thereof are provided respectively with upper/lower saliva discharge grooves 21, 22 for discharging oral saliva. *Id.* The front end of the occlusal pad 1 is provided with a hollow connection end 3 for a connector of a saliva discharge tube to be plugged in, and the inner side of the hollow connection end 3 is

correspondingly provided with a saliva suction hole 31 in communication with the upper/lower saliva discharge grooves 21, 22. *Id.*

4. *Analysis of Independent Claim 1*

Claim 1 recites, in relevant part, “a bridge structure that includes a plurality of spaced *protrusions* protruding *from an interior surface of the second wall*, the bridge structure extending across the distance between the first wall and the second wall through the interior space *towards the first wall*.” Ex. 1001, 6:29–33 (emphases added). The Specification describes the recited “protrusions” as forming a bridge structure “on an interior surface to ensure that the anterior and posterior surfaces remain separated during suction.” *Id.* at 4:48–51.

Petitioner contends that Black’s “transverse walls 348c are a bridge structure, as claimed,” that Black’s “transverse walls extend from an interior surface of the posterior flap 348a and to the anterior flap 348b,” and that, as such, “the transverse walls are protrusions.” Pet. 47 (citing Ex. 1003 ¶¶ 92–96; Ex. 1005, 14:21–47). In support of Petitioner’s arguments, Dr. Black (a named inventor on the Black reference) states that “transverse walls 348c are projections.” Ex. 1003 ¶¶ 1, 94. Claim 1, however recites “protrusions,” not “projections” and neither Dr. Black nor Petitioner address whether those terms mean the same thing.⁶

⁶ Black discusses both “protrusions” (*see, e.g.*, Ex. 1005, 13:9–14 (discussing a “bite member” that includes “three such protrusions”)) and “projections” (*see, e.g.*, Ex. 1005, 6:44–62 (discussing a “tongue shield aspirator” that includes “finger-like projections”)). Thus, Black appears to distinguish between “projections” and “protrusions.” Moreover, Petitioner does not direct us to any disclosure in Black that characterizes transverse walls 348c as either “projections” or “protrusions.” *See, generally*, Pet.

There is no dispute that Black’s transverse walls 348c “are connected to both the posterior layer and the anterior layer.” Ex. 1003 ¶ 95 (citing Ex. 1005, 14:21–47); *see also* Ex. 1005, 14:25–30 (stating “a first (posterior) layer 348a and a second (anterior) layer 348b . . . are connected to, but spaced apart from, one another by transverse walls 348c”). Patent Owner argues that the plain and ordinary meaning of “protrusions,” in light of the Specification, does not encompass “a ‘transverse wall’ that is attached to *both* the first wall and the second wall.” Prelim. Resp. 21. Patent Owner further states as follows:

The claims themselves draw a distinction between (1) a structure attached to both the first and second walls and (2) a “protrusion” attached to one wall and extending towards the other. For example, claim 1 separately recites a “connecting wall that connects one of the first edges of the first wall to one of the second edges of the second wall.” [Ex. 2030] ¶113. The fact that the claim only specifies that the protrusion is attached to one wall, while also claiming a structure attached to both walls, confirms that the claimed protrusions are only attached to one wall. *Bd. of Regents of the Univ. of Tex. Sys. v. BENQ Am. Corp.*, 533 F.3d 1362, 1371 (Fed. Cir. 2008) (“Different claim terms are presumed to have different meanings”).

The specification also confirms that the “protrusions” are only attached to one wall. The bridge structure 180 is “formed as a[] wave-like protrusion that generally corresponds to the distance between the anterior and posterior walls extending substantially (e.g., within 1 mm) the full distance at its crest and substantially flush to the surface at its trough.” [Ex. 1001], 4:54–59; [Ex.2030] ¶114. Additionally, “[t]he crests provide a plurality of contact points with the anterior wall to keep the anterior wall separated from the posterior wall during suction [while] the troughs provide gaps that allow for suction of air, fluids, and small debris through the bridge structure.” [Ex. 1001], 2:21–26. The specification never states that the protrusions connect the first and second walls. [Ex. 2030] ¶115.

