

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

SHENZHEN KANGVAPE TECHNOLOGY CO., LTD.,
Petitioner,

v.

RAI STRATEGIC HOLDINGS, INC.,
Patent Owner.

Case IPR2024-01406
Patent 11,925,202

PATENT OWNER PRELIMINARY RESPONSE

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LIST OF PATENT OWNER EXHIBITS

- Ex. 2001 Complaint from ITC Investigation No. 337-TA-1410
- Ex. 2002 Notice of Institution of ITC Investigation No. 337-TA-1410
- Ex. 2003 Initial Determination Denying TEO, ITC Investigation No. 337-TA-1410
- Ex. 2004 U.S. Patent Pub. No. 2008/0038363 (Zaffaroni)
- Ex. 2005 U.S. Patent No. 5,613,505 (Campbell)
- Ex. 2006 U.S. Patent No. 5,060,671 (Counts)
- Ex. 2007 U.S. Patent No. 6,234,167 (Cox)
- Ex. 2008 U.S. Patent No. 6,681,998 (Sharpe)
- Ex. 2009 U.S. Patent No. 10,543,323 (Buchberger)
- Ex. 2010 Patari & Mahapatra, *Liquid Wicking in a Paper Strip: An Experimental and Numerical Study*, ACS Omega 5, 22931–22939 (2020)
- Ex. 2011 U.S. Patent No. 9,901,123 (the '123 patent)

I. INTRODUCTION

The Board should deny institution of *inter partes* review (IPR) because each of the Petition's grounds is deficient, and Petitioner has not shown a reasonable likelihood of success on any of them.

The Petition's lead reference, Morgan, includes no description of wicking and thus fails to disclose the claimed storage compartment "configured for storage of a liquid aerosol-forming material and being arranged such that the liquid aerosol-forming material can be *wicked into contact with the electrical resistance heater*." The Petition argues that Morgan's extruded open-cell foamed tobacco structure wicks liquid, citing to Exhibits 1017 and 1018 as alleged "corroborating examples." But neither of these exhibits discloses a foamed tobacco structure (much less one that is extruded and open-cell), and both were filed more than 20 years after Morgan. Exhibits 1017 and 1018 corroborate nothing and do not support Petitioner's erroneous argument that Morgan discloses wicking. Grounds 1A and 1B should be rejected accordingly.

Grounds 2A and 2B also fail to show disclosure of the "wicked into contact" limitation. Gupta, the primary reference for these grounds, uses a controller and valve to supply "a desired volume of liquid" to a heating tube at "a substantially constant pressure." Actively supplying and controlling characteristics of the liquid's flow to the heating tube (*e.g.*, its volume, pressure, and rate), as described

in Gupta, are directly contrary to wicking, a passive phenomenon that occurs without assistance of external forces. The Petition makes the conclusory assertion that Gupta’s “capillary sized” passage wicks liquid, but Petitioner ignores key details set forth in Gupta that bear on whether the passage would, in fact, provide wicking (*e.g.*, the passage’s dimensions and materials). This is a failure of proof, and Grounds 2A and 2B should be rejected for these reasons and those below.

As with the preceding grounds, Ground 3 is deficient because the Petition failed to prove that each and every limitation is disclosed in the prior art. The Takeuchi reference, set forth as allegedly anticipatory in Ground 3, discloses a general “heater,” not the claimed “*electrical resistance* heater.” The Petition attempts to fill this gap in its Section 102 argument by arguing that the “use of DC power and [a] wired connection [to a heater element]” is indicative of the claimed “electrical resistance heater.” But Petitioner’s own evidence disproves its theory: Gupta describes an induction heater (not an electrical resistance heater) that uses a “5-15 Volt DC source” and a wired connection to a heating element.

Institution should be denied.

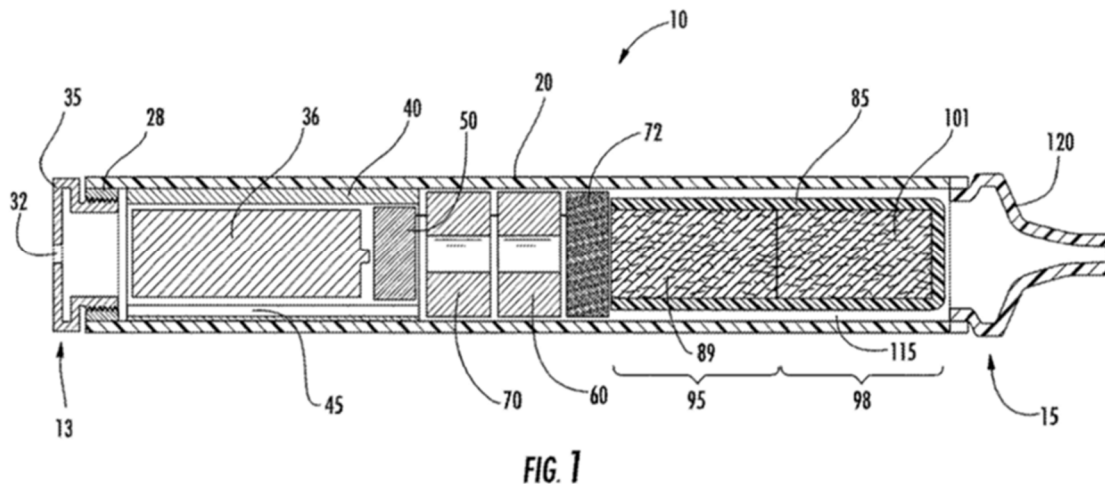
II. BACKGROUND

A. The ’202 Patent

The ’202 patent is entitled “Tobacco-Containing Smoking Article,” and claims priority through a series of continuation applications to U.S. Patent App.

