

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

ASCENTCARE DENTAL PRODUCTS, INC.,
Petitioner

v.

SOLMETEX, LLC
Patent Owner

Patent No. 12,290,418

Case No. IPR2025-01175

PATENT OWNER'S PRELIMINARY RESPONSE

TABLE OF CONTENTS

	Page
I. INTRODUCTION	1
II. OVERVIEW OF THE ‘418 PATENT	3
III. SUMMARY OF PETITIONER’S REFERENCES	10
A. Black (EX1005) (Grounds 1, 4-5, and 7).....	10
B. Park (EX1006) (Grounds 2-4 and 6-7).....	12
C. Baughan (EX1007) (Grounds 2-4 and 6-7).....	13
D. Johnson (EX1008) (Grounds 2-4 and 6-7).....	15
E. Hirsch (EX1012) (Grounds 1, 3-5, and 7).....	15
F. Zheng (EX1021) (Grounds 6-7).....	16
IV. PATENT OWNER’S DISCRETIONARY DENIAL REQUEST	17
V. LEVEL OF SKILL IN THE ART	19
VI. CLAIM CONSTRUCTION	21
A. “Wave-Like Structure” (Claims 1 and 11).....	21
1. Petitioner’s Interpretation Renders the “Wave-Like” Requirement Meaningless.....	23
2. Patent Owner’s Construction is Consistent with the Specification.....	25
3. Patent Owner’s Construction is Consistent with the Prosecution History.....	27
a) Prosecution History of the ‘232 Patent.....	28
b) Prosecution History of the ‘686 and ‘970 Patents	30
B. District Court Constructions.....	33
VII. PETITIONER FAILED TO MEET ITS BURDEN	35
A. Ground 1: Alleged Obviousness Based on Black and Hirsch (Claims 1-9, 11-17, and 19)	35
1. Independent Claims 1 and 11: Black Does Not Disclose a “Wave-Like Structure” or “Crests”	35
a) Black’s Transverse Walls Do Not Form a “Wave-Like Structure”	36
b) Black’s Transverse Walls Do Not Provide “Contact Points” ...	41
2. Dependent Claims	44

B.	Ground 2: Alleged Obviousness Based on Park, Baughan, and Johnson (Claims 20-22 and 24-28)	44
1.	Independent Claim 20	44
a)	Park is Not “Likely to Collapse” Under Suction.....	47
b)	A POSITA Would Not Have Combined Park, Baughan, and Johnson	55
c)	Petitioner’s Translation of Park Does Not Comply with the Board’s Rules.....	62
2.	Dependent Claims	64
C.	Ground 3: Obviousness Based on Park, Baughan, Johnson, and Hirsch (Claims 1-9, 11-17, and 23)	64
1.	Independent Claims 1 and 11	65
2.	Dependent Claims	69
D.	Ground 4: Alleged Obviousness Based on Park, Baughan, Johnson, and Black (Claim 19)	69
E.	Ground 5: Alleged Obviousness Based on Black, Hirsch, and Zheng (Claims 1-9, 11-17, and 19)	69
F.	Ground 6: Alleged Obviousness Based on Park, Baughan, Johnson, Hirsch, and Zheng (Claims 1-9, 11-17, and 20-28)	70
G.	Ground 7: Alleged Obviousness Based on Park, Baughan, Johnson, Hirsch and Zheng (Claim 19)	71
VIII.	Petitioner Did Not Establish IPR Eligibility	71
IX.	CONCLUSION.....	72

TABLE OF AUTHORITIES

	Page(s)
Cases	
<i>ActiveVideo Networks, Inc. v. Verizon Commc’ns, Inc.</i> , 694 F.3d 1312 (Fed. Cir. 2012)	61
<i>Apple Inc. v. Masimo Corp.</i> , No. 2022-1890, 2024 WL 137336 (Fed. Cir. Jan. 12, 2024).....	25
<i>Andersen Corp. v. Fiber Composites, LLC</i> , 474 F.3d 1361 (Fed. Cir. 2007)	32, 38
<i>Aptalis Pharmatech, Inc. v. Apotex Inc.</i> , 718 F. App’x 965 (Fed. Cir. 2018).....	27
<i>Ascentcare Dental Products, Inc. v. Solmetex, LLC</i> , IPR2025-01020, Paper 11 (PTAB Oct. 10, 2025).....	17, 20
<i>ATD Corp. v. Lydall, Inc.</i> , 159 F.3d 534 (Fed. Cir. 1998)	55
<i>Braintree Labs., Inc. v. Novel Labs., Inc.</i> , 749 F.3d 1349 (Fed. Cir. 2014)	61
<i>Computer Docking Station Corp. v. Dell, Inc.</i> , 519 F.3d 1366 (Fed. Cir. 2008)	32, 38
<i>Ex Parte Thomas Edward Shafovaloff</i> , No. Appeal 2022-004103, 2023 WL 5321165 (PTAB Aug. 16, 2023)	53
<i>Gentry Gallery, Inc. v. Berkline Corp.</i> , 134 F.3d 1473 (Fed. Cir. 1998)	32
<i>Google LLC v. Network-1 Techs., Inc.</i> , 726 F.App’x 779 (Fed. Cir. 2018)	44

<i>Grain Processing Corp. v. Am. Maize-Prods. Co.</i> , 840 F.2d 902 (Fed. Cir. 1988)	54
<i>Hengdian Grp. Dmegc Magnetics Co., Ltd. v. Hitachi Metals, Ltd.</i> , IPR2017-01313, Paper 7 (PTAB Nov. 6, 2017).....	64
<i>Hockerson-Halberstadt, Inc. v. Converse Inc.</i> , 183 F.3d 1369 (Fed. Cir. 1999)	24
<i>Insite Vision Inc. v. Sandoz, Inc.</i> , 783 F.3d 853 (Fed. Cir. 2015)	55
<i>In re Fine</i> , 837 F.2d 1071 (Fed. Cir. 1988)	44, 64, 68, 69
<i>In re Sasse</i> , 629 F.2d 675 (CCPA 1980).....	53
<i>Intel Corp. v. Qualcomm Inc.</i> , 21 F.4th 784 (Fed. Cir. 2021)	24, 25
<i>Juniper Networks, Inc. v. Smart Path Connections, LLC</i> , IPR2021-01356, Paper 27 (PTAB Jan. 19, 2023)	61
<i>Merck & Co. v. Teva Pharms. USA, Inc.</i> , 395 F.3d 1364 (Fed. Cir. 2005)	24
<i>Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co.</i> , 868 F.3d 1013 (Fed. Cir. 2017)	35
<i>Nystrom v. TREX Co.</i> , 424 F.3d 1136 (Fed. Cir. 2005)	48
<i>O.I. Corp. v. Tekmar Co.</i> , 115 F.3d 1576 (Fed. Cir. 1997)	43
<i>Orthopedic Equip. Co. v. United States</i> , 702 F.2d 1005 (Fed. Cir. 1983)	54

PersonalWeb Techs., LLC v. Apple, Inc.,
848 F.3d 987 (Fed. Cir. 2017)61

Purdue Pharma L.P. v. Depomed, Inc.,
643 F. App'x 960 (Fed. Cir. 2016).....54

Qualcomm Inc. v. Apple Inc.,
24 F.4th 1367 (Fed. Cir 2022)57

Qualcomm Inc. v. Apple Inc.,
134 F.4th 1355 (Fed. Cir. 2025)58

Samsung Elecs. Co., Ltd. et al. v. MemoryWeb, LLC,
IPR2022-00885, Paper 11 (PTAB Nov. 17, 2022).....71

Seachange Int'l, Inc. v. C-COR, Inc.,
413 F.3d 1361 (Fed. Cir. 2005)43

Shenzhen Aurora Tech. Co., Ltd. v. Putco, Inc.,
IPR2020-00670, Paper 10 (PTAB Aug. 27, 2020).....63, 64

Univ. of California v. Satco Prods., Inc.,
No. 2023-1356, 2024 WL 4972639 (Fed. Cir. Dec. 4, 2024)48

Xerox Corp. v. Bytemark, Inc.,
IPR2022-00624, Paper 9 (PTAB Aug. 24, 2022).....50

Statutes

35 U.S.C. § 31171

Regulations

37 C.F.R. § 1.6862, 63

37 C.F.R. § 42.262

37 C.F.R. § 42.6362, 63

37 C.F.R. § 42.6550

37 C.F.R. § 42.104	71
37 C.F.R. § 42.107	1

LISTING OF EXHIBITS

Exhibit No.	Description
2001	U.S. Patent Publication No. 2009/0274991 to Black
2002	U.S. Patent No. 1,731,322 to Riddle (“Riddle”)
2003	U.S. Patent No. 3,802,081 (“Rogers”)
2004	U.S. Patent No. 3,758,950 (“Krouzian”)
2005	U.S. Patent Publication No. 2006/0063129 to Hirsch (“Hirsch ‘129”)
2006	RESERVED
2007	First Case Management Order, <i>Solmetex, LLC v. Ascentcare Dental Products, Inc.</i> , Case No. 1:24-cv-00954-RJJ-MV, ECF No. 20 (Apr. 22, 2025)
2008	Defendant/Counter-Plaintiff Ascentcare Dental Products, Inc.’s Brief in Support of Motion to Stay, <i>Solmetex, LLC v. Ascentcare Dental Products, Inc.</i> , Case No. 1:24-cv-00954-RJJ-MV, ECF No. 38 (Jul. 11, 2025)
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2017	Excerpts of the Prosecution History of U.S. Patent No. 11,589,969 (Ex. 1020 in IPR2025-01020)
2018	Excerpts of the Prosecution History of U.S. Patent No. 11,589,969 (Ex. 1021 in IPR2025-01020)
2019	Excerpts of the Prosecution History of U.S. Patent No. 11,589,970 (Ex. 1002 in IPR2025-01057)
2020	Excerpts of the Prosecution History of U.S. Patent No. 11,589,970 (Ex. 1020 in IPR2025-01057)
2021	Excerpts of the Prosecution History of U.S. Patent No. 11,589,970 (Ex. 1021 in IPR2025-01057)
2022	Petition for <i>Inter Partes</i> Review of U.S. Patent No. 11,589,969, IPR2025-01020, Paper No. 2 (May 20, 2025)
2023	Defendant/Counter-Plaintiff Ascentcare Dental Products, Inc.'s Stipulation of Invalidity Contentions, <i>Solmetex, LLC v. Ascentcare</i>

	<i>Dental Products, Inc.</i> , Case No. 1:24-cv-00954-RJJ-MV (W.D. Mich. Aug. 20, 2025)
2024	Zyris, Inc. Virtual Patent Marking, https://www.zyris.com/patents/ (last accessed Aug. 25, 2025)
2025	Excerpts of the Prosecution History of U.S. Patent No. 11,744,686 (Ex. 1002 in IPR2025-01059)
2026	Excerpts of the Prosecution History of U.S. Patent No. 11,744,686 (Ex. 1020 in IPR2025-01059)
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2028	Petition for <i>Inter Partes</i> Review of U.S. Patent No. 11,744,686, IPR2025-01059, Paper No. 2 (May 28, 2025)
2029	Prosecution History for U.S. Patent No. 12,011,329 (Ex. 1002 in IPR2025-01104)
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2031	Declaration of Michael Jobin
2032	<i>Curriculum vitae</i> of Michael Jobin
2033	Petition for <i>Inter Partes</i> Review of U.S. Patent No. 11,589,970, IPR2025-01057, Paper No. 2 (May 20, 2025)
2034	U.S. Patent No. 11,744,686
2035	Merriam-Webster Dictionary (“crest”)
2036	Merriam-Webster Dictionary (“wave”)
2037	Dow Chemical Company, Silicone Rubber Selection Guide

2038	Elkem – Medical Grade Silicone
2039	Agreed-Upon Constructions, Exhibit B to Solmetex, LLC's Opening Claim Construction Brief, <i>Solmetex, LLC v. Ascentcare Dental Products, Inc.</i> , Case No. 1:24-cv-00954-RJJ-MV, ECF No. 62 (Oct. 10, 2025)
2040	Disputed Constructions, Exhibit C to Solmetex, LLC's Opening Claim Construction Brief, <i>Solmetex, LLC v. Ascentcare Dental Products, Inc.</i> , Case No. 1:24-cv-00954-RJJ-MV, ECF No. 62 (Oct. 10, 2025)
2041	Declaration of Dr. Brian P. Black, IPR2025-01057, Exhibit 1003 (May 20, 2025)
2042	DryShield User Guide

Solmetex, LLC (“Patent Owner”) submits this Preliminary Response under 37 C.F.R. § 42.107 to the Petition for *Inter Partes* Review (“Petition”) of U.S. Patent No. 12,290,418 (“the ‘418 Patent”), filed by Ascentcare Dental Products, Inc. (“Petitioner” or “Ascentcare”).¹

I. INTRODUCTION

Patent Owner respectfully requests that the Board deny institution because Petitioner has not meet its burden to show a reasonable likelihood that any challenged claim of the ‘418 Patent is unpatentable in relation to any ground in the Petition.

Petitioner did not meet its burden for Ground 1, which challenges independent claims 1 and 11 and certain dependent claims based on Black, because Black does not disclose the claimed “wave-like structure” or “crests” that serve as “contact points.” What Petitioner points to in Black is a series of rectangular walls that attach the anterior and posterior walls of Black’s mouthpiece. The specification and prosecution history of the ‘418 Patent and related applications expressly confirm that Black’s series of rectangular walls does *not* form a “wave-like” shape as claimed.

¹ The Board granted a good cause extension for this Preliminary Response due to a medical emergency. Paper 8; Paper 9. Patent Owner thanks the Board for its understanding.

Additionally, because Black's rectangular walls are attached to the anterior wall and the posterior wall, they do not have "crests" providing "contacts points" during suction.

Petitioner failed to meet its burden for Ground 2, which is based on a combination of Park, Baughan, and Johnson, for several reasons. For example, Petitioner's combination is premised on Park allegedly being susceptible to collapse when suction is applied, but Petitioner has not shown that this problem would occur. In fact, Petitioner's own evidence shows the opposite. Petitioner's obviousness theory is also flawed because it suggests that Park would not work for its intended purpose unless modified to include a "anti-collapse structure," even though Park is presumed to be operable. Further, the alleged motivation to modify Park is taken from the '418 Patent itself because Petitioner has not identified any prior art that discloses or suggests that two walls in a dental isolation mouthpiece would collapse under suction. The Petition used the '418 Patent's teaching that a wave-like structure with "crests" and "troughs" can prevent walls from collapsing on each other under suction as a blueprint for its proposed combination, resulting in an improper hindsight reconstruction.

Petitioner failed to meet its burden for Grounds 3-4, which also relies on Park, Baughan, Johnson, and Hirsch, for at least the same reasons as Ground 2: a skilled artisan would not be motivated to make the Park-Baughan-Johnson combination as

Petitioner proposes. Additionally, even if a POSITA were to combine these references as Petitioner proposes (which they would not), the resulting combination still fails to disclose the “wave-like structure” in claims 1 and 11. In arguing that rectangular protrusions in the resulting Park-Baughan-Johnson combination has a “wave” shape, Petitioner is again advancing an overbroad interpretation that effectively reads out the “wave-like” requirement and conflicts with the specification and prosecution histories of the ‘418 Patent and related applications.

Finally, Petitioner failed to meet its burden for Grounds 5-8 for at least the same reasons that it failed to meet its burden for Grounds 1-4, respectively. Grounds 5-8 merely repeat Grounds 1-4 but add an additional reference (Zheng) as a backup position for the cheek-retractor limitation if the Board does not find the cheek-retractor limitation in the references in Grounds 1-4.