Id. at 21–22.

Based on the evidence and arguments presented, we determine that Petitioner fails to show sufficiently for purposes of instituting *inter partes* review that Black teaches “protrusions protruding from an interior surface” of one wall of the mouthpiece “towards” an opposing wall of the mouthpiece, as required by claim 1. Black’s transverse walls 348c span the distance between the inner surfaces of two opposing walls and are connected to both walls. Claim 1, however, requires that the protrusions protrude not from either or both walls, but “from an interior surface of the second wall . . . towards the first wall.” Because transverse walls 348c of Black “are connected to both the posterior layer and the anterior layer” (Ex. 1005, 14:21–47) it is unclear from Petitioner’s arguments how a person of ordinary skill would have been able to distinguish which interior surface transverse walls 348c protrude “from” and which surface the transverse walls 348c extends “towards.”

In sum, Petitioner offers no evidence of the meaning of “protrusions,” in light of Specification, that would encompass a wall connecting both inner surfaces of two opposing walls. Dr. Black’s testimony in support of Petitioner that “transverse walls 348c are projections” is unsupported and conclusory. Ex. 1003 ¶ 94; compare with *id.* ¶ 49 (Dr. Black discussing “anti-collapse projections and molded walls” as “conventional mechanical structure used in dental apparatuses for a long time,” implying a difference between “projections” and “walls”).

We find that Petitioner has failed to meet its burden of identifying or supporting its assertion that “protrusions” should be construed to encompass transverse walls 348c of Black upon which Petitioner relies as corresponding to the claimed “protrusions.” Accordingly, Petitioner fails to sufficiently

show that Black teaches or suggests “protrusions” as recited in claim 1. Petitioner does not rely on Zheng as teaching the recited “protrusions.” *See* Pet. 119–120. Accordingly, we determine that Petitioner has not shown a reasonable likelihood of prevailing in showing that the subject matter of claim 1 would have been obvious over Black, alone, or in combination with Zheng.

5. *Analysis of Dependent Claims 2–5 and 8*

Claims 2–5 and 8 depend from claim 1. Because Petitioner has not shown how Black, alone, or in combination with Zheng, teaches each limitation of claim 1, Petitioner has not shown a reasonable likelihood of prevailing in showing that the subject matter of dependent claims 2–5 and 8 would have been obvious over Black, alone, or in combination with Zheng.

6. *Analysis of Independent Claims 9, 21, and 30*

In a materially identical manner to claim 1, independent claim 9 recites “a plurality of protrusions extending from an interior surface of the second wall towards the first wall,” claim 21 recites “a bridge structure extending from an interior surface of the first wall toward the second wall, . . . including a plurality of . . . protrusions,” and claim 30 recites “the second wall further includes a plurality of protrusions extending from an interior surface of the second wall towards the first wall.” Ex. 1001, 7:29–32, 9:23–26, 10:33–36. Petitioner contends the subject matter of claims 9, 21, and 30 would have been obvious over Black and Hirsch, as well as in further combination with Zheng. Pet. 56–63, 70–76, 80–81, 119–120.

Petitioner relies only on the transverse walls 348c of Black as teaching “protrusions,” as required by claims 9, 21, and 30. *Id.* For the same reasons discussed above with regard to claim 1, Petitioner has not shown

how Black teaches each limitation of claims 9, 21, and 30, and, therefore, Petitioner has not shown a reasonable likelihood of prevailing in showing that the subject matter of claims 9, 21, and 30 would have been obvious over the asserted combinations of Black and Hirsch or Black, Hirsch, and Zheng.⁷

7. *Analysis of Dependent Claims 6, 7, 10–20, 22–25, and 27–29*

Claims 6, 7, 10–20, 22–25, and 27–29 depend from one of claims 1, 9, 21, or 30. Because Petitioner has not shown how the asserted combinations of Black and Hirsch or Black, Hirsch, and Zheng teach each limitation of independent claims 1, 9, 21, and 30, Petitioner has not shown a reasonable likelihood of prevailing in showing that the subject matter of dependent claims 6, 7, 10–20, 22–25, and 27–29 would have been obvious over the combination of Black and Hirsch, or in further combination with Zheng.