No. 11/550,634, filed on October 18, 2006. Ex. 1001 at 1:8-24. The '202 patent describes embodiments of a smoking article that includes an electrical power source that powers an electrical resistance heater. *See, e.g., id.* at 6:4-14. The electrical resistance heater is configured to heat an aerosol-forming material in a storage compartment (*id.* at 5:65-6:29), and the storage compartment is arranged such that the liquid aerosol-forming material can be wicked into contact with the electrical resistance heater to volatilize the liquid aerosol-forming material. *Id.* at 33:1-6. Embodiments of the smoking article additionally include a controller configured to activate current flow through the heater in response to a draw on the smoking article. *Id.* at 5:29-36.

Figure 1, reproduced below, shows a longitudinal cross-sectional view of one embodiment of a representative smoking article 10 of the '202 patent:



Id. at Fig. 1. The smoking article 10 has an overall shape that is generally rod-like or tubular in nature, generally akin to a cigarette-type or cigar-type smoking

article. *Id.* at 19:53-55. The smoking article 10 includes a distal end 13 and a mouth-end 15. *Id.* at 19:56-57.

The smoking article 10 further includes an outer container or housing 20. *Id.* at 19:58-59. Although the dimensions and shape of the outer container 20 can vary, a representative outer housing generally has a greater length than diameter and can be provided using a variety of materials. *Id.* at 19:59-64. As shown, the mouth-end 15 includes an opening adapted for egress of an aerosol generated within the smoking article, and the distal end 13 includes an opening adapted for intake of air into the smoking article 10. *Id.* at 20:4-9.

B. Other Proceedings On The '202 Patent

On June 11, 2024, RAI, R.J. Reynolds Vapor Company, R.J. Reynolds Tobacco Company, and RAI Services Company (collectively “Complainants”) filed an ITC complaint, seeking institution of a Section 337 investigation against Petitioner and other Respondents for, *inter alia*, infringement of the '202 patent. *See Certain Disposable Vaporizer Devices*, Inv. No. 337-TA-1410; Ex. 2001. The ITC instituted the investigation on July 17, 2024. Ex. 2002.

Complainants also filed a Motion for Temporary Relief in the ITC on the same day that they filed the complaint. Ex. 1009. In the motion, Complainants requested a temporary exclusion order (TEO) and cease-and-desist orders directed to each of the Respondents. *Id.* On November 19, 2024, Administrative Law

Judge (ALJ) Monica Bhattacharyya denied Complainants' motion. Ex. 2003. The hearing for the permanent phase of the ITC investigation is scheduled to start on April 7, 2025, and the Commission is expected to issue its Final Determination in November 2025.

On August 13, 2024, ITC Respondents Ecto World, LLC and SV3, LLC filed IPR and PGR petitions against the '202 patent. IPR2024-01280, Paper No. 1; PGR2024-00049, Paper No. 3. Both petitions rely on the Takeuchi reference, which is also asserted in the instant IPR. Patent Owner filed preliminary responses (POPRs) to those petitions on December 11, 2024, and the Board's institution decisions are due by March 11, 2025.

C. The Asserted Prior Art

Petitioner asserts four prior art references across its five unpatentability grounds:

- U.S. Patent No. 5,249,586 to Morgan ("Morgan");
- EP Patent Appl. No. 0845220 to Susa ("Susa");
- U.S. Publication No. 2005/0205084 to Gupta ("Gupta"); and
- U.S. Patent No. 6,155,268 to Takeuchi ("Takeuchi").

Pet. at 1. Morgan, Susa, and Takeuchi were previously presented to the Patent Office. Ex. 1001 ("References Cited"). Takeuchi is also asserted against the '202 patent in PGR2024-00049 and IPR2024-01280, as noted above.

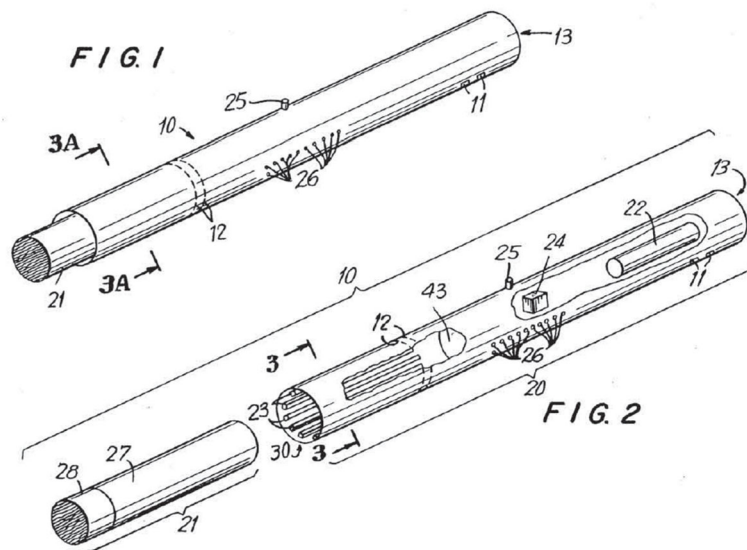
For Ground 1A, Petitioner asserts that claims 1, 3, 4, and 8-13 are anticipated by Morgan. Pet. at 11-30. For Ground 1B, Petitioner asserts that claims 1, 3, 4, 8-13, and 15 are obvious over Morgan in view of Susa. *Id.* at 30-39. For Ground 2A, Petitioner asserts that claims 1, 4, 8, 9, and 13 are anticipated by Gupta. *Id.* at 39-52. For Ground 2B, Petitioner asserts that claims 1, 3, 4, 8-13, and 15 are obvious over Gupta in view of Takeuchi. *Id.* at 52-65. For Ground 3, Petitioner asserts that claims 1, 3, 8-11, 13, and 15 are anticipated by Takeuchi. *Id.* at 65-75.