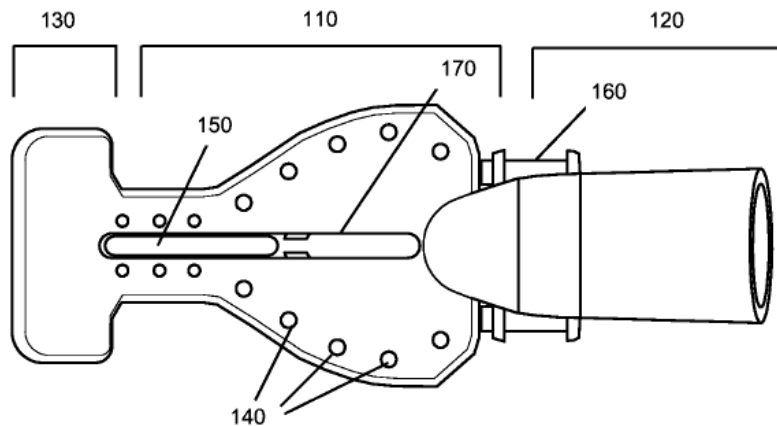
Accordingly, Patent Owner respectfully submits that the Petition should be denied and an IPR of the ‘418 Patent should not be instituted.

II. OVERVIEW OF THE ‘418 PATENT

The ‘418 Patent is directed to a dental isolation mouthpiece. EX1001, 1:26-27. As explained in the background section, at the time of the invention, “[v]arious mouthpieces . . . [were] used by dental health professionals, dental hygienists, and dental assistants.” EX1001, 1:31-33; EX2031, ¶59. Traditionally, dental procedures are performed by “a two-person team that comprises a dental professional and a

dental assistant” and used “many different types of dental equipment and materials.” EX1001, 1:33-37. By using a two-person teams, the dental assistant can “assist the dental professional in coordinating the use of these multiple items of different equipment and materials.” *Id.*, 1:45-48.

While other mouthpieces were in the marketplace at the time of the invention, the inventors recognized “a need in the art for improved systems and methods of providing dental services in a more efficient, comfortable, and safe manner to the dental patient.” EX1001, 1:49-51; EX2031, ¶60. To that end, the ‘418 Patent discloses “a 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.” EX1001, 1:55-59. In the illustrated embodiment, the mouthpiece includes a main body portion 110, a suction connector portion 120, and a check retractor portion 130. *Id.*, 3:28-34; EX2031, ¶60.



EX1001, FIG. 1B

The main body portion 110 “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.” EX1001, 3:53-58; EX2031, ¶61. These walls “protect the back of the mouth (e.g., throat and airway) from falling debris.” EX1001, 3:66-4:1.

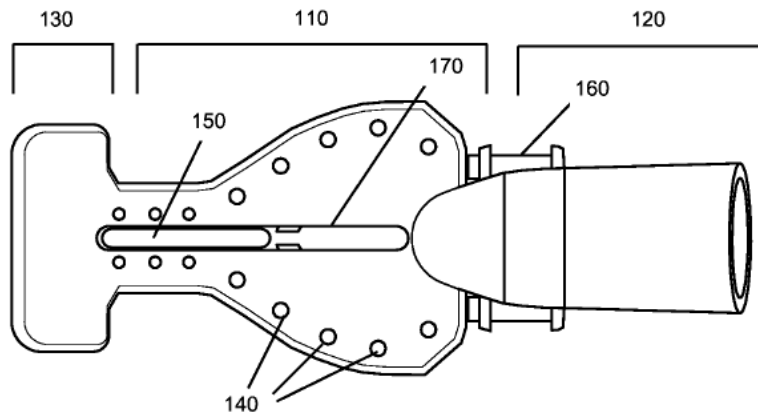
“When placed in a patient's mouth, the suction connector portion may protrude from one side of the patient's mouth, while the main body portion 110 lies against the back of the patient's mouth, and the cheek retractor portion 130 retracts the patient's cheek on the opposite side of the patient's mouth.” EX1001, 3:41-46; EX2031, ¶62. An illustration of how the mouthpiece fits into the patient's mouth is shown below:



EX2042

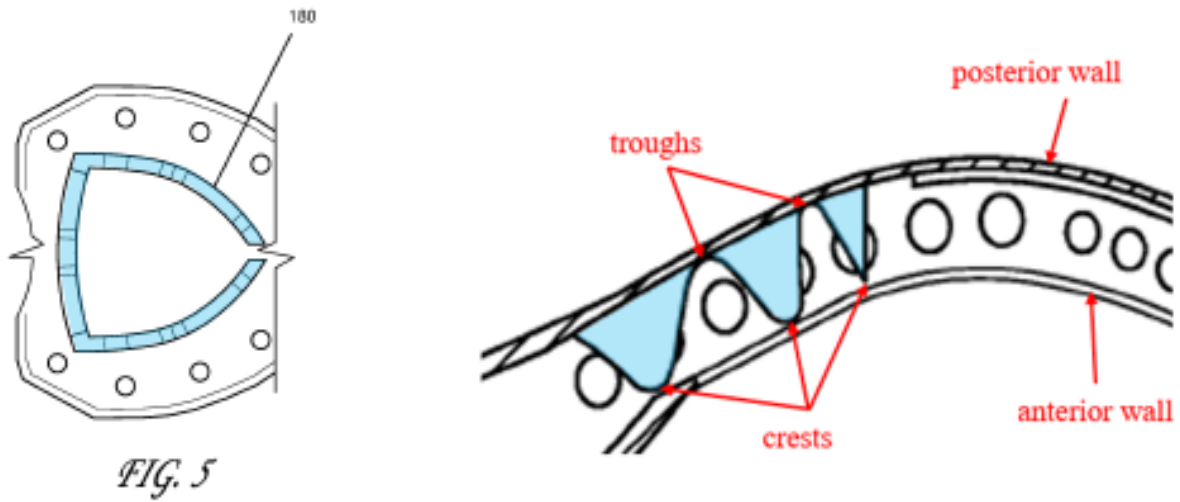
To perform the function of suctioning fluids while positioned within the mouth, the main body portion 110 includes perforations 140 or holes that “assist in suctioning of water, saliva and debris from the oral cavity.” EX1001, 4:13-17;

EX2031, ¶63. The open slit 170 may also assist in the suctioning “of water, saliva and debris.” EX1001, 4:48-54.



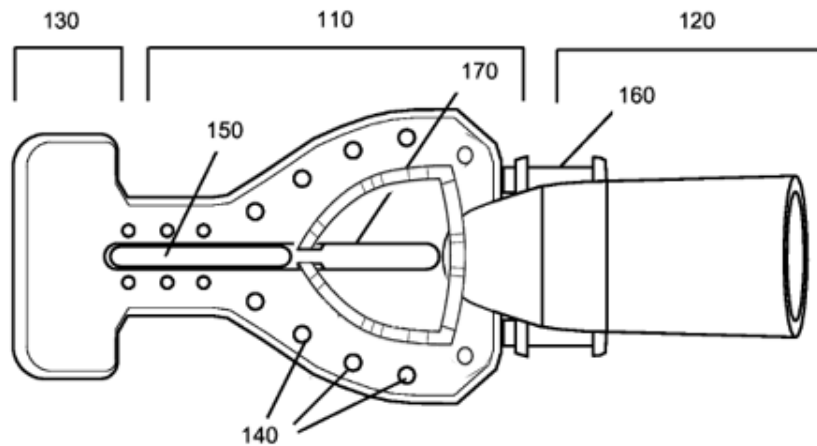
EX1001, FIG. 1B

When the suctioning force is applied to the mouthpiece during operation, given the particular design (including the presence of the open slit 170), the opposing anterior and posterior surfaces of the main body 110 could collapse on each other, thereby limiting the suctioning through the perforations 140. EX2031, ¶64. To prevent that problem, a bridge structure 180 is formed “on an interior surface [of the main body 110] to ensure that the anterior and posterior surfaces remain separated during suction.” EX1001, 4:55-59. FIG. 5 shows a “close-up view of the bridge structure 180” while FIG. 1E is a cross-sectional view that shows the bridge structure 180 formed on the interior surface of upper wall of the main body 110 and protruding toward the lower wall. *Id.*, 4:60-61; EX2031, ¶65.



EX1001, FIGS. 5, 1E (annotated)

As shown below where FIG. 5 is superimposed on top of FIG. 2B, the bridge structure 180 is positioned in the area of the open slit 170 with portions of the bridge structure 180 near some of the perforations 140 that follow the edges of the main body 110. EX2031, ¶¶66-67.

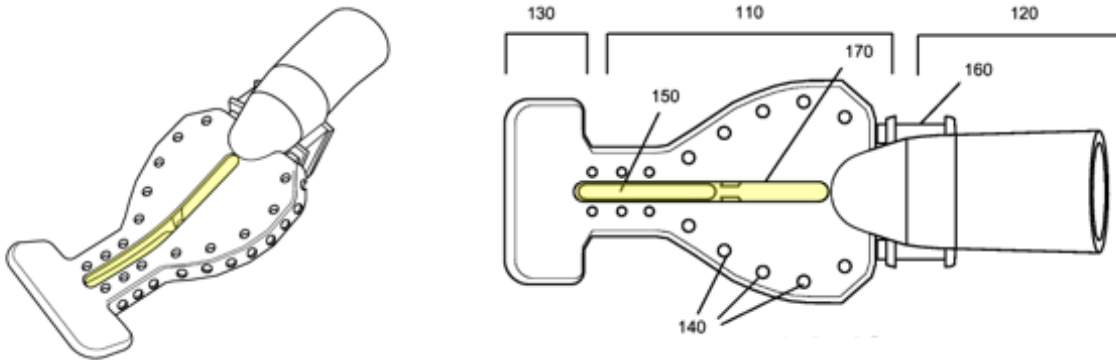


EX1001, FIGS. 1B and 5 (superimposed)

As shown in FIGS. 1E and 2E, 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.” EX1001, 4:61-66; EX2031, ¶68. Within this wave-like structure, “[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.” EX1001, 2:27-30; EX2031, ¶68. The geometry of the bridge structure 180 is important during operation because “[t]he 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,” which is “configured to attach to a high-suction vacuum adapter and to assist in transferring water, saliva, and debris from the oral cavity to the external adapter for removal” from the patient’s mouth. EX1001, 5:1-13; EX2031, ¶68.

The ‘418 Patent teaches that the mouthpiece can be made of “a high heat-resistant and autoclavable material” so that the “mouthpiece may be reusable.” EX1001, 1:64-67. The term “autoclavable” refers to the ability to clean and sterilize the equipment. EX2031, ¶69. As an additional benefit, because the wave-like protrusions are formed on only one wall of the main body 110, the walls can still be pulled away from each other to permit access into the interior space, for example, to

allow for manual cleaning with a brush. *Id.* In addition to allowing suctioning of materials therethrough, the open slit 170 also permits access between the walls to “assist in cleaning and maintenance.” EX1001, 4:51-54; EX2031, ¶70.



EX1001, FIGS. 1A-1B (annotated)

For example, one could insert a brush in the interior of the main body 110 through the open slit 170 for cleaning after patient use. EX2031, ¶70.

The fact that the wave-like structure is formed on only one wall of the main body 110 (not both) also provides additional flexibility to the mouthpiece, which is helpful when attempting to position the mouthpiece within the patient's mouth. EX2031, ¶71. In other words, if the bridge structure 180 were to be connected to both walls, the main body 110 would be more rigid and more resistive of torsional forces when attempting to twist the mouthpiece into the proper position. *Id.*

In summary, because only on the second wall (not both walls) of the main body 110 has the wave-shaped structure, the main body 110 is more flexible and the first and second walls can be pulled apart from each other to allow access into the

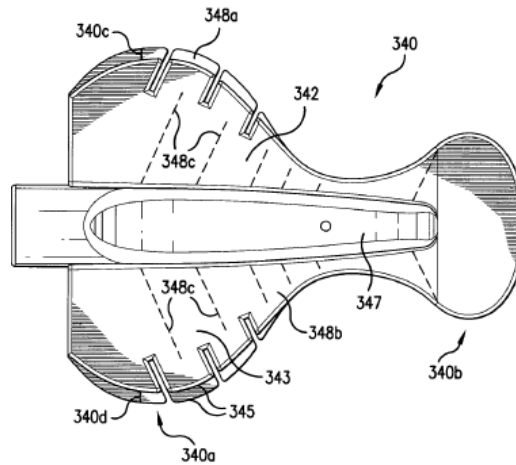
interior space for maintenance or cleaning. EX2031, ¶72. During operation when suction forces are applied, the first and second walls are separated from each other using the contact points at the crests associated with the second wall to contact the first wall, thereby permitting the suction of air, fluids, and small debris through the troughs between the crests of the wave-shaped protrusions. EX1001, 2:24-32.

III. SUMMARY OF PETITIONER'S REFERENCES

A. Black (EX1005) (Grounds 1, 5, and 7)

Black and its corresponding publication (EX2001) were cited and considered during prosecution. EX1002, 87, 89; Paper 7 at 4-5 (detailing how Black was extensively considered during prosecution of related applications). Black is directed to an intraoral device with a tongue shield aspirator, a bite member, a bite grip, and an evacuation tube. EX1005, Abstract; EX2031, ¶86. Black discloses several embodiments for the tongue shield aspirator.

In one embodiment, Black discloses a tongue shield aspirator 340 including “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).” EX1005, 14:25-30; EX2031, ¶89. The transverse walls 348c are angled relative to the longitudinal axis of the tongue shield aspirator 340 as shown below in FIG. 23A:



EX1005, FIG. 23A

Each pair of two consecutive walls 348c form the upper channels 342 and the lower channels 343. EX1005, 14:33-37; EX2031, ¶90.

Black illustrates a side view of the tongue shield aspirator 340 from FIG. 23A in FIG. 23C, which shows the transverse walls 348c connecting the first layer 348a and the second layer 348b, as well as the channels 342 between adjacent transverse walls 348c. EX2031, ¶91.

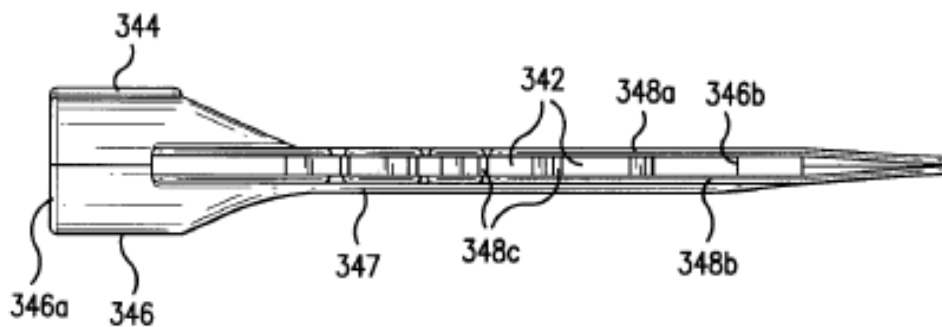


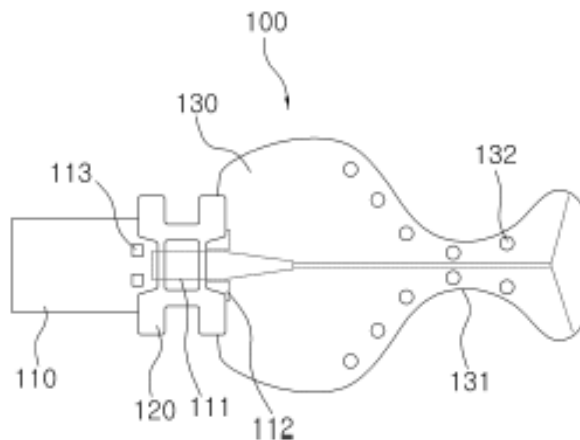
FIG. 23C

EX1005, FIG. 23C

B. Park (EX1006) (Grounds 2-4 and 6-7)

Park is a Korean patent publication directed to “a detachable oral illuminating device with a mouth prop that maintains the patient’s mouth in an open state, suppresses the movement of the tongue, allows for illumination and suction of foreign substances in the oral cavity, and enables the sterilization of only the mouth prop.” EX1006, ¶[0010]; EX2031, ¶92.