E. *Alleged Obviousness Over Park, Baughan, Johnson, and Additional Asserted Prior Art*

Across six grounds, Petitioner contends the subject matter of claims 1–25 and 27–30 would have been obvious over either the combination of Park, Baughan, and Johnson, or in further combination with additional prior art. In each of the six grounds, Petitioner relies on Baughan and Johnson, in combination with Park, as teaching or suggesting the “protrusions” recited in each of independent claims 1, 9, 21, and 30. For the

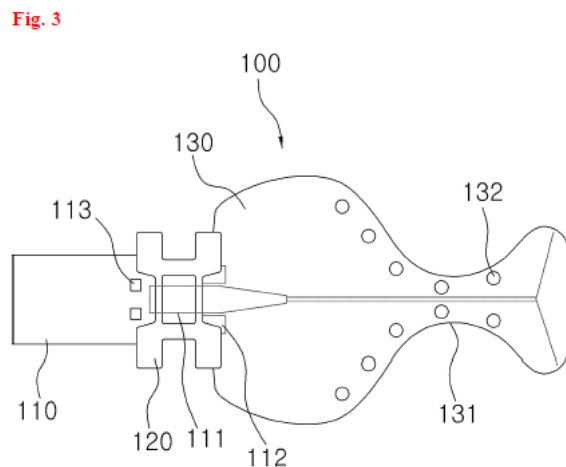
⁷ The decision denying Patent Owner’s request for discretionary denial of the Petition refers to evidence that the Office materially erred in its consideration of Hirsch with respect to the recitation in claim 1 of “the first wall and the second wall of the main body portion that transition into the cheek-retractor portion are spaced apart from each other.” Discretionary Denial Determination, 2–3. Here, the limitation we focus on concerns the “protrusions” recited by claim 1. Petitioner does not argue that Hirsch teaches the “protrusions” limitations of any of the Challenged Claims. *See generally* Pet.

reasons provided below, we determine that Petitioner has not made a sufficient showing for purposes of institution that the asserted combinations teach or suggest the recited “protrusions,” and has not provided sufficient reasoning in support of the asserted combinations under any of the six grounds.

1. *Overview of Park (Ex. 1006)*

Park, titled “Detachable Oral Illuminating Device with Mouth Prop,” describes a detachable oral illuminating device with a mouth prop, comprising a mouth prop that is inserted into the oral cavity and a device body that is detachably combined with the mouth prop. Ex. 1006, codes (54), (57). Park is a Korean patent publication filed on January 20, 2010, and published on November 11, 2011. *Id.* at codes (22), (45).

Park’s Figure 3, reproduced below, is a front view of a mouth prop. Ex. 1006 ¶ 20.



Park describes a mouth prop (100) that is inserted into the oral cavity of a patient requiring treatment for teeth or gums to maintain the mouth in an open state while suppressing the forward movement of the patient’s tongue, thus fixing its position. *Id.* ¶ 25. As shown in Figure 3, mouth prop (100) includes a hollow insertion port (110) formed on one side, a tooth support