Patent Owner provides an overview of Morgan, Gupta, and Takeuchi below. The Board need not to address Susa in denying institution, and Patent Owner does not further describe Susa here.

1. Morgan

Morgan discloses an “article . . . in which a replaceable tobacco flavor medium is electrically heated by a set of permanent reusable heaters to evolve inhalable flavors or other components in vapor or aerosol form.” Ex. 1004 at Abstract. It further describes that “[e]ach heater heats only a portion of the available tobacco flavor medium so that a plurality of individual puffs of tobacco flavor substance can be delivered sequentially to the smoker.” *Id.*

Figure 1 “is a perspective view of an electrical smoking article” and Figure 2 “is a partially fragmentary, exploded perspective view of the electrical smoking article of FIG. 1.” *Id.* at 2:42-45. Figures 1 and 2 are reproduced below.



Id. at Figs. 1, 2.

Morgan describes the “article 10 includes reusable or ‘permanent’ portion 20 and disposable filter/flavor portion or cartridge 21 which is received in a cavity 30 at the mouth end of portion 20.” *Id.* at 4:44-47. The reusable portion 20 includes, “at the end remote from the mouth end, a power source 22, which could include a battery, a capacitor or both.” *Id.* at 4:48-50. “The battery could be replaceable, rechargeable or both. If the battery is rechargeable, or if power source 22 is a capacitor alone, then article 10 is provided with charging contacts 11 on its outer surface, for connection to an external power supply (not shown) for charging power source 22.” *Id.* at 4:50-55. The “power source 22 provides power for heating elements 23, which are energized under the control of control circuit 24, which is in

turn actuated by pushbutton 25 or by a puff-actuated sensor (not shown).” *Id.* at 4:46-59.

Morgan further states that “[p]erforations 12 may be provided in the wall of portion 20 to allow outside air to be drawn in during puffing, or outside air may be drawn through all of portion 20 via openings (not shown) at its far end 13.” *Id.* at 5:1-5. It also notes that the “portion 20 is preferably covered by cigarette wrapping paper 31, to give it the appearance of a conventional cigarette.” *Id.* at 4:66-5:1.

2. Gupta

Gupta discloses an “aerosol generating device [that] includes a housing, a heater and an optional mouthpiece.” Ex. 1007 at Abstract. The “heater volatilizes liquid within a flow passage and forms an aerosol in the mouthpiece.” *Id.* “An aerosol confinement sleeve is disposed to control the size distribution of the aerosol.” *Id.*

Figure 1 of Gupta, reproduced below, “illustrates an embodiment of an aerosol generating device.” *Id.* at [0011].

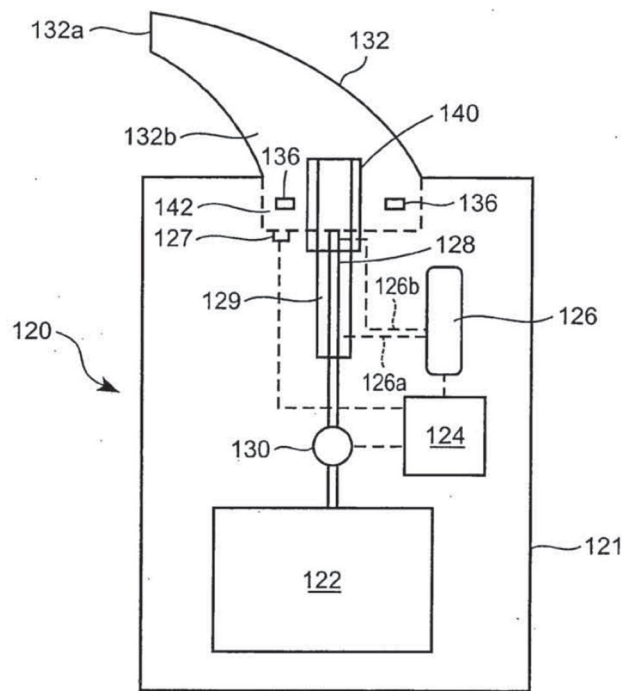


FIG. 1

Gupta describes that “FIG. 1 depicts a preferred embodiment of a hand-held aerosol generating device 120.” *Id.* at [0039]. The “aerosol generating device 120 comprises a housing 121, a source 122 of a liquid aerosol formulation, a controller 124, a power source 126, an optional sensor 127, such as a pressure sensor, a heated flow passage 128, a valve 130, and a mouthpiece 132.” *Id.* The “valve 130 is operable to deliver a volume of fluid, such as a predetermined dose, from the source 122 to the flow passage 128.” *Id.*

Gupta further states that “[t]he controller 124 is operably connected to the power source 126, the sensor 127 and valve 130 to effect delivery of the liquid from the source 122 to the flow passage 128, and to operate a heater arranged to heat

liquid in the flow passage 128.” *Id.* at [0040]. “For example, in a preferred embodiment, the flow passage comprises a capillary sized flow passage.” *Id.* It explains that “[f]or example, the capillary sized flow passage can be a tube or alternatively a passage in a body, such as a monolithic or multilayer body of an electrically insulating material.” *Id.*

3. Takeuchi

Takeuchi discloses a “flavor-generating device” that “includes a chamber having an air inlet port and a flavor inhalation port.” Ex. 1009 at Abstract. The device defines “a gas passageway between the air inlet port and the inhalation port.” *Id.* It also provides for “a liquid container for storing a liquid flavor source” that “is maintained at substantially an atmospheric pressure.” *Id.*

Figure 1 of Takeuchi, reproduced below, shows “the construction of a flavor-generating device 10 according to one embodiment.” *Id.* at 4:26-28.