Fig. 3



EX1006, FIG. 3

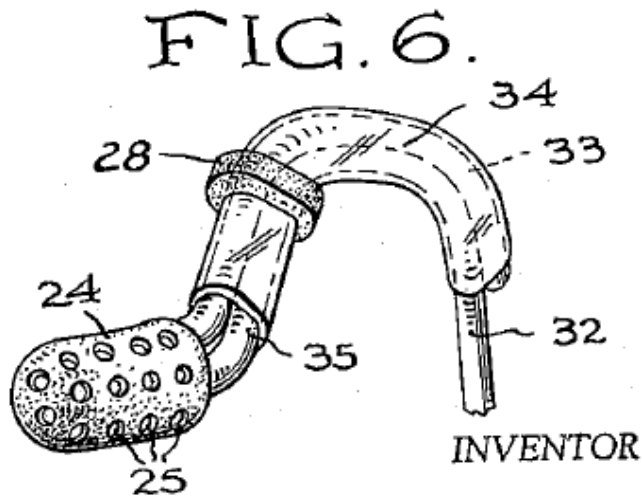
According to Petitioner, Park has “the same basic structure of conventional isolation mouthpieces,” including Black and Hirsch (discussed below). Petition, 16-23-24; EX1003, ¶27. Petitioner admits that Park and Hirsch “perform the same function and have very similar designs (Hirsch simply lacks sidewalls).” Petition, 97. Although the internal structures are relevant to this Petition, Petitioner further admits that “Park is silent regarding whether any structures are formed inside the interior chamber of the main body.” *Id.*, 72. Petitioner’s expert goes further,

admitting that “Park fails to expressly describe or illustrate whether the mouth prop 100 includes any internal features that assist with suction or preventing collapse under suction.” EX1003, ¶179.

Considering that Petitioner has admitted (i) Park has “the same basic structure of conventional isolation mouthpieces” such as Black and Hirsch and performs the same function (Petition, 23-24) and (ii) Park fails to expressly describe or illustrate any internal features that assist with suction or preventing collapse under suction (*Id.*, 72), Park is cumulative of the references that were already considered by the Office. *See* Paper 7, 11-13 (further detailing how Park is cumulative).

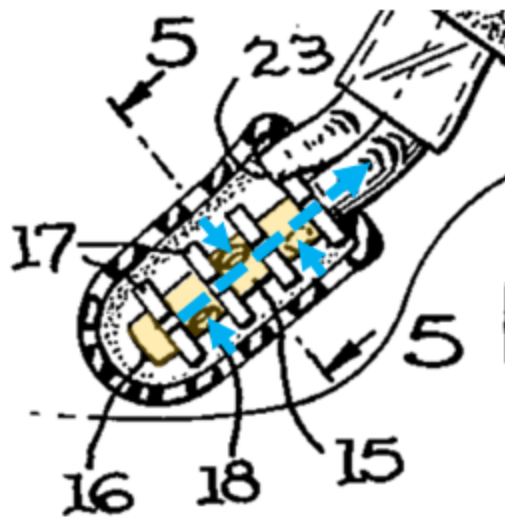
C. Baughan (EX1007) (Grounds 2-4 and 6-7)

Baughan was considered during prosecution of a related application, or a minimum is cumulative of references that were considered for the ‘418 Patent. Paper 7 at 7-11. Baughan is directed to a different type of dental appliance than the ‘418 Patent: a dental saliva ejector with “suction relief means.” EX1007, 1:6-7; EX2031, ¶93. Baughan’s dental saliva ejector is designed so that it “cannot traumatize or damage the mouth tissue by sucking the tissue into the suction orifices during the operation of the device for removing saliva from the mouth.” EX1007, 1:6-20; EX2031, ¶94.



EX1007, FIG. 6

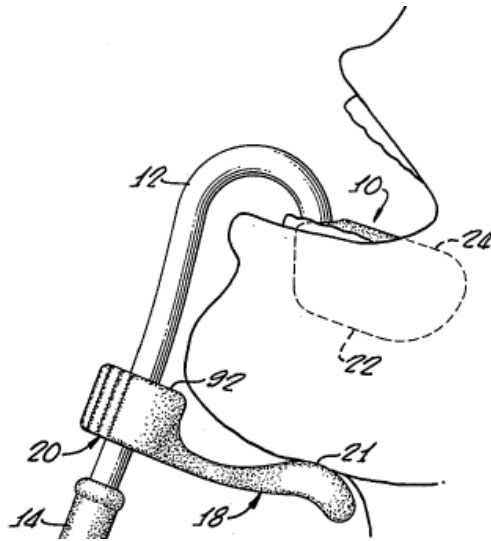
During operation, suction is applied through orifices 18 in the terminal tube portion 15, which is surrounded by a series of circular discs 17 which prevent the outer sleeve 24 from blocking orifices 18. EX1007, 3:36-48; EX2031, ¶95.



EX1007, FIG. 3 (excerpted and annotated)

D. Johnson (EX1008) (Grounds 2-4 and 6-7)

Johnson was considered during prosecution. EX1002, 86; Paper 7 at 6. Like Baughan, Johnson is directed to a “saliva ejector capable of acting as a tongue guard” and “a chin holder ... adapted for use with dental appliances, such as saliva ejectors.” EX1008, 1:6-11; EX2031, ¶96.



EX1008, FIG. 1

E. Hirsch (EX1012) (Grounds 1, 3-5, and 7)

Hirsch was considered during prosecution. EX1002, 88; Paper 7 at 5-6. Hirsch is directed to “dental appliances for illuminating and/or vacuum suction of the mouth of a dental patient for examination and/or operative purposes.” EX1012, ¶[0002]; EX2031, ¶97. Between Hirsch’s two flaps 310, 320, there is a central spine 365 that “may serve as a light pipe and a separator for an upper internal evacuation channel and a lower internal evacuation channel.” EX1012, ¶[0078]; EX2031, ¶98.

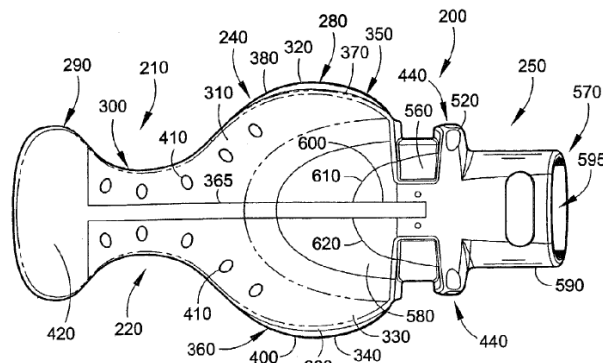


FIG. 19A

EX1012, FIG. 19A

F. Zheng (EX1021) (Grounds 6-7)

Zheng is a Chinese Patent Publication that describes “an oral moisture barrier device that can effectively protect the tongue and buccal mucosa of the patient.”

EX1021, 5; EX2031, ¶99.

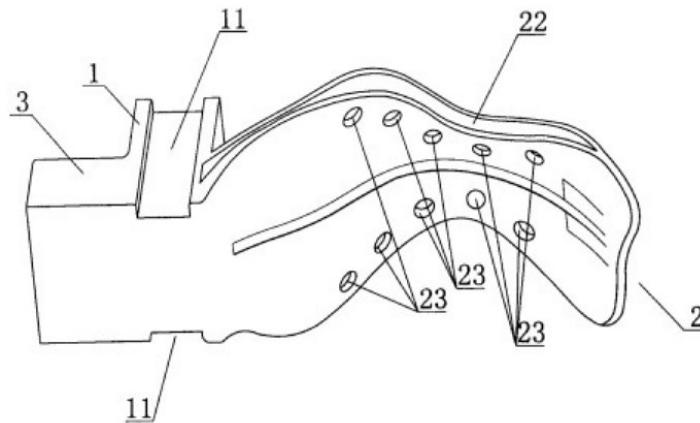


Figure 2

EX1021, FIG. 2

Petitioner relies on Zheng in Grounds 5-7 for the claimed “cheek retractor.”
Petition, 101-03. Petitioner admits, however, that Zheng is “similar in design to

Hirsch” and argues that Black and Hirsch have the same feature, rendering Zheng cumulative. Paper 7 at 13.

IV. PATENT OWNER'S DISCRETIONARY DENIAL REQUEST

Patent Owner requested discretionary denial pursuant to 35 U.S.C. § 325(d) because the same or substantially the same art was considered during prosecution. Paper 7 at 3-17. On October 17, 2025, Deputy Director Stewart denied the request. Paper 11 (“the Referral Decision”). The Referral Decision did not dispute that the references in the Petition—Black, Park, Baughan, Johnson, Hirsch, and Zheng—were either expressly considered or cumulative of references that were considered. Paper 11 at 2-3. Indeed, in connection with IPRs for patents related to the ‘418 Patent, Deputy Director Stewart found that Black, Park, Baughn, Johnson, and Hirsch were “considered extensively by the patent examiner during prosecution of the challenged patent, cited by Patent Owner during the prosecution, or cumulative thereto.” *Ascentcare Dental Products, Inc. v. Solmetex, LLC*, IPR2025-01020, Paper 11 at 2 (PTAB Oct. 10, 2025).

For the ‘418 Patent, however, the Referral Decision found that during prosecution of related U.S. Patent No. 12,011,329 (“the ‘329 Patent”), the Examiner “rejected the claims over Hirsch, but indicated that a dependent claim recited the allowable subject matter of ‘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 between within the cheek-retractor portion before being connected to each other in the cheek-retractor portion.” Paper 11 at 3. The Referral Decision found that “Petitioner presents evidence, however, that Hirsch appears to teach this limitation” and that “at least one of the challenged claims in IPR2025-01175 [i.e., claim 11] appears to recite the same limitation at issue.” Paper 11 at 3; EX1001, 8:37-42.

Patent Owner submits that the Examiner's alleged “error” in assessing Hirsch is not material to the grounds in the Petition for two reasons. First, the Notice of Allowance for the ‘418 Patent makes no mention of the cheek-retractor limitation. EX1002, 265-66. Instead, the Notice of Allowance found that the prior art does not disclose or render obvious the “wave-like structure” recited in claims 1 and 11:

the art of record does not teach or render obvious, either alone or in combination, an isolation mouthpiece for use with a suction in a dental procedure, where the isolation mouthpiece including a plurality of crests of a wave-like structure formed on an interior surface of a second wall to provide contact points with a first wall and a plurality of troughs of the wave-like structure providing gaps between adjacent ones of the plurality of crests for allowing the suctioning of fluid through the plurality of troughs in combination with the elements set forth in the claim.

EX1002, 265; *see also id.*, 266 (addressing claim 11). Thus, the supposed “error” by the Examiner was not repeated for the ‘418 Patent relative to claim 11, which is the

only independent claim with the limitation that led to the supposed "error." The Examiner's reliance on the "wave-like structure" and the plurality of crests and troughs was consistent with the prior indications of allowance in other related family members, as discussed below. *Infra*, §VI.A.3.

Second, Hirsch is not relied upon as a primary reference in Grounds 1-7. Petitioner only relies on Hirsch for limited purposes in Grounds 1, 3, and 5-7, and does not rely on Hirsch as allegedly teaching the cheek-retractor limitation in claim 11. Petition, 63 (addressing claim 11 in Ground 1), 98-99 (addressing claim 11 in Ground 3). Petitioner instead argues that Black and Park teach this feature. *See id.*, 100-01. Thus, even if the Examiner erred in finding that Hirsch does not disclose the cheek-retractor feature for the '329 Patent, that finding is immaterial to the grounds in this Petition for the '418 Patent.

V. LEVEL OF SKILL IN THE ART

Petitioner proposes the following definition for a POSITA in relation to the '418 Patent:

a PHOSITA, at the time the '418 Patent was filed, would have been a person with at least a B.S. degree in mechanical engineering or a related field with at least two years' experience designing dental devices. Less work experience may be compensated by a higher level of education, such as a master's degree, and vice versa.

Petition, 29.

This definition differs from the POSITA definition that Petitioner has proposed for related Patent Nos. 11,589,969 (“the ‘969 Patent”), 11,589,970 (“the ‘970 Patent”) and 11,744,686 (“the ‘686 Patent”), which Petitioner challenged in IPR2025-01020, IPR2025-01057, and IPR2025-01059, respectively.² In those proceedings, Petitioner argued that a POSITA would have at least a B.S. in mechanical engineering and two years’ experience designing medical devices. EX2022, 28-29 (Petition for ‘969 Patent); EX2028, 23 (Petition for ‘686 Patent); EX2033, 26-27 (Petition for ‘970 Patent). Petitioner has also proposed the following definition for a POSITA for the ‘418 Patent in the Parallel Litigation: “at least a degree in mechanical engineering or related field with at least 2 years of experience designing dental devices *or suction devices*.” EX2015, 7; EX2011, 45.

Patent Owner submits that Petitioner’s definition in (1) its other IPRs for patents in the same family as the ‘418 Patent that requires experience designing “medical devices” or (2) the Parallel Litigation that requires experience designing dental devices *or* suction devices is more appropriate than the narrower definition in the Petition. EX2031, ¶¶79-81. Nothing in the claims of the ‘418 Patent necessarily requires experience designing “dental devices.” *Id.*, ¶82. For example, the claims do

² Each of these petitions were discretionarily denied. *Ascentcare Dental Products, Inc. v. Solmetex, LLC*, IPR2025-01020, Paper 11 (PTAB Oct. 10, 2025).

not recite any features that necessarily require specialized knowledge regarding dental anatomy or procedures. *Id.* Rather, the claims are directed to structural components of a dental isolation mouthpiece, and an individual with a mechanical engineering degree and experience designing medical devices or suction devices would be a POSITA for purposes of the '418 Patent. *Id.*

Regardless, for purposes of this Preliminary Response and institution, the Board need not resolve the discrepancy between Petitioner's various definitions for a POSITA because Petitioner failed to meet its burden regardless of which definition is adopted. EX2031, ¶¶83-84.

VI. CLAIM CONSTRUCTION

The Petition does not expressly propose any claim constructions. Petition, 32-33. Instead, Petitioner argues that if “there is any departure from the plain and ordinary meaning, Petitioner adopted Patent Owner's constructions implied from their overly broad infringement contentions” without identified what it believes the “implied” constructions are. *Id.*, 31. As discussed below, the Petition takes positions on the scope of the “wave-like structure” term that is far broader than the plain and ordinary meaning in view of the intrinsic record.

A. “Wave-Like Structure” (Claims 1 and 11)

Claims 1 and 11 of the '418 Patent both recite: (1) “wherein a plurality of crests of a wave-like structure is formed on an interior surface of the second wall to

provide contact points with the first wall” and (2) “a plurality of troughs of the wave-like structure provides gaps between adjacent ones of the plurality of crests for allowing the suctioning of fluid through the plurality of troughs.” EX1001, 6:36-42 (claim 1), 7:67-8:6 (claim 11). While Petitioner does not propose a claim construction for the “wave-like structure” requirement,³ Petitioner argues that “[i]n light of the specification, this merely means that the wave-like structure needs spaced-apart projections with gaps therebetween.” Petition, 44.

Patent Owner submits that the Board should construe the “wave-like structure” requirement as follows, which is dispositive for Petitioner’s challenges to claims 1 and 11 (and their dependent claims). EX2031, ¶¶103-05.

Phrase	Patent Owner’s Construction
<p>wherein a plurality of crests of a wave-like structure is formed on an interior surface of the second wall to provide contact points with the first wall and a plurality of troughs of the wave-like structure provides gaps between adjacent ones of the plurality of crests for allowing the suctioning of fluid through</p>	<p>The interior surface of the second wall includes a structure with curved surfaces between (i) crests that provide contact points with the first wall during suction, and (ii) troughs that provide gaps that allow for the transfer of fluids during suction</p>

³ Petitioner contends in the Parallel Litigation that no construction is necessary, and Patent Owner has proposed the same claim construction as it does here. EX2040.

the plurality of troughs (claims 1 and 11)	
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Patent Owner's construction is consistent with the specification and the prosecution history of the '418 Patent and related patents. On the other hand, Petitioner's interpretation of this claim phrase is contrary to the intrinsic evidence. In particular, Petitioner's suggestion that a series of rectangular walls or columns constitute a "wave-like structure" is directly refuted by the prosecution history of the '418 Patent and related patents.