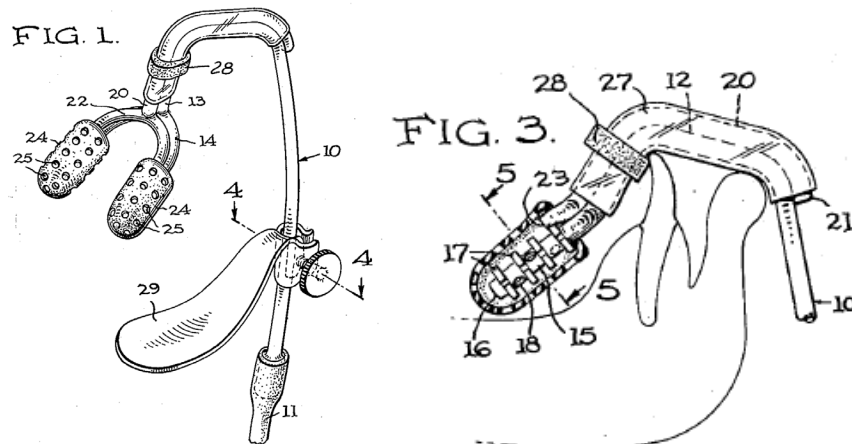
section (120) formed in front of the insertion port (110), and a tongue retractor (130) that extends from the insertion port (110) to the other side. *Id.*

¶ 26. The tooth support section (120) is formed to extend a certain length forward from the insertion port (110), with interlocking grooves formed on the upper and lower sides, allowing the patient's upper and lower teeth to interlock, thereby maintaining the mouth prop (100) in a fixed position in the oral cavity while keeping the mouth open. *Id.* ¶ 29. The tongue retractor (130) is formed to extend a certain length from the insertion port (110) to the other side, blocking the front of the tongue to suppress its forward movement. *Id.* ¶ 30.

2. Overview of Baughan (Ex. 1007)

Baughan, titled "Dental Saliva Ejectors," describes a saliva ejector having improved means to completely eliminate clogging or blocking of the suction orifices with mouth tissue during the operation of the ejector.

Ex. 1007, 1:3, 1:9–12. Baughan is a U.S. Patent filed on May 15, 1961, and issued on August 27, 1963. *Id.* at 1. Figures 1 and 3 of Baughan, reproduced below, illustrate, respectively, a perspective view of a dental saliva ejector and a fragmentary side elevation of an ejector during use, partly in section. Ex. 1007, 1:45–47, 1:50–51.



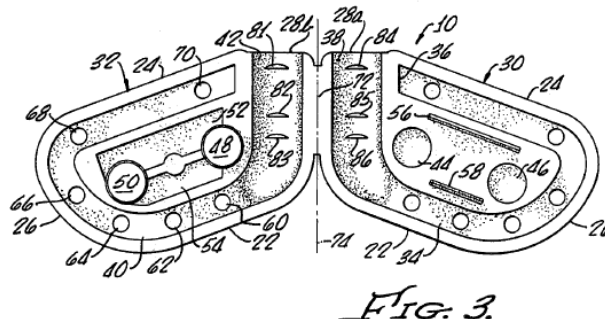
As shown in Figures 1 and 3, Baughan's ejector includes a substantially rigid main suction tube 10 connected to a flexible suction hose 11. *Id.*

"The U-shaped tube portion 14 carries integral relatively short terminal tube extensions 15 having their lower ends 16 suitably closed, and carrying a plurality of longitudinally spaced circular flow rings or discs 17, suitably rigidly secured thereto in equidistantly spaced parallel relation and at right angles to the terminal tube portions 15." *Id.* at 2:19–25. "A flexible hollow rubber sleeve or boot 24 surrounds and encloses each tube extension 15 and its several discs 17, and has snug gripping engagement with the U-shaped tube, portions 14 and 22 just above the uppermost discs 17. *Id.* at 2:51–55. "The discs 17 prevent the flexible sleeve or boot 24 from collapsing upon the terminal tube portion 15 and closing the orifices 18 thereof." *Id.* at 3:46–48.

3. *Overview of Johnson (Ex. 1008)*

Johnson, titled "Saliva Ejector and Chin Holder Therefor," describes a saliva ejector that is formed with a flattened body having an internal suction passage extending along the bottom and continuous to the top of the body. Ex. 1008, codes (54), (57). Johnson is a U.S. Patent filed on March 22, 1976, and issued on April 19, 1977. *Id.* at codes (22), (45).