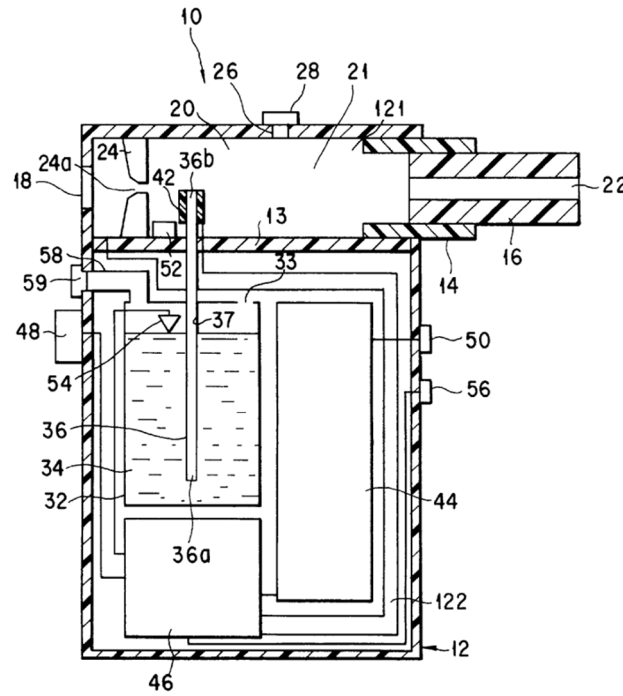


FIG. 1

Id. at Fig. 1.

“In the device 10, the liquid passageway is constituted by a capillary tube.”
Id. at 4:28-29. The flavor-generating device 10 also “includes a casing 12 made of plastic, metal, ceramic, wood, etc.” *Id.* at 4:29-31. The inner space of the casing 12 is partitioned into two chambers, “an upper chamber 121 and a lower chamber 122 by a partition wall 13.” *Id.* at 4:31-33. The specification describes that “the upper chamber 121 is used as a gas passageway 20 for forming a gaseous stream of a flavor which is to be inhaled by a user,” and “the lower chamber 122 is used as a housing for housing a liquid container 32, a power source 44 and a control circuit.” *Id.* at 4:33-38.

Figure 8 of Takeuchi, reproduced below, schematically “shows the construction of a flavor-generating device according to another embodiment.” *Id.* at 8:49-51.

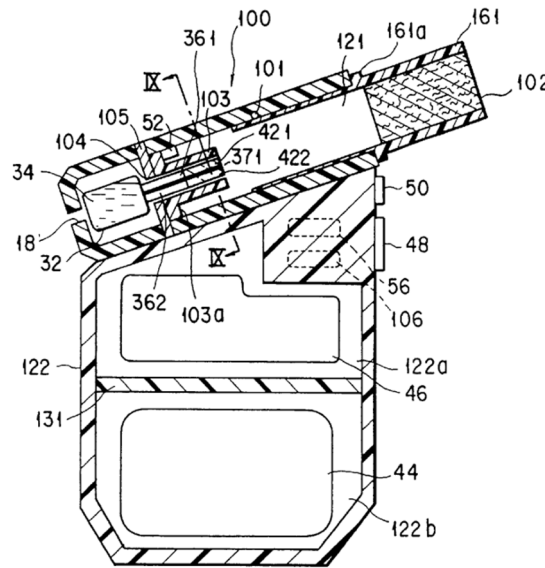


FIG. 8

Id. at Fig. 8.

Air intake port 18, like that shown in Figure 1, “is provided at the closed end (lower end) of the upper chamber 121.” *Id.* at 9:8-9. A mouthpiece 161 may be detachably inserted directly “into the open end portion (upper end portion) of the upper chamber 121.” *Id.* at 9:9-12. The specification discloses that the electrical connections are “essentially the same as those in the device shown in FIG. 1, and thus are not shown in FIG. 8.” *Id.* at 9:5-7.

D. Level Of Ordinary Skill In The Art

Petitioner proposes a definition of a POSA. Pet. at 6-7. Patent Owner reserves the right to dispute Petitioner's definition if an IPR is instituted. For purposes of this POPR, Patent Owner maintains that Petitioner's arguments fail even under Petitioner's POSA definition.

E. Claim Construction

Claim terms are to be construed in accordance with the standard set forth in *Phillips v. AWH Corp.*, 415 F.3d 1303, 1312 (Fed. Cir. 2005) (en banc).

The Petition proposes a claim construction for the term “wicked into contact”: “wicked into contact (1) with the heater, or (2) with an area in close proximity to, and exposed by the heat produced by, the heater.” Pet. at 7. This is the construction the Board reached in construing the same term of U.S. Patent No. 9,901,123 (“the ’123 patent”), a parent application to the ’202 patent (the ’202 patent is a continuation of the ’123 patent, with both patents having the same disclosure). IPR2020-1602, Paper 32 at 10 (PTAB Mar. 30, 2022); *compare* Ex. 1001 (’202 patent) to Ex. 2011 (’123 patent). Patent Owner adopts this construction for purposes of this POPR, and Petitioner's grounds fail even under its proposed construction of “wicked into contact,” as explained below. Patent Owner reserves its right to put forth constructions of this or any other terms if the Board institutes trial.