1. Petitioner's Interpretation Renders the "Wave-Like" Requirement Meaningless

Petitioner argues in Grounds 1 and 3, for example, that *rectangular and square* "protrusions" or "walls" meet the "wave-like structure" requirement in claims 1 and 11. Petition, 43-45, 76-77. Attempting to justify reading these rectangular walls onto the claims, Petitioner argues that "[i]n light of the specification, this [limitation] merely means that the bridge structure needs spaced-apart projections with gaps therebetween" and "[t]he resulting shape of any such bridge structure is necessarily a wave shape." Petition, 44. In other words, under Petitioner's apparent construction, *any* plurality of projections extending from a first surface towards a second surface constitute a "wave-like structure" with crests and troughs.

Petitioner's apparent construction cannot be correct because it ignores the full claim language and strips the term "wave-like" in the claim of any meaning. *Hockerson-Halberstadt, Inc. v. Converse Inc.*, 183 F.3d 1369, 1374 (Fed. Cir. 1999) ("Proper claim construction ... demands interpretation of the entire claim in context, not a single element in isolation"); *Merck & Co. v. Teva Pharms. USA, Inc.*, 395 F.3d 1364, 1372 (Fed. Cir. 2005) ("A claim construction that gives meaning to all the terms of the claim is preferred over one that does not do so"). There will necessarily be gaps between any plurality of protrusions or projections extending from a given surface. EX2031, ¶¶107-08. But claims 1 and 11 of the '418 Patent require a specific geometry: they require a "**wave-like** structure."⁴ If any group of "projections" with gaps between them meets the claim language, as Petitioner argues, then the term "wave-like" has no meaning. Such an interpretation is incorrect. EX2030, ¶109; *Intel Corp. v. Qualcomm Inc.*, 21 F.4th 784, 792 (Fed. Cir. 2021) (adopting narrower of two proposed constructions because "if the 'radio frequency input signal' refers to just any radio frequency signal that is an input, then the word 'input' makes no contribution to the claim").

⁴ Unless otherwise stated, all emphasis in case cites and evidence cites is added.

2. Patent Owner's Construction is Consistent with the Specification

The specification confirms Patent Owner's construction. *Intel*, 21 F.4th at 792 (finding that consistent description of the feature in specification supported Board's construction); *Apple Inc. v. Masimo Corp.*, No. 2022-1890, 2024 WL 137336, at *3 (Fed. Cir. Jan. 12, 2024) ("the Board's reading of the term is consistent with how the invention is described in the specification"). The specification explains:

bridge 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. ... 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.

EX1001, 4:61-66; *see also id.*, 2:26-27 ("a bridge structure may protrude from the interior surface in a wave shape with crests and troughs"), 4:37-41 ("a bridge structure may be formed as an wave-like protrusion"), 5:1-7 (referring to "waves of the bridge structure 180") EX2031, ¶¶110-11. Thus, the specification teaches the "wave-like" shape of the protrusions of the bridge structure. FIG. 2E illustrates an example of a bridge structure having the "wave-shape" with its crests and troughs.

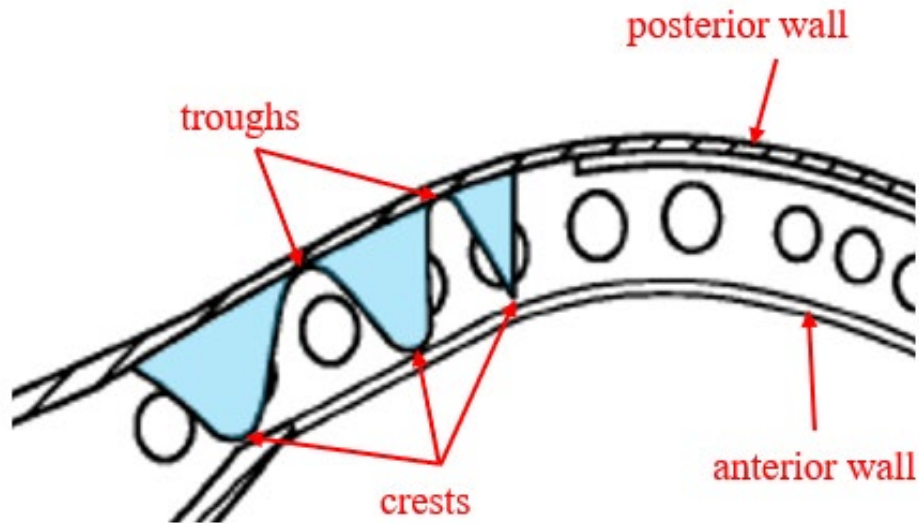


FIG. 2E (annotated); *see also id.*, FIG. 1E. As shown, there are curved surfaces⁵ at locations between the crests (the contact points with the first wall) and troughs (the minimum points near the second wall). EX2031, ¶¶113-16. By contrast, there is no example of a “bridge structure” with a plurality of protrusions in a rectangular or “square” pattern. EX2031, ¶117.

The plain and ordinary meaning of “wave” is “a shape or outline having successive curves,” which is consistent with the shape of the most common “wave” – waves on a body of water. EX2031, ¶118; EX2036 (defining the noun “wave” as “a shape or outline having successive curves”). The inclusion of the modifier “like” in relation to the word “wave” in the claims does not change the analysis because

⁵ The right of the three wave-shaped protrusions appears to be flatter, but that is because it is bending into or out of the paper. EX2031, ¶114.

the specification uses the terms “wave” and “wave-like” interchangeably. EX1001, 2:27 (referring to “a wave shape with crests and troughs”), 4:39 (referring to “wavelike bridge structure”), 4:62-63 (referring to “wave-like protrusion”), 5:1-2 (referring to “waves of the bridge structure”); EX2031, ¶112.

Considering the contextual claim language and the specification, this phrase requires that the interior surface of the second wall includes a structure with curved surfaces between (i) crests that provide contact points with the first wall during suction and (ii) troughs that provide gaps that allow for the transfer of fluids during suction. It is this pattern with *curved surfaces* that differentiates the claimed structure in the ‘418 Patent from rectangular walls or columns (e.g., like those in Black) and gives meaning to the “wave-like” requirement in claims 1 and 11.

3. Patent Owner's Construction is Consistent with the Prosecution History

The prosecution history of the ‘418 Patent and related applications also confirms Patent Owner's construction and forecloses Petitioner's overbroad interpretation of the “wave-like structure” limitation. *See Aptalis Pharmatech, Inc. v. Apotex Inc.*, 718 F. App'x 965, 971 (Fed. Cir. 2018) (“even in the absence of a clear and unmistakable disavowal, we conclude that the prosecution history can be

evaluated to determine how a person of ordinary skill would understand a given claim term”).

After conducting an Interview, in the Notice of Allowance for the ‘418 Patent, the Examiner found that the prior art of record does not disclose or render obvious the “wave-like structure” recited in claims 1 and 11:

the art of record does not teach or render obvious, either alone or in combination, an isolation mouthpiece for use with a suction in a dental procedure, where the isolation mouthpiece including a plurality of crests of a wave-like structure formed on an interior surface of a second wall to provide contact points with a first wall and a plurality of troughs of the wave-like structure providing gaps between adjacent ones of the plurality of crests for allowing the suctioning of fluid through the plurality of troughs in combination with the elements set forth in the claim.

EX1002, 265; *see also id.*, 266 (addressing claim 11); EX2031, ¶120. The Examiner's reasons for allowance for claims 1 and 11 in the ‘418 Patent are consistent with the prosecution history of the related applications discussed below where the Office found, and the applicant argued, that Black's rectangular columns do not have a “wave” shape.

a) Prosecution History of the ‘232 Patent

The earliest non-provisional application to which ‘418 Patent claims priority is U.S. Patent Application No. 14/100,323, which issued as U.S. Patent No.

8,911,232 (“the ‘232 Patent”). During prosecution of the ‘232 Patent, the Examiner rejected the pending claims in a first office action (1) as anticipated by Rhoades and (2) as obvious over Rhoades and Black. EX1015, 49-52. The dependent claims rejected as being obvious based on Rhoades and Black recited that the bridge structure has a “wave shape.”

9. The mouthpiece of claim 8, wherein the bridge structure protrudes from the interior surface of the posterior wall in a wave shape, and wherein the contact points are at crests of the wave shape.

10. The mouthpiece of claim 9, wherein troughs of the wave shape are configured to allow suction through the bridge structure.

Id., 25. The Examiner contended that Black’s transverse walls 48, which comprise a rectangular pattern, met the limitations of dependent claims 9-10. *Id.*, 51-52.

In a second office action, the Examiner changed course by relying on Black for rejections of independent claim 1 and dependent claim 8, but found claims 9-10 allowable because:

the prior art fail to disclose or reasonably teach of a mouthpiece holding comprising, inter alia: a bridge structure protruding from an interior surface of a posterior wall *in a wave shape*, wherein the contact points are at *crests of the wave shape*.

EX1015, 109-11. Due to analyzing the art in more detail to develop new rejections under §102, the Examiner correctly recognized that Black's rectangular pattern did not teach the "wave-shape" limitation. Notably, the independent claim at the time recited a "bridge structure comprising a plurality of spaced contact points that keep the anterior wall separated from the posterior wall during suction." EX1015, 124.

In response, Applicant amended the pending claims attempting to take this allowable subject matter but did *not* include the "wave shape" feature in those amended claims. EX1015, 124-31. In the subsequent Notice of Allowance, the Examiner entered an Examiner's Amendment adding the "wave shape" language to claim 1. *Id.*, 145-48. It is therefore clear that the "wave shape" language was a key feature that distinguished the prior art during prosecution of the '232 Patent. EX2031, ¶¶121-26.

b) Prosecution History of the '686 and '970 Patents

The prosecution history of other related applications further confirms Patent Owner's construction. For example, during prosecution of the '686 Patent (which is the great grandparent of the '418 Patent), the Examiner rejected the then-pending claims as allegedly anticipated by Black. EX2026, 309-10. The Examiner incorrectly found that Black discloses a "bridge structure 448c (shown as dashed lines 44c in Fig. 24A) ... wherein the protrusions of the bridge structure 448c protrude in a wave shape comprising one or more crests and one or more troughs (Figs. 24A and 26A)."

Id., 310.⁶ This rejection was inconsistent with the Examiner's findings regarding Black during prosecution of the '232 Patent. *Supra*, §VI.D.3.a.

In response, the Applicant explained that "Black cannot teach 'wherein the bridge structure is not attached [to] the first wall' as claimed" and that "the walls 448c of Black ***are rectangular columns and do not 'protrude in a wave shape*** comprising one or more crests and one or more troughs' that protrude from 'an interior surface of the second wall' as claimed." EX2026, 369-70. Thus, Patent Owner has been consistent in its interpretation of the "wave shape" requirement in the challenged claims. In the subsequent Office Action, the Examiner withdrew the rejections based on Black and found these arguments "persuasive." EX2026, 384. In particular, the Examiner noted that "Black et al. fail to disclose the bridge structure not being attached to the first wall." *Id.*; EX2031, ¶¶127-29.

As another example, during prosecution the related '970 Patent, the Examiner applied Black as a secondary reference and alleged that it discloses "a wave-shaped bridge structure 48c having formed therein the interior wall of the device 40." EX2019, 246. In response, the applicant argued that (1) "the walls of Black do not provide a wave shape" and (2) "claim 1 explicitly claims that the protrusion of the bridge structure are unattached to the anterior wall" whereas Black "recites that the

⁶ As discussed below, this is the exact position that Petitioner takes in Grounds 1-2.

walls 48c are connected to both ‘a first (posterior) layer 48a and a second (anterior) layer 48b.’” *Id.*, 312-13 (emphasis in original). The Examiner then withdrew the rejections based on Black. *Id.*, 391; EX2031, ¶¶130-32.

While the Applicant provided multiple bases for distinguishing Black during prosecution, this does not change the fact that the Applicant clearly and unambiguously disclaimed Black's rectangular walls from reading onto the “wave-like” shape requirement in the claims. *See, e.g., Computer Docking Station Corp. v. Dell, Inc.*, 519 F.3d 1366, 1378 (Fed. Cir. 2008) (noting that “applicants distinguished their invention from the prior art in multiple ways” and statements relevant to claim construction “can lie in a single distinction among many”); *Andersen Corp. v. Fiber Composites, LLC*, 474 F.3d 1361, 1374 (Fed. Cir. 2007) (“an applicant's argument that a prior art reference is distinguishable on a particular ground can serve as a disclaimer of claim scope even if the applicant distinguishes the reference on other grounds as well”); *Gentry Gallery, Inc. v. Berkline Corp.*, 134 F.3d 1473, 1477 n.* (Fed. Cir. 1998) (when applicant distinguishes a reference on multiple grounds, “any of those grounds may indicate the proper construction of particular claim terms”). Consequently, it is clear from the prosecution history that the “wave-like” limitation in the claims does not encompass square or rectangular walls like those in Black. EX2031, ¶133.

B. District Court Constructions

In the Parallel Litigation, the parties have agreed to the following claim constructions for the ‘418 Patent:

Term/Phrase	Agreed Construction
“troughs” (claims 1, 11, 20)	the points nearest to the second wall that create the gaps between the crests that allow for the transfer of fluids during suction
“cutout has a shield shape” (claim 6)	a cutout having the general shape of an isosceles triangle with rounded sides

EX2039. The parties dispute the proper construction for the following additional terms/phrases in the Parallel Litigation:

Term/Phrase	Patent Owner’s Construction	Petitioner’s Construction
“main body portion” (Claims 1, 11, 20)	Plain and ordinary meaning	The portion of the mouthpiece between, but not including, the cheek retractor portion and the suction connector and mouth prop, if present
“a third wall that connects one of the first edges of the first wall to one of the second edges of the second wall” (Claim 20)	Plain and ordinary meaning	A sidewall that connects either the inferior edge of the first wall to the inferior edge of the second wall or the superior edge of the first wall to the superior edge of the second wall

<p>“a third wall connecting the first wall and the second wall such that the first wall is spaced from the second wall” (Claims 1 and 11)</p>	<p>Plain and ordinary meaning</p>	<p>Indefinite; or A sidewall that connects either the inferior edge of the first wall to the inferior edge of the second wall or the superior edge of the first wall to the superior edge of the second wall</p>
<p>“first wall and the second wall are shaped such that that first edge of the first wall corresponds in shape to the third edge of the second wall and the second edge of the first wall corresponds in shape to the fourth edge of the second wall; and wherein the first shape of the first wall corresponds to the second shape of the second wall” (Claim 1)</p>	<p>Plain and ordinary meaning</p>	<p>A second wall have a substantially identical shape to the shape of the first wall such that the edges of the second wall are aligned with the edges of the first wall</p>
<p>“a mouth prop injection-molded in one piece” (Claim 25)</p>	<p>Mouth prop molded (or injection-molded) as a unitary structure</p>	<p>No construction necessary</p>
<p>“interior space” / “space” (Claim 20)</p>	<p>Plain and ordinary meaning</p>	<p>An open space defined by an enclosure without subdivisions that spans between the anterior wall, the posterior wall, and inferior sidewall and/or a superior sidewall</p>
<p>“an interior surface of the second wall”</p>	<p>Plain and ordinary meaning</p>	<p>A surface of the second wall facing the first wall between,</p>

		but not including, the edges of the second wall
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EX2040. Patent Owner identifies these constructions so that the record is complete but submits that the Board need not construe these terms at the institution stage to find that Petitioner did not meet its burden. *Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co.*, 868 F.3d 1013, 1017 (Fed. Cir. 2017); EX2031, ¶136.

VII. PETITIONER FAILED TO MEET ITS BURDEN

The Board should deny institution because Petitioner has not met its burden of showing a reasonable likelihood that any claim of the ‘418 Patent is unpatentable for any of the grounds in the Petition.

A. Ground 1: Alleged Obviousness Based on Black and Hirsch (Claims 1-9, 11-17, and 19)

In Ground 1, Petitioner argues that independent claims 1 and 11 and dependent claims 2-9, 12-17, and 19 of the ‘418 Patent are obvious over Black and Hirsch. Petition, 37-65. For the reasons discussed below, Petitioner failed to meet its burden.