Johnson's Figure 3, reproduced below, illustrates a saliva ejector engaged upon a vacuum tube. Ex. 1008, 2:29–30.



Johnson describes a saliva ejector 10 having a body that has a substantially flattened shape, having two long or major dimensions and a minor dimension. *Id.* at 3:6–8. The body of the saliva ejector is formed of a pair of substantially congruent and mating plates 30, 32. *Id.* at 3:16–17. Plate 30 is formed with a recess 34 extending along the bottom of the plate continuing along the front of the plate and then extending along the top of the plate to a closed end 36. *Id.* at 3:17–21. Recess 34 is continuous, following the edges of the plate and terminating at the rear of the plate in an enlarged groove 38 formed in the neck 28a of the plate 30. *Id.* at 3:21–24. Plate 32 has a similar recess 40 extending from a closed end at the top rear edge of the plate forwardly along the edge of the plate, downwardly along the front edge and rearwardly along the bottom edge where it terminates at a groove 42 formed in the neck 28b of plate 32. *Id.* at 3:25–30.

“The plates 30 and 32 are molded of a suitable rigid or semi-rigid plastic with the hinge section 72 being thin enough to allow a hinged pivoting (actually a bending of section 72) of one of the plates relative to the other.” *Id.* at 4:24–27. According to Johnson, “[i]f deemed necessary or desirable, molded projections 81, 82, 83, 84, 86, 86 are formed on the interior surfaces of the neck sections 28a and 28b, having sharper corners or edges on their downwardly (as viewed in FIG. 3) facing edges in order to more firmly grasp the surface of the vacuum tube 12 and to better clamp the tube against inadvertent withdrawal from the cylindrical receiving opening.” *Id.* at 4:16–23.

4. *Analysis of Independent Claim 1*

As discussed above, claim 1 recites, in relevant part, “a bridge structure that includes a plurality of spaced *protrusions* protruding from an

interior surface of the second wall, the bridge structure extending across the distance between the first wall and the second wall through the interior space *towards the first wall.*” Ex. 1001, 6:29–33. Petitioner recognizes that Park does not teach “protrusions,” as claimed. Pet. 89 (stating “Park is silent regarding whether any structures are formed inside the interior chamber of the main body”).

Petitioner turns to Baughan, asserting that Baughan teaches “a mechanical element that prevents collapse under suction,” and specifically “three projecting discs 17,” that are “rigid structures” that project “outward from the tube.” Pet. 93 (citing, e.g., Ex. 1007, 3:43–48). In Baughan, Petitioner notes, “projecting discs 17 are secured to the tube 15, and the sleeve rests upon the discs.” *Id.* at 92–93. The projecting discs 17 of Baughan do not extend from and are not attached to any portion of the sleeve, rather, the projecting discs are used to prevent from the sleeve from collapsing upon the terminal tube portion 15. *See* Ex. 1007 3:46–48. Apparently recognizing that Baughan does not teach “protrusions,” as required by claim 1, Petitioner argues that a person of ordinary skill “using basic common sense,” would have modified Baughan’s “discs 17 for a tube-shaped embodiment to be projections for a flatter, non-tube embodiment.” Pet. at 92 (citing Ex. 1003 ¶ 219).

As purported support, Petitioner turns to Johnson as teaching “projections on a flat surface.” *Id.* at 93 (citing Ex. 1003 ¶¶ 239–240; Ex. 1008, 4:16–23, Fig. 3). Johnson’s “projections 81, 82, 83, 84, 86, 86 are formed on the interior surfaces of the neck sections 28a and 28b, having sharper corners or edges on their downwardly (as viewed in FIG. 3) facing edges in order to more firmly grasp the surface of the vacuum tube 12 and to

better clamp the tube against inadvertent withdrawal from the cylindrical receiving opening.” Ex. 1008, 4:16–23. Although Park’s tongue retractor 130 (Ex. 1006, Fig. 3) appears to have flatter surfaces than Baughan’s flexible sleeve 24 (Ex. 1007, Fig. 3), the relevance of Johnson to Petitioner’s combination is unclear, because claim 1 does not require any surface to be flat. Petitioner does not suggest that Johnson teaches or suggests “a bridge structure that includes a plurality of spaced protrusions protruding from an interior surface of the second wall, the bridge structure extending across the distance between the first wall and the second wall through the interior space towards the first wall,” as required by claim 1.