III. THE BOARD SHOULD DENY INSTITUTION BECAUSE PETITIONER HAVE NOT SHOWN A REASONABLE LIKELIHOOD THAT ANY CHALLENGED CLAIM IS UNPATENTABLE

The Petition fails to show that any claim of the '202 patent is unpatentable, and therefore institution should be denied.¹

A. Grounds 1A And 1B: The Petition Failed To Prove That Each And Every Limitation Is Disclosed In The Prior Art

In Ground 1A, Petitioner argues that claims 1, 3, 4, and 8-13 are anticipated by Morgan. Pet. at 11-30. Ground 1B argues that claims 1, 3, 4, 8-13, and 15 are obvious over Morgan and Susa. *Id.* at 30-39. These grounds are deficient because Petitioner failed to show that each limitation of the challenged claims is disclosed in the prior art.

The challenged claims of the '202 patent require a “storage compartment being configured for storage of a liquid aerosol-forming material and being arranged such that the liquid aerosol-forming material can be wicked into contact with the electrical resistance heater to volatilize the liquid aerosol-forming material.” Ex. 1001 at 33:1-6. Petitioner argues that Morgan’s flavor segment 27 discloses this limitation (Pet. at 16-18, 35), but this is wrong because the flavor

¹ Patent Owner reserves the right to make additional arguments concerning the patentability of the challenged claims if the Board institutes trial.

segment 27 is not “arranged such that the liquid aerosol-forming material can be *wicked into contact with the electrical resistance heater.*” Grounds 1A and 1B therefore fail.

1. Morgan Does Not Disclose The “Wicked Into Contact” Limitation

Morgan does not describe its smoking device as being configured to wick liquid. Ex. 1004. The word “wick” does not appear in Morgan, and the action of wicking (by which liquid flows in a narrow space without assistance of external forces) is likewise not described in Morgan. *Id.* The Petition states that “capillary action” is an example of wicking (Pet. at 18), but, even if that’s true, Morgan does not describe capillary action. And the Petition’s citations (*see id.*) to 2:26-33, 3:28-68, and 5:34-65 of Morgan do not disclose any type of wicking.

Morgan’s flavor segment 27 can include “approximately 10% of an aerosol precursor such as glycerine” (Ex. 1004 at 5:34-46), but Morgan never describes this aerosol precursor as being wicked. Petitioner’s proposed construction for “wicked into contact,” adopted for purposes of this POPR, requires “wicked into contact (1) with the heater, or (2) with an area in close proximity to, and exposed by the heat produced by, the heater.” Pet. at 7. Because Morgan discloses no wicking of any kind, Morgan does not disclose the “wicked into contact” limitation under the Petition’s construction.

Ground 1A argues that Morgan anticipates the challenged claims, and the absence of wicking in Morgan is dispositive of this ground's failure. *See, e.g., TF3 Ltd. v. Tre Milano, LLC*, 894 F.3d 1366, 1374 (Fed. Cir. 2018) (reversing Board anticipation holding, noting that anticipation requires “the identical invention must be shown in as complete detail as contained in the patent claim”) (quoting *Richardson v. Suzuki Motor Co.*, 868 F.2d 1226, 1236 (Fed. Cir. 1989)). The lack of wicking in Morgan also causes Ground 1B to fail, since Petitioner applies the secondary reference Susa only for the “mouthpiece” limitation, and thus Susa cannot remedy Morgan's failure to disclose “wicked into contact.” Pet. at 30-36. And Petitioner's attempts to fill the gaps in Morgan based on its disclosure of an “extruded open-cell foamed tobacco product” should be rejected, as explained in the following section.

2. Petitioner Has Not Established That Wicking Necessarily Occurs In Morgan

Morgan describes its flavor segment 27 as having an “extruded open-cell foamed tobacco” structure in embodiments. *See, e.g., Ex. 1004 at 5:34-57.* Petitioner argues that Morgan's disclosure of the extruded open-cell foamed tobacco structure “confirms Morgan's liquid aerosol precursor (such as glycerine) would be capable of wicking through the pores of such a foam substrate.” Pet. at 18. But Petitioner and its expert fail to show that liquid aerosol precursor would

necessarily wick through Morgan’s extruded open-cell foamed tobacco structure.

In re Robertson, 169 F.3d 743, 745 (Fed. Cir. 1999) (inherency requires “the missing descriptive matter [to be] necessarily present in the thing described in the reference,” and “may not be established by probabilities or possibilities”).

First, Petitioner did not argue (much less prove) that *all* foam structures would necessarily provide wicking of a liquid aerosol precursor. Pet. at 16-18; Ex. 1003, ¶¶61-65. To the contrary, Petitioner’s own evidence indicates that some foam structures do not wick liquid. Exhibit 1017, discussed further below, states that “physical properties, including surface tension and viscosity,” dictate whether a material will “allow [a] liquid to be transported by capillary action.” Ex. 1017 at [0029]; *see also* [0030] (describing physical properties of liquid governing capillary action). At most, this publication shows that some foam structures may or may not wick liquid.

More importantly, despite having every opportunity to do so, the Petition made no attempt to show that Morgan’s *specific* extruded open-cell foamed tobacco structure would necessarily wick liquid aerosol precursor. Morgan states that its flavor segment 27 preferably “is a cylindrical portion of an extruded open-cell foamed tobacco product of the kind described in commonly-assigned U.S. Pat. No. 4,510,950 [the ’950 patent], which is hereby incorporated by reference in its entirety.” Ex. 1004 at 5:34-42. In multiple places, Morgan cites the ’950 patent

for its description of the extruded open-cell foamed tobacco structure. *Id.* at 5:34-42, 5:54-57.