1. Independent Claims 1 and 11: Black Does Not Disclose a “Wave-Like Structure” or “Crests”

As discussed above, limitations 1(e) and 11(e) recite: (1) “wherein a plurality of crests of a wave-like structure is formed on an interior surface of the second wall to provide contact points with the first wall” and (2) “a plurality of troughs of the

wave-like structure provides gaps between adjacent ones of the plurality of crests for allowing the suctioning of fluid through the plurality of troughs.” EX1001, 6:36-42 (claim 1), 7:67-8:6 (claim 11). Petitioner failed to show that Black meets these limitations at least because Black does not disclose (1) a “wave-like structure” or (2) “crests” that serve as “contact points.”

a) Black's Transverse Walls Do Not Form a “Wave-Like Structure”

For both limitations 1(e) and 11(e), Petitioner relies on Black's disclosure of “transverse walls 348c” in FIGS. 23A and 23C. Petition, 34-45 (claim 1), 63 (claim 11); EX2031, ¶140. Black's transverse walls 348c are annotated below:

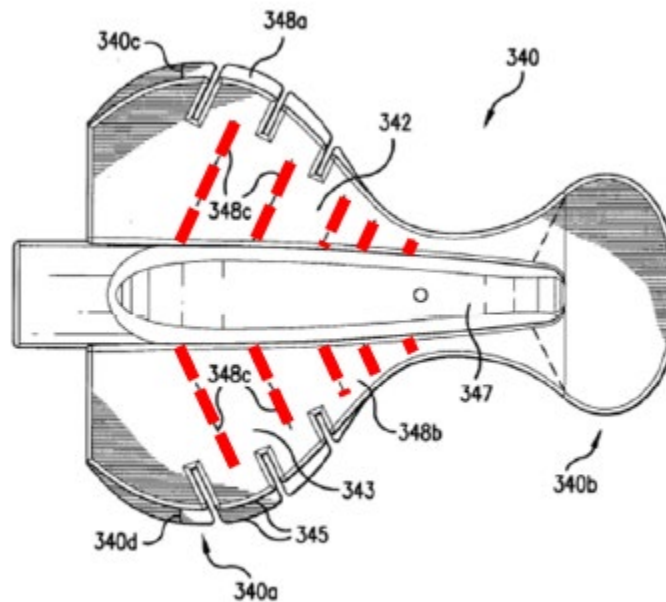


FIG. 23A

EX1005, FIG. 23A (annotated)

In an attempt to address the “wave-like structure” requirement in these limitations, Petitioner argues that “Black teaches a square wave shape formed by the channels 342 and the transverse walls 348c (i.e., the presence [sic] transverse walls 348c and the gaps therebetween that form the channels 342).” Petition, 44-45.

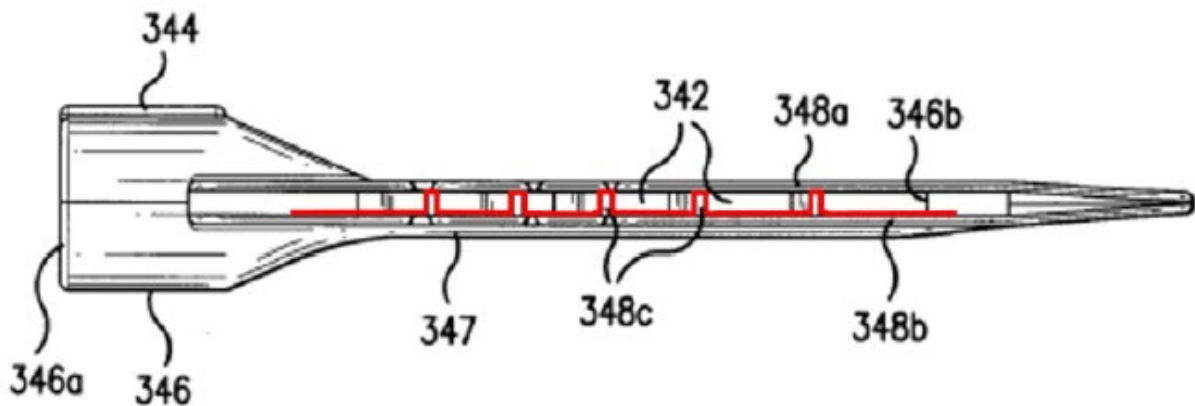


FIG. 23C

Petition, 45 (annotating EX1005, FIG. 23C)

Petitioner's theory for how Black meets limitations 1(e) and 11(e) is predicated on its assertion that the claimed “wave-like structure” merely requires “spaced-apart projections with gaps therebetween.” Petition, 44. As discussed above, this interpretation of the claim language is inconsistent with the specification and prosecution history. *Supra*, §VI.A. Black does not meet Patent Owner's proposed construction because the rectangular transverse walls 348c do not have any curved surfaces. EX2031, ¶145.

In any event, Patent Owner submits that the Board does not necessarily have to adopt Patent Owner's proposed construction to resolve this dispute; it need only find that the Applicant expressly disclaimed Black's rectangular transverse walls 348c from reading on similar "wave shape" language. *Supra*, §VI.A.3.b; *Dell*, 519 F.3d at 1378; *Andersen*, 474 F.3d at 1374. The Notice of Allowance in the '418 Patent confirms that the considered art, which includes Black, fails to disclose or render obvious the "wave-like structure" requirement. EX1002, 265-66. In short, Petitioner's theory for how Black meets the "wave-like structure" requirement is directly contradicted by the prosecution history and should be rejected.

Even if the Board were to agree with Petitioner's apparent claim construction, Petitioner failed to show that Black transverse walls 348c constitute "spaced-apart projections with gaps therebetween." Petition, 44. Black's transverse walls 348c extend between, and are connected to, *both* the posterior layer 348a and the anterior layer 438b. EX1005, 14:25-30; EX2031, ¶143. This is clear from FIG. 23C:

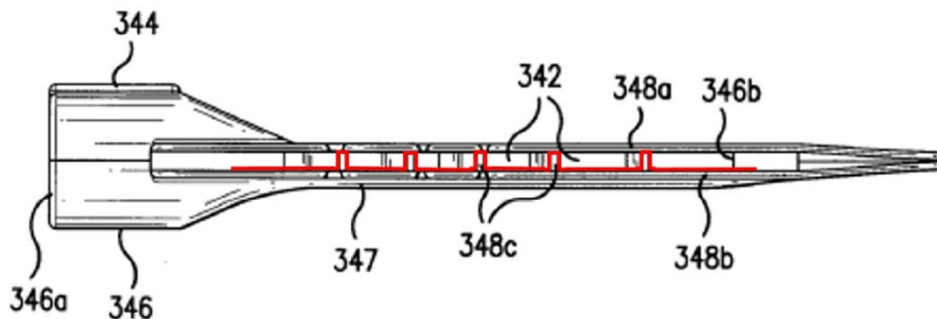
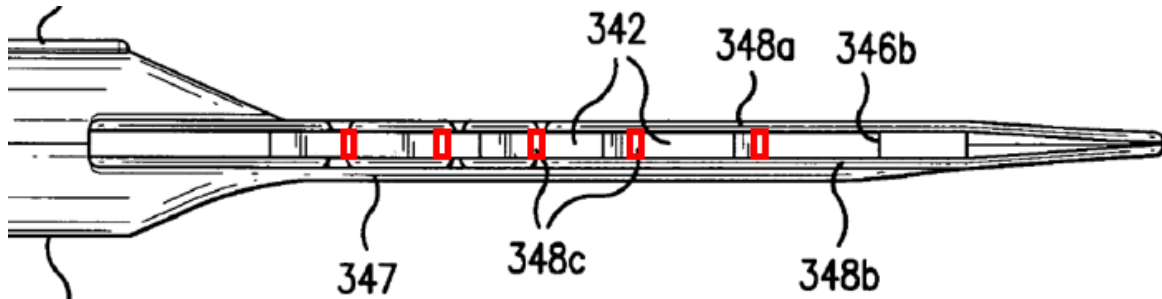


FIG. 23C

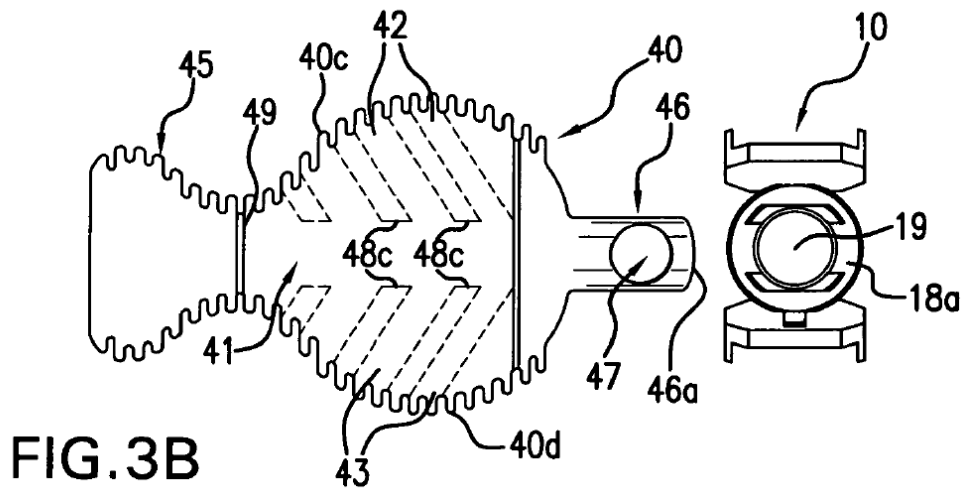
Petition, 45 (annotating EX1005, FIG. 23C)

Petitioner's annotations are misleading because they suggest the transverse walls 348c are not connected to the posterior layer 348a. EX2031, ¶144. The annotation below more accurately reflects the structure of the transverse walls 348c in Black:



EX1005, FIG. 23C (annotated)

Black's transverse walls 348c are walls, not "spaced-apart projections." EX2031, ¶¶146-48. Black itself differentiates between a "wall," like the transverse walls 348c, and a "projection" or a "protrusion." The term "projection" or "projections" appears over a dozen times in Black. EX1005, 6:47-62, 15:36-63, 16:63-17:1, 21:26-30; EX2031, ¶¶149-50. For example, referring to FIG. 3, Black discloses "finger-like projections 45." EX1005, 6:47-62; EX2031, ¶150.



EX1005, FIG. 3B

The term “protrusion” also appears over a dozen times in Black. *See* EX1005, 10:4-11, 11:25-61, 12:41-46, 13:4-55, 19:42-47. Thus, the express teachings of Black confirm that Black’s transverse walls 348c are not projections. EX2031, ¶151.

This understanding is consistent with the ‘418 Patent, which similarly differentiates between a “wall” and a “protrusion.” *See, e.g.,* EX1001, 3:53-58 (anterior and posterior walls “may connect at a superior wall and an inferior wall...”), 4:29-32 (“Stability bar 150 may be a protrusion...”), 4:62 (“bridge structure 180 may be formed as a[] wave-like protrusion...”), 5:44-45 (“...interlocking with a corresponding protrusion...”). A POSITA would understand, in light of the surrounding claim language and specification, that the Black’s transverse walls 346c are walls, not projections. EX2031, ¶¶152-53.

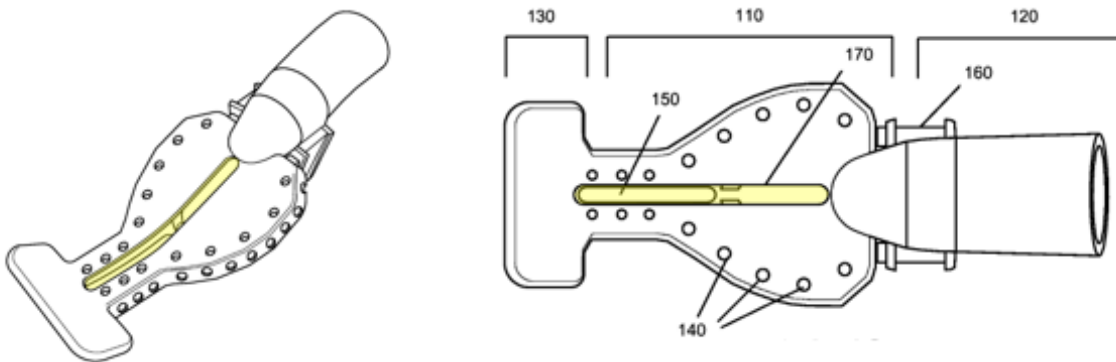
Accordingly, even when accepting Petitioner's own construction, Black does not disclose "spaced-apart projections with gaps therebetween." Petition, 44.

b) Black's Transverse Walls Do Not Provide "Contact Points"

Claims 1 and 11 specify that the plurality of crests, which are formed on an interior surface of the second wall, "provide *contact points* with the first wall." EX1001, 6:36-39 (claim 1), 8:2-3 (claim 11). Notably, the terms "crests" and "troughs" do not appear anywhere in Petitioner's discussion of claims 1 and 11 in Ground 1. *See* Petition, 43-45, 63. Black does not disclose "crests" that serve as "contacts points with the first wall" as required in limitations 1(e) and 11(e) because Black's transverse walls 348c provide *attachment* or *connection* points between Black's anterior and posterior walls regardless of whether suction is applied. EX2031, ¶¶154-55.

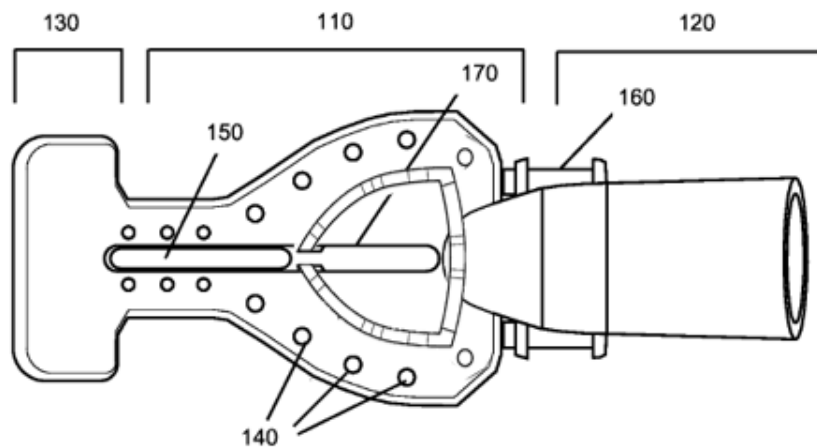
The plain claim language is consistent with the specification, which describes the "crests" as providing "contact points" rather than attachment points. EX1001, 2:28-30 ("The crests provide a plurality of contact points with the anterior wall to keep the anterior wall separated from the posterior wall during suction"). The specification also teaches that the crests can extend "substantially (e.g., within 1 mm) the full distance" between the anterior and posterior walls. EX1001, 4:61-65; EX2031, ¶156. A POSITA would understand that crests are intentionally designed

to provide contact points instead of attachment points because the specification teaches that the mouthpiece can be manually cleaned via the open slot 170. EX1001, 4:51-54; EX2031, ¶¶156-57.



EX1001, FIGS. 1A-1B (annotated)

If the crests of the bridge structure 180 provided attachment points rather than contact points, one would not be able to insert a brush to clean the mouthpiece because the bridge structure 180 would block the brush. EX2031, ¶157.



EX1001, FIGS. 1B and 5 (superimposed)

Petitioner's suggestion that Black's transverse walls 348c that attach the anterior and posterior have "crests" that provide "contact points" is inconsistent with the purpose and functionality of the crests in the specification. *Id.*

While claim 20 of the '418 Patent expressly recites that "the contact points are not attached to the first wall," that does not necessarily mean that the "contact points" in claims 1 and 11 encompass attachment points for several reasons. EX1001, 9:27-28; EX2031, ¶¶158-59. First, claim differentiation is not "a hard and fast rule and will be overcome by a contrary construction dictated by the written description or prosecution history." *Seachange Int'l, Inc. v. C-COR, Inc.*, 413 F.3d 1361, 1369 (Fed. Cir. 2005); *O.I. Corp. v. Tekmar Co.*, 115 F.3d 1576, 1582 (Fed. Cir. 1997) ("construction of claims is not based solely upon the language of other claims").