Petitioner fails to sufficiently show that any of Park, Baughan, or Johnson, alone or in combination, teaches or suggests “protrusions,” as claimed. In particular, Petitioner has not identified in Baughan “protrusions” as claimed, but instead relies on rigid discs attached to an interior tube in Baughan, and proposes using “common sense” to transform those discs into a different structure to correspond to “projections” recited in claim 1. Johnson’s disclosure relied upon by Petitioner does not change the shortcoming in Baughan. Johnson’s teaching of projections on a flat surface does not change the fact that Petitioner fails to show how Baughan teaches “protrusions,” as required by claim 1. We are not persuaded that Petitioner’s reliance on “using basic common sense” to modify Baughan’s “discs 17 for a tube-shaped embodiment to be projections for a flatter, non-tube embodiment” establishes a reasonable likelihood of prevailing. *See* Prelim. Resp. 57 (asserting that “Petitioner cannot rely on ‘basic common sense’ to fill in this missing element under Federal Circuit precedent” (citing

Qualcomm Inc. v. Apple Inc., 24 F.4th 1367, 1373–77 (Fed. Cir. 2022);
Qualcomm Inc. v. Apple Inc., 134 F.4th 1355, 1364–65 (Fed. Cir. 2025)).

We also find Petitioner’s reasoning in support of the asserted combination deficient. Petitioner argues that Park’s walls are “likely to collapse under the suction force,” based not on Park, but on Baughan, which states that “discs” in Baughan are used to prevent the “flexible sleeve” of Baughan from collapsing. Pet. 89. (citing Ex. 1007, 3:46–48). Petitioner reasons that because Park uses silicone, a flexible material, Park’s walls must also collapse like Baughan. *Id.* (citing Ex. 1006 ¶¶ 32, 34). Petitioner, however, directs us to no disclosure in Park to suggest that the material used in Park or the arrangement of Park would collapse in the same manner as Baughan. Indeed, if Park’s mouthpiece collapses as Petitioner speculates, it would appear likely to render Park inoperable. *See* Ex. 2030 ¶ 205.

Additionally, Petitioner recognizes that in Park “the sidewalls and the insertion part 111 would help resist this collapsing force,” and states that in Park it “is unclear whether the mouth prop 100 includes a spine or other rigid structure running through the middle of the mouth prop 100.” Pet. 89–90. Thus, whether Park is susceptible to collapse is, at best, unknown. *See* Prelim. Resp. 48 (asserting that a person of ordinary skill would have known “that silicone can have varying degrees of hardness, tensile strength, and elasticity such that Park’s mouthpiece would not necessarily collapse under suction”) (citing Ex. 2030 ¶¶ 189–90; Ex. 2036; Ex. 2037).

Even assuming, as Petitioner asserts, that “additional anti-collapsing structure would assist at the weakest areas of the tongue retractor” in Park, Petitioner offers insufficient reasoning for why a person of ordinary skill would have turned to Baughan and modified the structure taught by Baughan

to instead conform to what is recited in claim 1. Petitioner’s suggestion that “common sense” would have led a person of ordinary skill in the art to modify the structures of Baughan to solve a problem with collapse in Park that Park does not suggest was a problem is likewise unpersuasive and insufficient. Pet. 93 (further asserting that “it was well known in the art how to make projections on a flat surface”). Petitioner’s reliance on Johnson as generically teaching that protrusions can be on flat surfaces does not supply a reason why a person of ordinary skill in the art would have made the proposed modifications outside of improper hindsight. *See also* Prelim. Resp. 58, 59 (arguing that the projections in Johnson are on a semicircular surface, not on a flat surface as Petitioner asserts) (citing Ex. 1008 Figs. 4, 5).