Despite this, Petitioner ignores the '950 patent in its analysis of the “wicked into contact” limitation for Morgan.² Pet. at 16-18. The '950 patent provides ample technical details on Morgan’s extruded open-cell foamed tobacco structure; even a cursory glance at the '950 patent’s abstract reveals details about the respective percentage weights and sizes of tobacco and filler particles included in the structure. Ex. 1005. Such details are relevant to whether liquid aerosol precursor would wick in Morgan’s structure, yet Petitioner and Dr. Nayfeh do not address them at all. Pet. at 16-18; Ex. 1003, ¶¶61-65. This is fatal to Grounds 1A and 1B, as the Board finds petitioners’ failures to analyze relevant evidence as being a basis for denying institution. *See, e.g., TCL Commc’n Tech. Holdings Ltd. v. DataQuill Ltd.*, IPR2020-00746, Paper 21 at 21 (PTAB Sep. 18, 2020) (“We are not satisfied that the Petition provides adequate explanation or is appropriately

² Petitioner cites the '950 patent (submitted with the Petition as Ex. 1005) with respect to claim 3 of the '202 patent (reciting “wherein the storage compartment comprises a fibrous substrate”). Pet. at 21-22. The Petition’s discussion for claim 3 does not address whether the '950 patent bears on the “wicked into contact” limitation of claim 1. *See id.*

precise and specific in articulating the basis of the proposed grounds to establish a reasonable likelihood that the references teach the limitations of the challenged claims.”).

Instead of analyzing the ’950 patent incorporated by reference into Morgan, Dr. Nayfeh cites two irrelevant patent publications. Ex. 1003, ¶65, citing Ex. 1017 (U.S. Publication No. 2013/0306064) and Ex. 1018 (U.S. Publication No. 2014/0000638). Dr. Nayfeh cites these documents as allegedly describing “capillary action through a foam substrate for purposes of wicking the aerosol-forming liquid.” Ex. 1003, ¶65. Even if true, Dr. Nayfeh makes no attempt to show that Morgan’s foam structure is comparable to those of Exhibits 1017 and 1018. *See id.* It is not. Morgan describes the foam structure of the flavor segment 27 as an “extruded open-cell foamed tobacco product” (Ex. 1004 at 5:34-57), and Exhibits 1017 and 1018 do not describe this specific structure. These exhibits do not disclose a foamed tobacco product, much less one that is also extruded and open-cell. Whether some foam structures *may* wick liquid (as allegedly described in Exhibits 1017 and 1018) is beside the point. The issue is whether *Morgan’s* specific *extruded open-cell foamed tobacco structure* is capable of wicking liquid aerosol precursor, and Exhibits 1017 and 1018 provide no evidence that it is.

Further, Exhibits 1017 and 1018 were filed more than 20 years after Morgan, further confirming their irrelevance. Exhibit 1017 was filed in December

2011, and Exhibit 1018 was filed in June 2012, whereas Morgan is a continuation of an application filed in March 1991. Ex. 1004. Dr. Nayfeh makes no attempt to establish the relevance of these documents filed years after Morgan, particularly when they do not describe the same extruded open-cell foamed tobacco structure as Morgan. *See* Ex. 1003, ¶¶64-65.

Dr. Nayfeh instead strings together quotations of Exhibits 1017 and 1018 without providing any context or analyses:

... I note that others in the industry have similarly described such capillary action through a foam substrate for purposes of wicking the aerosol-forming liquid in similar devices, including corroborating examples in EX1017 (U.S. Publication No. US2013/0306064) and EX1018 (U.S. Publication No. US2014/0000638). *See* EX1017, [0030] (“the capillary wick may comprise spongelike or foam-like material formed into a rod shape”), [0040], [0061] (“conveyed by capillary action”), [0084]-[0085]; EX1018, [0009] (“transport elements (e.g., wicks)” can be formed on “solid foams, or other porous materials” that exhibit “capillary action”), [0016] (“absorbed in a substrate” which can be “e.g., a foam”), [0018] (“a wick having a defined capillary action” which can have a material of “carbon foam”).

Id., ¶65.

Contrary to Dr. Nayfeh’s assertion, Exhibits 1017 and 1018 do not corroborate anything. They show that some “foam-like” materials (*e.g.*, “carbon

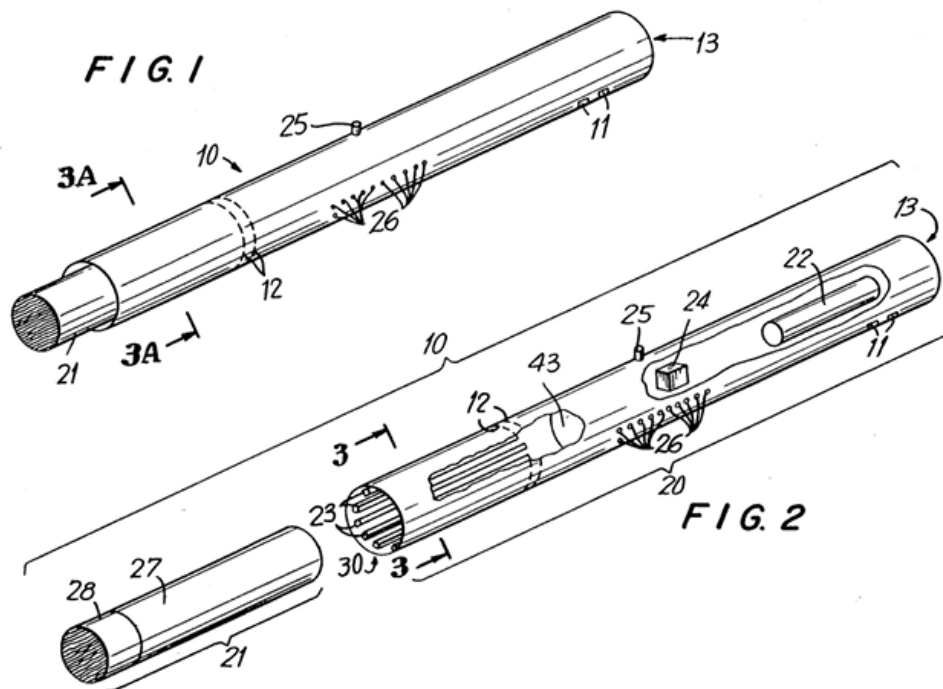
foam”) as of 2011-2012 exhibited capillary action. This says nothing about whether Morgan’s specific “extruded open-cell foamed tobacco” structure circa 1991 was capable of wicking liquid aerosol precursor. Exhibits 1017 and 1018 are not even prior art to the ’202 patent, having been filed years after the ’202 patent’s October 18, 2006 priority date, further confirming their irrelevance.