Second, the lengthy prosecution history of this patent family shows that there were at least two independent bases for overcoming Black: (1) the transverse walls 348c do not have a "wave" shape and (2) the transverse walls 348c are attached to both the anterior and posterior walls. *See, e.g.*, EX2026, 369-70 (distinguishing Black on both bases during prosecution of the '686 Patent); EX2019, 312-13 (same for the '970 Patent). Unlike claims 1 and 11, claim 20 does not recite a "wave-like structure," so it expressly included the "not attached" language to indisputably avoid Black under the broadest reasonable interpretation standard applied during

prosecution. It may be “reasonable” to construe “contact points” as attachment points under the broadest reasonable interpretation, but that is not the plain and ordinary meaning. *Google LLC v. Network-1 Techs., Inc.*, 726 F.App’x 779, 784 (Fed. Cir. 2018) (“In order to be found reasonable, it is not necessary that a claim be given its correct construction under the framework laid out in *Phillips*”).

For at least these reasons, Petitioner failed to meet its burden in Ground 1.

2. Dependent Claims 2-9, 12-17, and 19

Petitioner failed to meet its burden for dependent claims 2-5 and 8 in Ground 1 for at least the same reasons it failed to meet its burden for independent claim 1. *Supra*, §VI.A; *In re Fine*, 837 F.2d 1071, 1076 (Fed. Cir. 1988) (“Dependent claims are nonobvious under section 103 if the independent claims from which they depend are nonobvious”); EX2031, ¶161.

B. Ground 2: Alleged Obviousness Based on Park, Baughan, and Johnson (Claims 20-22 and 24-28)

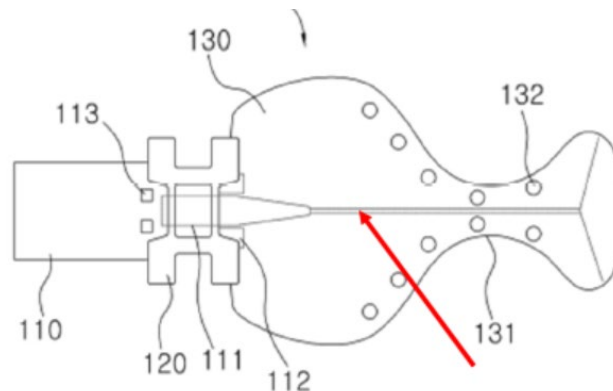
In Ground 2, Petitioner argues that independent claim 20 and dependent claims 21-22 and 24-28 of the ‘418 Patent are obvious over Park, Baughan, and Johnson. Petition, 65-83. For the reasons discussed below, Petitioner failed to meet its burden for Ground 2.

1. Independent Claim 20

Petitioner failed to show that a POSITA would have been motivated to modify Park in view of Baughan and/or Johnson to meet limitation 20(e) in claim 20 of the

'418 Patent. Park does not disclose, teach, or suggest any “crests” that are “formed on an interior surface of the second wall” or “troughs.” EX2031, ¶¶163-64. Petitioner and Dr. Black admit that “Park is silent regarding whether any structures are formed inside the interior chamber of the main body.” Petition, 72; EX1003, ¶179 (admitting “Park fails to expressly describe or illustrate whether the mouth prop 100 includes any internal features that assist with suction or preventing collapse under suction”).

Petitioner and Dr. Black further admit they can only speculate as to the function of certain features shown in Park's drawings. For example, Dr. Black refers to “what appears to be a light pipe” (annotated below) but admits that “it is unclear whether this is structural or simply something to assist with lighting.” EX1003, ¶179; *see also* Petition, 75 (speculating that “the line shown in FIG. 3 may not provide any rigidity or anti-collapse features at all and may only assist in guiding light from the light guide 240”).



EX1003, ¶179 (annotating EX1005, FIG. 3)

Dr. Black goes on to explain that “[m]y first impression was that the mouth prop 100 includes a spine” (EX1003, ¶229) and at least a portion of his analysis “assumes that there is a spine running down the symmetrical axis of the mouthpiece” (*Id.*, ¶182).

Petitioner claims that Park's lack of details “may be intentional as Park mentions that ‘common features,’ such as anti-collapse structures, ‘are omitted.’” Petition, 72 (quoting EX1006, ¶22). To the extent that Petitioner is suggesting that Park did not mention “anti-collapse structures” because they were “common” in dental isolation mouthpieces, Petitioner provides no evidence that such a structure is inherent in Park or was otherwise “common” in prior art dental isolation mouthpieces. EX2031, ¶167. As explained below, Petitioner cites no prior art that teaches that “collapsing” was a problem requiring a solution and, instead, relies on the ‘418 Patent itself for the teaching of this problem.

Attempting to address this critical deficiency in Park with respect to the claimed “crests” and “troughs,” Petitioner proffers only one alleged motivation to modify Park to include these claimed features: that “the first wall and the second wall are likely to collapse under the suction force.” Petition, 73. Specifically, Petitioner argues that “[t]his “collapsing would occur because Park teaches that the mouth prop comprises a flexible material, such as silicone.” *Id.* (citing EX1006, ¶¶32, 34). As discussed below, Petitioner has not shown that a POSITA would recognize such a problem with Park and therefore would have been motivated to

modify Park to arrive at the claimed invention. Instead, Petitioner's obviousness combination is an improper hindsight reconstruction.

a) Park is Not "Likely to Collapse" Under Suction

As noted above, Petitioner argues that a POSITA would modify Park to include a bridge structure because Park's walls are "likely to collapse under the suction force." Petition, 72-73. But Petitioner has not shown that a POSITA would recognize this supposed problem in Park, or that the problem was otherwise known in the field of dental isolation mouthpieces before the '418 Patent. EX2031, ¶168. Quite the contrary, Petitioner's own evidence shows that Park's walls would *not* collapse under suction, which refutes Petitioner's only proffered reason for modifying Park to meet the challenged claims.

Dr. Black initially suggests that Park's walls would collapse under suction (and therefore motivate the addition of a bridge structure) "given how thin Park's mouth prop 100 appears." EX1003, ¶181. But Park does not disclose any dimensions for the walls or indicate that the figures are drawn to scale that would permit Dr. Black to reach this conclusion. EX2031, ¶169. Indeed, Petitioner admitted in its Petition challenging the related '969 Patent that "Park ... is silent regarding the thickness of its various walls." EX2022, 74. Because Park's figures "are not drawn to scale" and do not provide dimensions, Dr. Black's argument that Park's mouthpiece would collapse because it appears "thin" in the drawings is "unavailing."

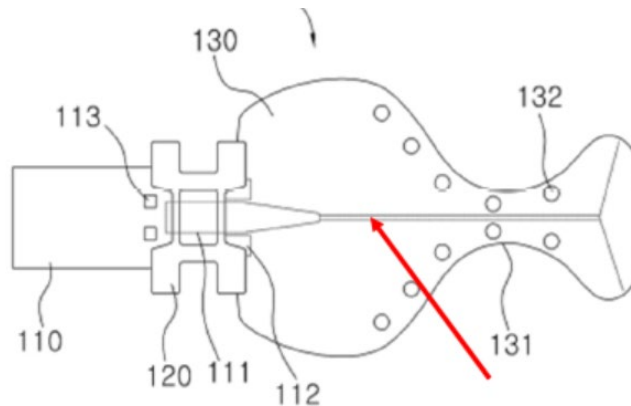
Nystrom v. TREX Co., 424 F.3d 1136, 1149 (Fed. Cir. 2005); *see also Regents of Univ. of California v. Satco Prods., Inc.*, No. 2023-1356, 2024 WL 4972639, at *4 (Fed. Cir. Dec. 4, 2024) (vacating Board decision that relied on “relative thickness” of feature shown in figures that were not drawn to scale).

The only other reason Petitioner provides regarding why Park's walls would supposedly collapse (and therefore motivate the addition of crests and troughs) is that the walls are formed from “a flexible material, such as silicone.” Petition, 73 (citing EX1006, ¶¶32, 34). But the mere fact that Park comprises “flexible” material like silicone does not mean that the walls would collapse under suction. Park states that its material has “a predetermined elasticity” but does not provide any values. EX1006, ¶[0032]; EX2031, ¶170. A POSITA would know that different types of silicone can have varying degrees of hardness, tensile strength, and elasticity such that Park's mouthpiece would not necessarily collapse under suction. EX2031, ¶¶171-72; EX2037; EX2038. Further, Petitioner's expert admitted in his declaration concerning the related '969 Patent that “elasticity and ‘resiliency’ are essentially synonymous concepts.” EX2041, ¶125; EX2031, ¶173. Whether Park's walls could collapse under suction is also function of the applied suction force, which Park does not disclose, and Petitioner and Dr. Black do not address. EX2031, ¶¶174-75.

Petitioner's own assertions and evidence further undermine its argument that “flexible material” is inherently “likely to collapse under the suction force.” Petition,

73. First, Petitioner admits that Park's "sidewalls and the insertion part 111 would help resist this collapse force" and that "the sidewall, the socket 111, or the insertion port 110" are "*rigid* structure[s]." *Id.* The sidewall, socket 111 and insertion port 110 are made of the same material as the rest of Park's mouthpiece, yet Petitioner characterizes them as "rigid." EX2031, ¶¶176-77. On one hand, Petitioner argues that "collapsing *would occur*" because Park's mouthpiece comprises a flexible material, yet on the other hand admits that the same material prevents collapse. Petitioner cannot have it both ways.

Second, while Petitioner and Dr. Black admit that Park is ambiguous, Dr. Black "assumes that there is a spine running down the symmetrical axis of the mouthpiece." EX1003, ¶182; Petition, 74.

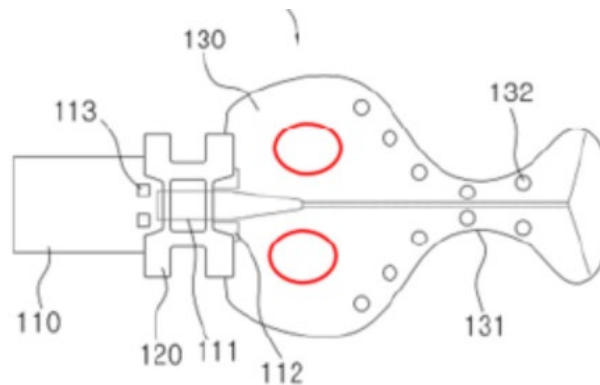


Petition, 74 (annotating EX1005, FIG. 3); EX1003, ¶181

Dr. Black then further assumes that this spine may serve as an "anti-collapsing structure." EX1003, ¶181; *see also* ¶¶136-39 (explaining that a "spine" would

increase rigidity). The fact that the central “spine” is made of the same flexible material as the rest of the mouthpiece and yet provides rigidity further undermines Petitioner’s theory that Park’s flexible material would inherently collapse. EX2031, ¶¶176-77.

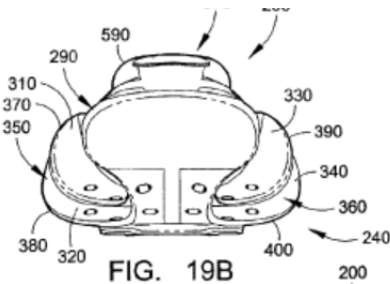
Third, Petitioner identifies the areas circled in red below as being the most likely to collapse under suction. Petition, 73.



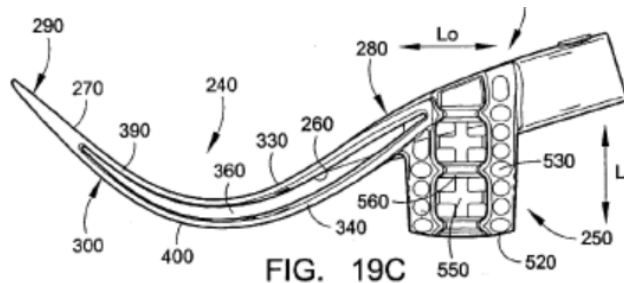
Petition, 73 (annotating EX1007, FIG. 3)

But Petitioner provides no explanation or evidence for this assertion beyond Dr. Black’s conclusory testimony that cites no additional evidence or facts beyond those in the Petition. *See* EX1003, ¶¶181-83. Such testimony is entitled to no weight. *Xerox Corp. v. Bytemark, Inc.*, IPR2022-00624, Paper 9 at 15-17 (PTAB Aug. 24, 2022) (precedential) (testimony restating “the petitioner’s arguments without any additional supporting evidence or reasoning” is accorded “little weight”); 37 C.F.R. § 42.65(a) (“Expert testimony that does not disclose the underlying facts or data on which the opinion is based is entitled to little or no weight”).

In any event, Petitioner's own evidence contradicts its characterizations of the "problem" in Park. For example, Petitioner and Dr. Black admit that Park is the same as Hirsch, with the only difference being that "Hirsch simply lacks sidewalls" in at least one embodiment. Petition, 97; EX1003, ¶232. If Petitioner were correct that Park has "weak points" that require reinforcement, then Hirsch would have the same problem given its similarity to Park. EX2031, ¶¶179-80. In fact, according to Petitioner, the problem would be even worse in Hirsch because it "lacks sidewalls" (Petition, 97), whereas Park has sidewalls that resist collapse (*id.*, 73).

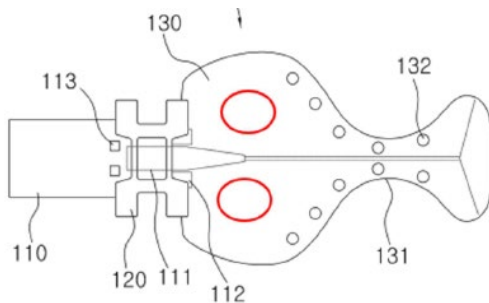


EX1012, FIG. 19B

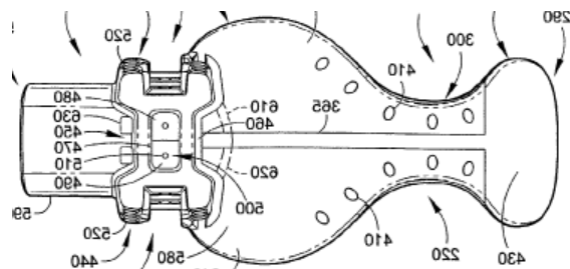


EX1012, FIG. 19C

Yet Hirsch has no reinforcing structure at the same supposed "weak points" identified by Petitioner:



Petition, 73

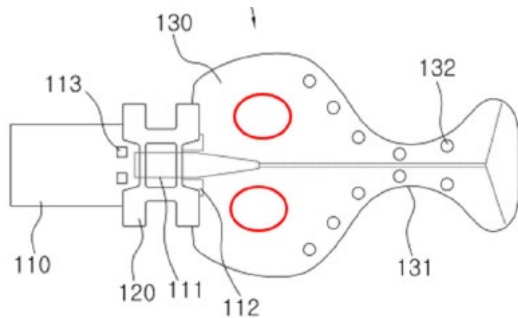


EX1012, FIG. 19E

EX2031, ¶¶181-82. Hirsch therefore refutes Petitioner's assertions that a POSITA

would recognize a problem with Park's walls collapsing under suction.

Similarly, Dr. Black's opinions regarding Park's "problem" are undermined by his discussion of the "Isolite" product. EX1003, ¶¶10-17. The Isolite product is similar to Park and Hirsch and lacks "sidewalls" but there are no anti-collapse structures at the supposed "weak points" in Park. EX2031, ¶¶183-84.



Petition, 73



EX1003, ¶11

The fact that similar mouthpieces would have at least the same if not more reason to include "anti-collapse" structures and yet contain none confirms that a POSITA would not recognize a problem with Park's walls collapsing that would require a modification. EX2031, ¶¶179-85.