Based on the evidence and arguments presented, we determine that Petitioner fails to show sufficiently for purposes of instituting *inter partes* review that the asserted combination of Park, Baughan, and Johnson, or in further combination with Zheng, teaches “protrusions protruding from an interior surface” of one wall of the mouthpiece “towards” an opposing wall of the mouthpiece, as required by claim 1, or that a person of ordinary skill in the art would have had reason to combine the asserted references in the manner alleged by Petitioner.

5. *Analysis of Dependent Claims 2–4, 6, and 8*

Claims 2–4, 6, and 8 depend from claim 1. Because Petitioner has not shown how the asserted combination of Park, Baughan, and Johnson, or in further combination with Zheng, teaches or suggests each limitation of claim 1, or that a person of ordinary skill in the art would have had reason to combine the asserted references in the manner alleged by Petitioner,

Petitioner has not shown a reasonable likelihood of prevailing in showing that the subject matter of dependent claims 2–4, 6, and 8 would have been obvious over the same combinations.

6. *Analysis of Independent Claims 9 and 30*

Petitioner contends independent claims 9 and 30 would have been obvious over the combination of Park, Baughan, Johnson, and Black, or in further combination with Zheng. Pet. 102–106, 110–111, 120–121. For the same reasons discussed above with regard to claim 1, Petitioner has not shown how the asserted combinations teach or suggest each limitation of claims 9 and 30, or that a person of ordinary skill in the art would have had reason to combine the asserted references in the manner alleged by Petitioner. Accordingly, Petitioner has not shown a reasonable likelihood of prevailing in showing that the subject matter of claims 9 and 30 would have been obvious over the asserted combinations.

7. *Analysis of Dependent Claims 5 and 10–20*

Claims 5 and 10–20 depend from either claim 1 or claim 9. Because Petitioner has not shown how the asserted combination of Park, Baughan, Johnson and Black, or in further combination with Zheng, teaches or suggests each limitation of claim 1 and 9, or that a person of ordinary skill in the art would have had reason to combine the asserted references in the manner alleged by Petitioner, Petitioner has not shown a reasonable likelihood of prevailing in showing that the subject matter of dependent claims 5 and 10–20 would have been obvious over the same combinations.

8. *Analysis of Independent Claim 21*

Petitioner contends the subject matter of claim 21 would have been obvious over Park, Baughan, Johnson, and Hirsch, or in further combination

with Zheng. Pet. 113–117, 120–121. Petitioner does not rely on Hirsch with regard to the recited “protrusions.” *See id.* For the same reasons discussed above with regard to claim 1, Petitioner has not shown how the asserted combinations teach or suggest each limitation of claim 21, or that a person of ordinary skill in the art would have had reason to combine the asserted references in the manner alleged by Petitioner. Accordingly, Petitioner has not shown a reasonable likelihood of prevailing in showing that the subject matter of claim 21 would have been obvious over the asserted combinations.

9. *Analysis of Dependent Claims 7, 22–25, and 27–29*

Claims 7, 22–25, and 27–29 depend from either claim 1 or claim 21. Because Petitioner has not shown how the asserted combination of Park, Baughan, Johnson and Hirsch, or in further combination with Zheng, teaches or suggests each limitation of claims 1 and 21, or that a person of ordinary skill in the art would have had reason to combine the asserted references in the manner alleged by Petitioner, Petitioner has not shown a reasonable likelihood of prevailing in showing that the subject matter of dependent claims 7, 22–25, and 27–29 would have been obvious over the same combinations.

IV. CONCLUSION

For the foregoing reasons, the information presented in the Petition and accompanying evidence does not establish a reasonable likelihood that Petitioner would prevail in showing the unpatentability of at least one of the Challenged Claims.

V. ORDER

In consideration of the foregoing, it is hereby:

ORDERED that the Petition is *denied*.

IPR2025-01104
Patent 12,011,329 B2

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