In sum, Petitioner failed to show that Morgan’s liquid aerosol precursor would necessarily wick through its extruded open-cell foamed tobacco structure. Petitioner did not analyze Morgan’s description of the extruded open-cell foamed tobacco structure (incorporated by reference from the ’950 patent), and Dr. Nayfeh’s citation to the irrelevant Exhibits 1017 and 1018 without any analysis or context does not remedy this deficiency. Grounds 1A and 1B should be rejected for at least these reasons.

3. Petitioner Ignores That Morgan’s Disclosures Are Contrary To The “Wicked Into Contact” Limitation

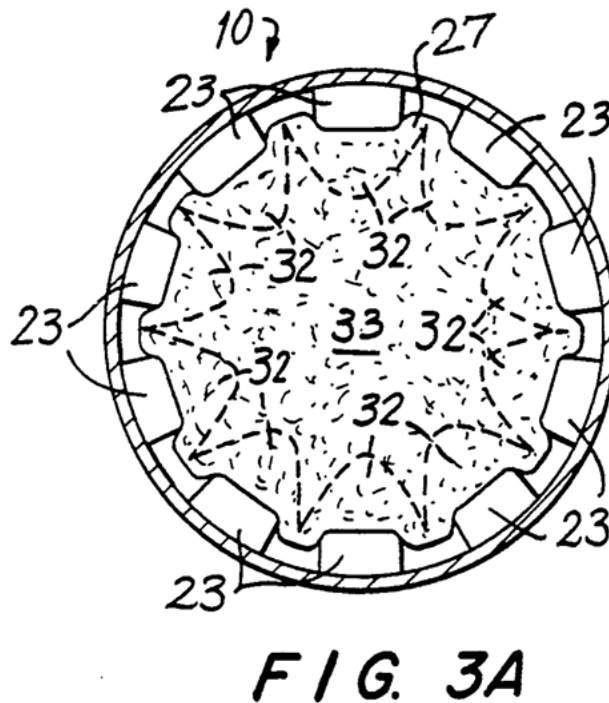
Petitioner did not prove that Morgan discloses the “wicked into contact” limitation, and Grounds 1A and 1B fail on that basis alone, as established above. Even further, Grounds 1A and 1B are deficient because Petitioner ignores that Morgan describes heating each region 32 of the flavor segment 27 only a *single time*, which directly contradicts the concept of wicking.

Specifically, the Petition cites to the smoking article 10 of Morgan's Figures 1-4 having a reusable (also referred to as "permanent") portion 20 with heating elements 23 "distributed substantially uniformly around the circumference of cavity 30" (Ex. 1004 at 4:42-25):



As seen above, a disposable portion 21 including flavor segment 27 and filter segment 28 is received in the cavity 30, "so that [heating] elements 23 press into flavor segment 27 for intimate thermal contact." *Id.* at 5:26-57.

Figure 3A of Morgan "shows a radial cross-sectional view of article 10 with disposable portion 21 inserted" (*id.* at 5:58-61):



Id.

This figure “shows regions 32 of flavor segment 27 adjacent heaters 23, each region 32 representing that fraction of segment 27 that is heated by each respective heater 23 to provide an individual charge of tobacco flavor substance.” *Id.* at 5:61-65. Thus, each of the heating elements 23 heats a single, adjacent region 32, and the respective regions 32 “do not overlap, which could lead to reheating and the production of undesired compounds and off tastes.” *Id.* at 5:18-25. The heating elements 23 are energized individually under the control of a control circuit 24 “in an appropriate sequence” so that “a plurality of individual puffs of tobacco flavor substance can be delivered sequentially to the smoker.” *Id.* at Abstract, 3:9-25, 4:56-59, 5:6-25, 5:58-65, 6:31-45. The disposable portion 21 is “spent after one

activation of each of said plurality of electrical heating means” and is disposed after use. *Id.* at 2:6-9, 7:11-14, 7:44-54,

This disclosure is contrary to the “wicked into contact” limitation. As explained above, insertion of the disposable portion 21 into the cavity 30 causes the heating elements 23 to press into the flavor segment 27. *Id.* at 5:26-57. This means that Morgan does *not* use wicking to put liquid into contact with the heating elements 23 or an area in close proximity to the heating elements 23; such contact is achieved (if at all) by the user’s act of inserting the disposable portion 21 into the cavity 30.

And Morgan does not describe wicking liquid into contact with the heating elements 23 to replace liquid that was previously evaporated in the regions 32. Instead, Morgan makes clear that the respective regions 32 *are not reheated* (*id.* at 2:6-9, 5:18-25, 7:11-14, 7:44-54), and this disclosure is contrary to wicking: If Morgan used wicking, then Morgan would have described heating the regions 32 multiple times, with each reheating of a region 32 evaporating the liquid most recently wicked into contact with the adjacent heating element 23. But Morgan discloses the opposite of this—the regions 32 are not reheated, and each region 32 is “spent” after providing just a single charge of tobacco flavor substance to the user. *Id.* at Abstract, 2:6-9, 3:9-25, 4:56-59, 5:6-25, 5:58-65, 6:31-45, 7:11-14, 7:44-54. The Petition fails to address this disclosure that is contrary to wicking.