Petitioner's argument that a POSITA would modify Park to avoid collapse is also flawed because it is premised on Park's mouthpiece being inoperable in its current form. Petitioner argues that unless Park is modified with Baughan's "anti-collapse" features, "collapsing *would occur* because Park teaches that the mouth prop comprises a flexible material, such as silicone." Petition, 73. Petitioner goes on

to explain that if Park's walls "collapse under suction, suction power would be significantly reduced or blocked entirely." *Id.*, 74; EX1003, ¶183.

If, as Petitioner suggests, suction is "blocked entirely" in Park, then Park would not work for its intended purpose, which includes "forming a suction line to expel foreign substances from the oral cavity" during dental procedures. EX1006, ¶[0012]; EX2031, ¶¶186-87. Park also would not work, or would at least be ineffective, if suction is "significantly reduced" due to collapsing walls. EX2031, ¶187. Indeed, Petitioner admits that its proposed modification to Park is not just an alleged improvement but is in fact necessary "**lest the purpose of Park's mouth prop be defeated.**" Petition, 78. This reasoning is flawed because Park "is presumed to be operable." *Ex Parte Thomas Edward Shafovaloff*, No. Appeal 2022-004103, 2023 WL 5321165, at *2 (PTAB Aug. 16, 2023) (citing *In re Sasse*, 629 F.2d 675 (CCPA 1980)). If anything, the fact that Park lacks any internal "anti-collapse" structure refutes Petitioner's proposed motivation to modify Park. Stated another way, if "anti-collapse" structure were actually necessary for Park's mouthpiece to work, as Petitioner argues, then Park would have disclosed it. But as Petitioner admits, Park does not.

As the above discussion demonstrates, Petitioner's proposed Park-Baughan-Johnson combination is a hindsight reconstruction of the invention. The Federal Circuit has held that the use of improper hindsight is apparent where, as here, the

petitioner fails “to demonstrate ... that the problem was known in the art or that [the petitioner’s] formulation of the problem was derived directly from the prior art, rather than from the challenged claims.” *Purdue Pharma L.P. v. Depomed, Inc.*, 643 F. App'x 960, 966 (Fed. Cir. 2016); *see also Grain Processing Corp. v. Am. Maize- Prods. Co.*, 840 F.2d 902, 907 (Fed. Cir. 1988) (“Care must be taken to avoid hindsight reconstruction by using ‘the patent in suit as a guide through the maze of prior art references, combining the right references in the right way so as to achieve the result of the claims in suit’”) (quoting *Orthopedic Equip. Co. v. United States*, 702 F.2d 1005, 1012 (Fed. Cir. 1983)).

Petitioner has not shown that the alleged problem in Park’s isolation mouthpiece—walls collapsing under suction—was known in the art before the ‘418 Patent. Park does not disclose this problem and, if anything, suggests that there is no such problem. To the extent Petitioner argues that Baughan demonstrates that the problem with structures collapsing under suction was known, this argument fails because Baughan is directed to a dental saliva ejector rather than an isolation mouthpiece, so it does not and cannot teach that the walls Park’s mouthpiece would collapse under suction. EX1007, 1:6-8; EX2031, ¶188. To the extent Petitioner points to Black, which is not even part of Ground 2, it contains no express teaching regarding this alleged problem.

The only express teaching of the collapsing problem which forms the basis

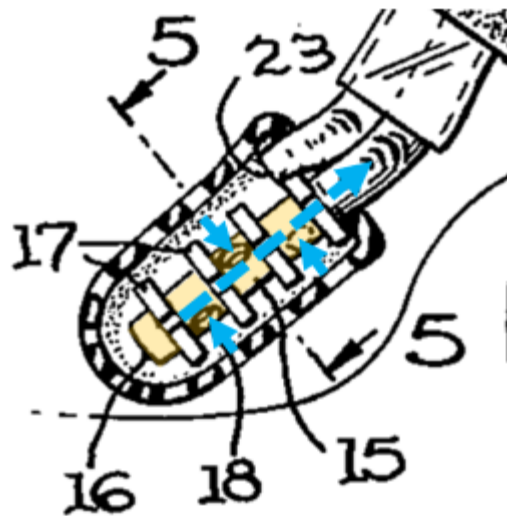
for Petitioner's obviousness combination comes from the '418 Patent itself, which teaches that the bridge structure "ensure[s] that the anterior and posterior surfaces remain separated during suction." EX1001, 4:55-58; *supra*, §II (explaining why this problem exists for the geometry of the disclosed embodiments in the '418 Patent). It is clear that Petitioner used this teaching as a blueprint for its Park-Baughan-Johnson combination, which is an improper hindsight reconstruction of the invention and should be rejected. *Insite Vision Inc. v. Sandoz, Inc.*, 783 F.3d 853, 859 (Fed. Cir. 2015) (holding that "defining the problem in terms of its solution reveals improper hindsight in the selection of the prior art relevant to obviousness"); *ATD Corp. v. Lydall, Inc.*, 159 F.3d 534, 546 (Fed. Cir. 1998) ("obviousness [cannot] be based on the hindsight combination of components selectively culled from the prior art").

b) A POSITA Would Not Have Combined Park, Baughan, and Johnson

Even if, *arguendo*, a POSITA would have recognized that Park's walls may collapse under suction, a POSITA would not have looked to modify Park with Baughan and/Johnson. As an initial matter, Petitioner ignores other potential measures for avoiding collapse. For example, if a POSITA believed that Park's walls may collapse because they are "thin," as Dr. Black suggests, they could easily modify Park to thicken the walls without adding any other features. EX2031, ¶¶200-02. As another example, if a POSITA believed Park's "flexible" material was

susceptible collapse, they could simply pick a stronger (yet still sufficiently flexible) material. *Id.* A POSITA would recognize that adding a “bridge structure,” as Petitioner suggests, would be more costly and complicated than either of the above options. *Id.* Petitioner and Dr. Black do not explain why Park would need to be modified to include an additional “anti-collapse” structure rather than these alternatives. *See* Petition, 72-80; EX1003, ¶¶179-91.

Baughan is directed to a dental saliva ejector rather than an isolation mouthpiece. EX1007, 1:6-8; EX2031, ¶188. Baughan does describe structures to prevent suction orifices from being blocked, but Baughan is directed to a different problem and geometry than the alleged problem in Park. EX2031, ¶189. In Baughan, the discs 17 prevent the sleeve 24 from blocking the orifices 18 of the terminal tube portion 15, which are the source of suction. EX1007, 3:36-48; EX2031, ¶¶189-90.



EX1007, FIG 3 (excerpted and annotated)

Baughan's discs are designed to prevent a moveable surface (the sleeve 24) from blocking holes providing suction from a fixed surface (the tube 15). *Id.* By contrast, in Park, two surfaces are urged toward one another under suction rather than one surface being urged towards the source of suction. EX2031, ¶190.

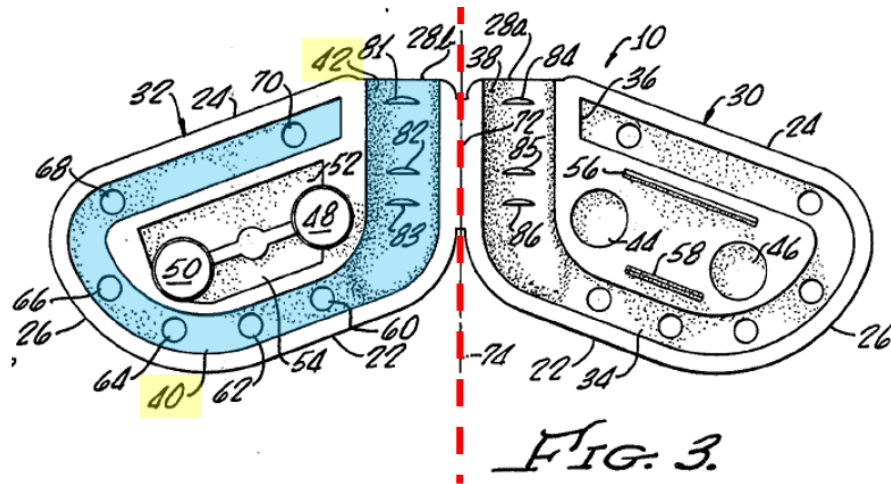
Petitioner acknowledges Baughan's fundamentally different geometry that uses "outward projecting discs" around the circumference of an inner cylindrical tube. Petition, 78. Petitioner also acknowledges that Baughan's discs would need to be modified for use with Park and argues that "a PHOSITA using basic common sense, would modify the discs for a tube-shaped embodiment to be projections for a flatter, non-tube embodiment." *Id.* There are several problems with this assertion.

First, Petitioner's reliance on "basic common sense" is an improper use of general knowledge that may not be used to supply a missing claim limitation in an IPR, which must be based on patents or printed publications. None of the references in the Petition disclose (1) a plurality of crests is formed on an interior surface of the second wall to provide a plurality of contact points with the first wall where the contact points are not attached to the first wall, or (2) wherein a plurality of troughs provide a plurality of gaps through which fluids can pass between the contact points, as required in claim 20 of the '418 Patent. EX2031, ¶191. Petitioner cannot rely on "basic common sense" to fill in this missing element under Federal Circuit precedent. *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).⁷

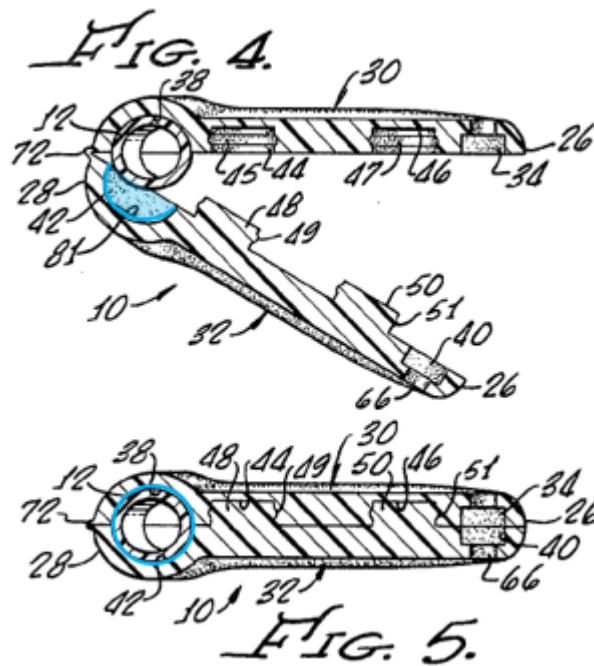
Second, Johnson does not cure this deficiency in Baughan because, contrary to Petitioner's suggestion, it does not teach "projections for a flatter, non-tube embodiment." Petition, 78; EX2031, ¶192. To this point, Dr. Black asserts that "Johnson shows how to form projections 81-86 on a flat surface 40 [in FIG. 3] for dental application." EX1003, ¶186. This is incorrect. EX2031, ¶¶192-97. Johnson describes reference numeral 40 in FIG. 3 as follows: "recess 40 extend[s] 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 groove 42 formed in the neck 28b of plate 32." EX1008, 3:25-30; EX2031, ¶196. In FIG. 3, plates 30 and 32 "pivot with respect to one another about a hinge axis (denoted by a line 74)." EX1008, 4:11-13; EX2031, ¶196.

⁷ See also July 31, 2025 Memorandum entitled "Enforcement and Non-Waiver of 37 C.F.R. 42.104(B)(4) and Permissible Uses of General Knowledge in *Inter Partes* Reviews."



EX1008, FIG. 3 (annotated)

As shown more clearly in FIGS. 4-5, for example, when the plates 30 and 32 are closed, the recess 40 is *not* “flat” as asserted by Petitioner and Dr. Black – it is semicircular. EX2031, ¶197.

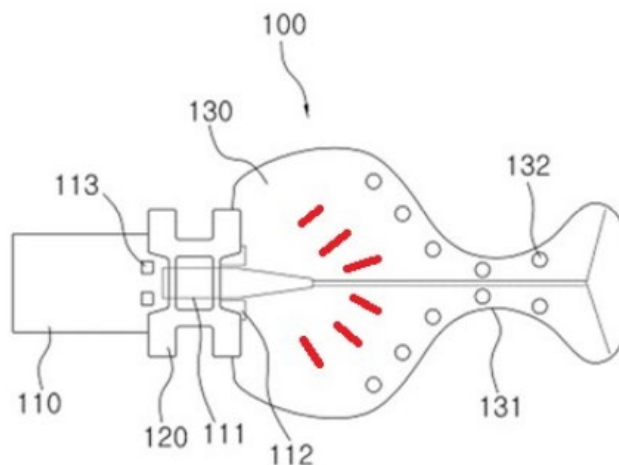


EX1008, FIGS. 4-5 (annotated)

Thus, contrary to Petitioner and Dr. Black's assertions, Johnson does *not* teach "how to form projections 81-86 on a flat surface 40 [in FIG. 3] for dental application."

EX1003, ¶186; Petition, 78.

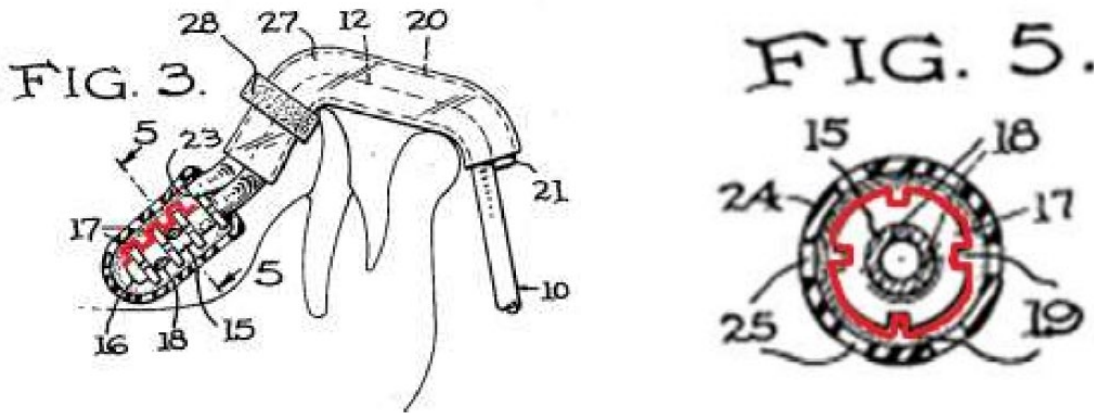
Additionally, Petitioner fails to explain *how* a POSITA would modify Baughan's discs for Park's walls and thus the proposed combination is unclear. Petition, 76-80. While Petitioner provides the following annotated top-down view of the combination, it fails to explain how Baughan's discs would be implemented at the red line locations in Park:



Petition, 79

To the extent Petitioner is arguing that Baughan's discs would be cut in half (which is unclear), Petitioner does not explain how or why the modified discs would be attached to one of Park's walls. *Id.*, 79-80. Additionally, Petitioner's annotations of Baughan's discs and arguments for how they allegedly result in the claimed

invention exacerbate the lack of clarity in terms of how they would be implemented in Park:



Petition, 77 (annotating EX1007, FIGS. 3 and 5)

Petitioner's failure to explain how Park and Baughan would be combined is yet another basis for denying the Petition. *See, e.g., ActiveVideo Networks, Inc. v. Verizon Commc'ns, Inc.*, 694 F.3d 1312, 1327-28 (Fed. Cir. 2012) (obviousness analysis failed to explain specifically how the references would be combined and was not specific to the claim limitations); *Braintree Labs., Inc. v. Novel Labs., Inc.*, 749 F.3d 1349, 1359 (Fed. Cir. 2014) (“[Party] failed to prove ... why the prior art references would have worked together” (cleaned up)); *PersonalWeb Techs., LLC v. Apple, Inc.*, 848 F.3d 987, 993-94 (Fed. Cir. 2017) (finding a failure to explain “how the combination of the two references was supposed to work”); *Juniper Networks, Inc. v. Smart Path Connections, LLC*, IPR2021-01356, Paper 27 at 48-50 (PTAB Jan. 19, 2023) (finding petitioner did “not adequately explain[] how [one reference]

would be modified to incorporate teachings from [another reference]").

c) Petitioner's Translation of Park Does Not Comply with the Board's Rules

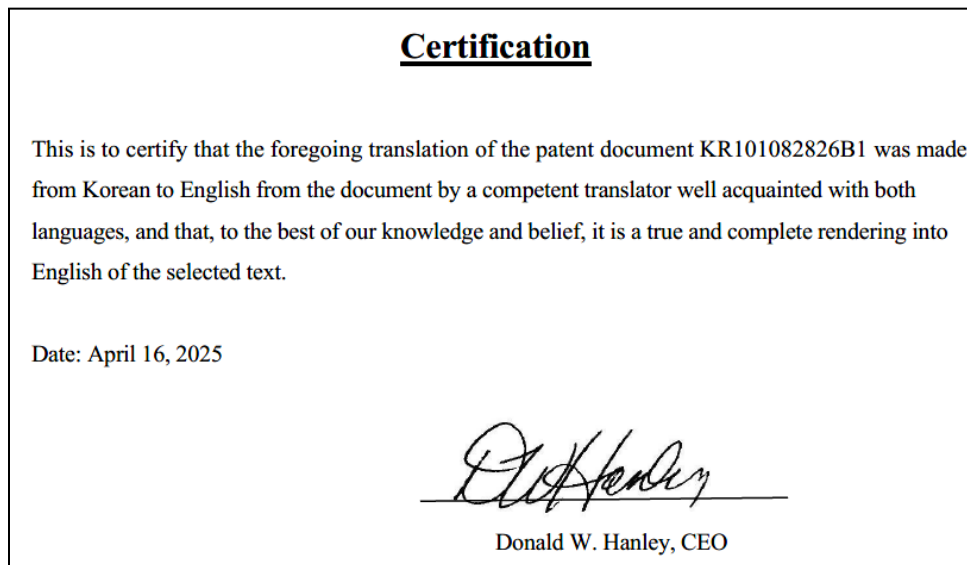
Park is a Korean patent publication, and Exhibit 1006 purport to be an English translation. EX1006. The Board's rules require that "[w]hen a party relies on a document or is required to produce a document in a language other than English, a translation of the document into English *and an affidavit* attesting to the accuracy of the translation must be filed with the document. 37 C.F.R. § 42.63(b). The Board's rules define "affidavit" as "affidavit or declaration under § 1.68 of this chapter." 37 C.F.R. § 42.2. In turn, § 1.68 provides:

Any document to be filed in the Patent and Trademark Office and which is required by any law, rule, or other regulation to be under oath may be subscribed to by a written declaration. Such declaration may be used in lieu of the oath otherwise required, if, and *only if, the declarant is on the same document, warned that willful false statements and the like are punishable by fine or imprisonment, or both (18 U.S.C. 1001)* The declarant must set forth in the body of the declaration that all statements made of the declarant's own knowledge are true and that all statements made on information and belief are believed to be true.

37 C.F.R. § 1.68.

Petitioner's translation does not comply with the Board's rules because the "Certification" accompanying Exhibit 1006 is unsworn and was not executed under

penalty of perjury:



EX1006, 21. There is no sign that the signatory was “warned that willful false statements and the like are punishable by fine or imprisonment.” 37 C.F.R. § 1.68. Moreover, the “Certification” is signed by the translation firm’s CEO rather than the individual(s) who purportedly translated Park from Korean into English. EX1006, 21. There is no identification of who the translator was, what their qualifications are, or, most importantly, a sworn statement from the translator that Exhibit 1006 is an accurate translation. *Id.*; 37 C.F.R. § 42.63(b); 37 C.F.R. § 1.68. Since the firm’s CEO does purport to be a Korean/English translator, it is unclear how he can have sufficient personal knowledge to “certify” that the translation is “true and complete.” EX1006, 21.

The Board has denied institution for non-compliance with the Board’s rules governing translations. *Shenzhen Aurora Tech. Co., Ltd. v. Putco, Inc.*, IPR2020-

00670, Paper 10 at 6 (PTAB Aug. 27, 2020) (denying institution because “Petitioner failed to comply with the Board's rule requiring an affidavit attesting to the accuracy of a translation”); *see also Hengdian Grp. Dmegc Magnetics Co., Ltd. v. Hitachi Metals, Ltd.*, IPR2017-01313, Paper 7 at 5 n.2 (PTAB Nov. 6, 2017) (“The failure to file a proper affidavit with the translation of [a reference] can be a reason to deny institution of any ground related to [that reference]”). Because Grounds 2-4 and 6-7 in the Petition are based on Park, Patent Owner submits that the Board can and should find Petitioner did not meet its burden for these grounds for this additional reason.

2. Dependent Claims 21-22 and 24-28

Petitioner failed to meet its burden for dependent claims 21-22 and 24-28 in Ground 2 for at least the same reasons it failed to meet its burden for independent claim 20. *Supra*, §VI.B.1; *Fine*, 837 F.2d at 1076; EX2031, ¶203.

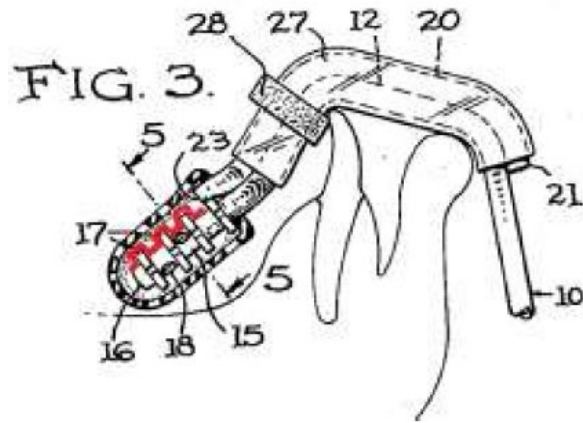
C. Ground 3: Obviousness Based on Park, Baughan, Johnson, and Hirsch (Claims 1-9, 11-17, and 23)

In Ground 3, Petitioner argues that independent claims 1 and 11 and dependent claims 2-9, 12-17, and 23 of the ‘418 Patent are obvious over Park, Baughan, Johnson, and Hirsch. Petition, 83-100. As set forth below, Petitioner failed to meet its burden.

1. Independent Claims 1 and 11

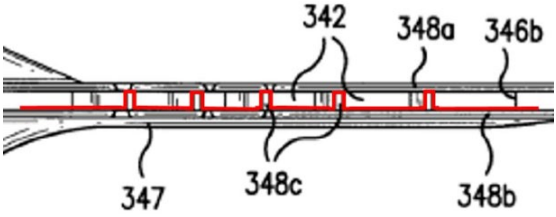
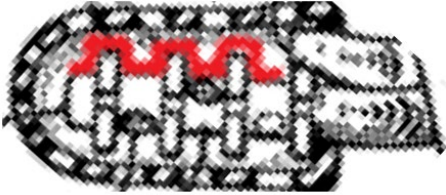
In Ground 3, Petitioner refers back to and relies on the same alleged motivations to modify Park with Baughan and Johnson. *See, e.g.*, Petition, 84 (referring to Section IX.B.1.e for limitation 1(e), which discusses combining Park Baughan, and Johnson). Petitioner's reliance on Hirsch in Ground 3 does not address the deficiencies and flaws in the proposed Park-Baughan-Johnson combination. *Id.*, 88-90 (relying on Hirsch for limitation 1(j)). Thus, Petitioner failed to meet its burden for Ground 3 for at least the same reasons it failed to meet its burden for Ground 2. *Supra*, §VII.B.1; EX2031, ¶¶205-06.

Additionally, limitations 1(e) and 11(e) require a “wave-like structure” which is not present in independent claim 20. *See supra*, §VI.A. Petitioner does not expressly address the “wave-like structure” requirement in in Ground 3 and instead refers back to its discussion for claim 20 in Ground 2. Petition, 84 (referring to Section IX.B.1.e for limitation 1(e)), 98-99 (referring to Section IX.B.1.e for limitation 11(e)). In Ground 2, Petitioner argues that “Baughan teaches that the spaced-apart discs result in a square wave shape having crests and troughs” and “notches 19 in the disc also form a *square wave* shape.” Petition, 76-77. Petitioner annotates this “square’ pattern from Baughan as shown below:



Petition, 77

As discussed above, a series of rectangular columns is not a structure with curved surfaces between (i) crests that provide contact points with the first wall during suction, and (ii) troughs that provide gaps that allow for the transfer of fluids during suction under the proper construction for “wave-like structure.” *Supra*, §VI.A; EX2031, ¶¶207-10. The prosecution history reinforces this conclusion at least because (1) the Examiner concluded that a series of rectangular columns do not constitute a “wave” shape during prosecution of the ‘232 Patent and (2) the applicant disclaimed a series of rectangular columns from reading on a “wave” shape during prosecution of the related ‘686 and ‘970 Patents. *Supra*, §§VI.A.3. As shown below, the geometry Petitioner relies on in Baughan is the same as the transverse walls 348c that were differentiated multiple times during prosecution:

Black	Baughan
 <p data-bbox="212 611 787 688">Petition, 45 (annotating EX1005, FIG. 23C)</p>	 <p data-bbox="834 621 1409 699">Petition, 77 (annotating EX1007, FIG. 3)</p>

Dr. Black confirms the similarity of these shapes in asserting that Baughan's "discs 17 are essentially the exact same concept I taught in Black when I taught the transverse walls." EX1003, ¶187.

The Petition also argues that "each individual disc 17 is formed in a wave shape with notches 19" and "the notches 19 in the disc also form a square wave shape." Petition, 77.



Petition, 77 (annotating EX1007, FIG. 5)

Dr. Black does not opine on this apparent alternative theory, so it amounts to unsupported attorney argument. *See* EX1003, ¶¶184-85. In any event, this rectangular or square pattern is not a wave-like structure for at least the same reasons that Baughan's discs 17 shown in FIG. 3 of and Black's transverse walls 348c are not. EX2031, ¶¶211-13.

Thus, even if a POSITA were motivated to modify Park to add on the various features of Baughan and Johnson, including the "square wave" columns (which they would not), the proposed Park-Baughan-Johnson combination still does not meet the "wave-like structure" shape requirement in claims 1 and 11 when properly construed in light of the specification and prosecution history. Petitioner therefore failed to meet its burden for these claims in Ground 3 for this additional reason.

2. Dependent Claims 2-9, 12-17, and 23

Petitioner failed to meet its burden for dependent claims 2-9, 12-17, and 23 in Ground 3 for at least the same reasons it failed to meet its burden for independent claims 1, 11, and 20. *Fine*, 837 F.2d at 1076; EX2031, ¶214.

D. Ground 4: Alleged Obviousness Based on Park, Baughan, Johnson, and Black (Claim 19)

In Ground 4, Petitioner argues that dependent claim 19 of the '418 Patent is obvious over Park, Baughan, Johnson, and Black.⁸ Petition, 100-01. Petitioner failed to meet its burden for Ground 4 for at least the same reasons it failed to meet its burden for independent claim 11 in Ground 3. *Supra*, §VII.C; *Fine*, 837 F.2d at 1076; EX2031, ¶¶215-16.⁹

E. Ground 5: Alleged Obviousness Based on Black, Hirsch, and Zheng (Claims 1-9, 11-17, and 19)

In Ground 5, Petitioner argues that independent claims 1 and 11 and dependent claims 2-9, 12-17, and 19 of the '418 Patent are obvious over Park, Baughan, Johnson, Hirsch, and Zheng. Petition, 101-02. Specifically, Petitioner

⁸ Petitioner refers to Hirsch in the section header for Ground 4, but this appears to be a typo because the substance of Ground 4 instead relies on Black. Petition, 100.

⁹ Dr. Black's discussion for Ground 4 references claims from a related patent rather than claim 19 of the '418 Patent. EX1003, ¶¶253-55.

argues that if “the Board does not agree that Black teaches two walls that are separated for a short distance in the cheek retractor before merging together to form the cheek retractor, it would have been obvious to modify the mouthpiece to do so in view of Zheng.” *Id.*, 101. This additional argument does not Black’s failure to disclose the “wave-like structure” and “contact points” limitations. *Supra*, §VII.A.1. Thus, Petitioner failed to meet its burden for Ground 5 for at least the same reasons as Ground 1. EX2031, ¶217.

F. Ground 6: Alleged Obviousness Based on Park, Baughan, Johnson, Hirsch, and Zheng (Claims 1-9, 11-17, and 20-28)

In Ground 6, Petitioner relies on the same obviousness arguments based on Park, Baughan, and Johnson for claims 1-9, 11-17, and 20-28 as Ground 3 and additionally argues that it would have been obvious to modify Black in view of Zheng to include “two walls that are separated for a short distance in the cheek retractor before merging together to form the cheek retractor.” Petition, 102-03. Because this proposed combination with Zheng does not address the deficiencies discussed above for the Park-Baughan-Johnson combination, Petitioner failed to meet its burden for Ground 6 for at least the same reasons as Ground 3. *Supra*, §VII.C; EX2031, ¶218.

G. Ground 7: Alleged Obviousness Based on Park, Baughan, Johnson, Hirsch and Zheng (Claim 19)

In Ground 7, Petitioner relies on the same obviousness arguments as Ground 4 and the same combination with Zheng as Ground 6. Petition, 102-03. Because this proposed combination does not address any of the deficiencies in Ground 4, Petitioner failed to meet its burden for Ground 7 for at least the same reasons as Ground 4. *Supra*, §VII.D; EX2031, ¶219.

VIII. PETITIONER DID NOT ESTABLISH IPR ELIGIBILITY

The '418 Patent issued less than 9 months before the Petition was filed and claims priority to a provisional application filed in December 2012 (pre-AIA) and a non-provisional application filed in December 2013 (post-AIA). EX1001, Cover. Petitioner purports to certify that the '418 Patent is IPR eligible because it "claims priority to December 7, 2012," i.e., the pre-AIA provisional. Petition, 17. But Petitioner goes on to argue that the pre-AIA "provisional application *does not support all claim limitations*" in the '418 Patent. *Id.*, 21 n.1.

Petitioner's position that at least one claim is *not* supported by the pre-AIA provisional application is irreconcilable with its purported certification that the '418 Patent is IPR eligible. 35 U.S.C. § 311(c)(1); AIA § 3(n)(1); 37 C.F.R. § 42.104; *Samsung Elecs. Co., Ltd. et al. v. MemoryWeb, LLC*, IPR2022-00885, Paper 11 (PTAB Nov. 17, 2022) (denying IPR where petitioner argued that claims lacked

support in pre-AIA priority application). If the allegations in the Petition are taken at face value, then the '418 Patent is not eligible for IPR until February 2026. If Petitioner wanted to argue that one or more claims of the '418 Patent are not supported by the pre-AIA provisional, then it should have filed a PGR instead of an IPR. The consequence of this decision is that Petitioner cannot certify IPR eligibility and the Petition should be denied. 37 C.F.R. § 42.104.

IX. CONCLUSION

For at least the foregoing reasons, the Petition should be denied as to each of the requested grounds. For brevity, Patent Owner may not have addressed all characterizations of the applied references and the challenged claims and reserves the right to do so should institution be granted. The absence of a response by Patent Owner to any of the positions presented in the Petition or the associated expert declaration is not a concession to those positions. The fact that Patent Owner's Preliminary Response has focused on particular arguments is not a concession that there are no other arguments for patentability of the challenged claims.

Respectfully submitted,

Dated: October 22, 2025

By: /s/ Angelo J. Christopher

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Patent No. 12,290,418
IPR2025-01175

Patent Owner's Preliminary Response

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CERTIFICATION OF WORD COUNT

Pursuant to 37 C.F.R. § 42.24(d), the undersigned hereby certifies that the foregoing Patent Owner's Preliminary Response is produced using a 14-point Times New Roman font and contains approximately 13,303 words, which is less than the 14,000 total words permitted by the U.S. Patent Trial and Appeal Board rules. Counsel relies on the word count of the computer program used to prepare the response on October 22, 2025.

Dated: October 22, 2025

By: /s/ Angelo J. Christopher

Lead Counsel for Patent Owner

CERTIFICATE OF SERVICE

The undersigned hereby certifies that a copy of the foregoing **Patent Owner's Preliminary Response** was served on October 22, 2025 by email:

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