Additionally, Petitioner overlooks that Morgan discloses each of the different regions 32 of the flavor segment 27 should provide a consistent amount of aerosol “under standard conditions of use.” *Id.* at 3:58-61. Morgan discloses selecting heater parameters “to allow delivery of an effective amount of tobacco flavor substance,” such as “2 mg of aerosol ... during a 35 ml puff having a two-second duration.” *Id.* at 3:61-64. If Morgan’s smoking article employed wicking, then aerosol precursor would migrate between the respective regions 32, frustrating Morgan’s goal of providing consistent amounts of aerosol for each of the regions 32. For example, after a first region 32 was heated, aerosol precursor from neighboring regions 32 would migrate into the first region 32 to fill the vacated space. This migration would leave less aerosol precursor in the neighboring regions 32, causing them to deliver less aerosol than desired, and/or necessitating more powerful or larger heaters to deliver the desired amount. Morgan does not disclose migration of aerosol precursor between the regions 32 or techniques for providing consistent amounts of aerosol across the regions 32 despite such migration.

Nevertheless, the Petition (at 18) argues that “liquid aerosol precursor (such as glycerine) would be capable of wicking through the pores of [Morgan’s] foam substrate—especially as the glycerine is heated/volatilized and evacuated from those pores immediately adjacent the heating element (generating capillary action

of the glycerine through the open-cell foam toward the evacuated pores).”

However, Petitioner failed to prove that such wicking would necessarily occur (*see* Section III.A.2 above), and the Petition never addresses the inconsistency between its position (that liquid allegedly wicks into regions 32 to replace previously evaporated liquid) and Morgan’s disclosure (stating that each region 32 is spent after one use and should not be reheated).

Petitioner’s failure to reconcile these contradictions in Morgan’s disclosures renders Grounds 1A and 1B deficient and compels their rejection.

B. Grounds 2A And 2B: The Petition Failed To Prove That Each And Every Limitation Is Disclosed In The Prior Art

In Ground 2A, Petitioner argues that claims 1, 4, 8, 9, and 13 are anticipated by Gupta. Pet. at 39-52. Ground 2B argues that claims 1, 3, 4, 8-13, and 15 are obvious over Gupta and Takeuchi. *Id.* at 52-65.

As with Grounds 1A and 1B, Grounds 2A and 2B are deficient because Petitioner failed to show disclosure of the “wicked into contact” limitation. The Petition (at 47) argues that a liquid aerosol formulation stored in Gupta’s source 122 and flow passage 128 would be capable of wicking into contact with a heater, but wicking is not described in Gupta, and Petitioner failed to establish that such wicking necessarily would have occurred in Gupta. Grounds 2A and 2B therefore fail.

1. Gupta Describes Actively Supplying Liquid To The Heater, Not Passively Wicking Liquid

Gupta does not describe its aerosol-generating device as being configured to wick liquid. Ex. 1007. Gupta does not use the term “wick”, nor does Gupta disclose the concept of wicking. *Id.* Gupta discloses a source 122 containing “a suitable liquid aerosol formulation” (*id.* at [0061]), but Gupta never describes wicking of this liquid. Thus, under Petitioner’s proposed construction of “wicked into contact” (requiring “wicked into contact (1) with the heater, or (2) with an area in close proximity to, and exposed by the heat produced by, the heater,” Pet. at 7), Gupta fails to disclose this limitation.

Instead of describing wicking—a passive phenomenon that occurs without assistance of external forces, *see, e.g.*, Ex. 2009 at 4:5-8, 11:45-53, 16:66-17:3; Ex. 2010 at 22932—Gupta describes *actively* supplying liquid aerosol precursor to heaters at a predetermined volume, pressure, and flow rate using a controller, a valve, and possibly other components (*e.g.*, a pump, a pressurization arrangement). In Gupta’s aerosol generating device, flow passage 128 acts as a heater, or a heater is located alongside the flow passage 128, thus enabling vaporization of a liquid aerosol formulation within the flow passage 128. Ex. 1007 at [0039], [0041], [0043]-[0044], [0046], [0050]. Flow passage 128 is depicted in Figure 1 of Gupta:

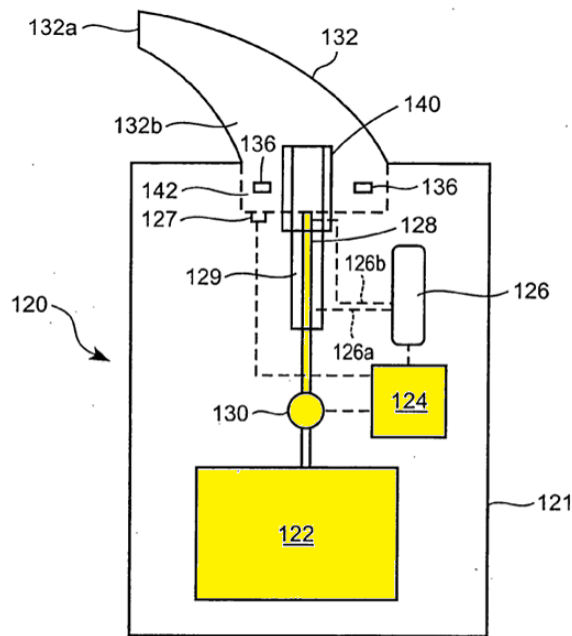


FIG. 1

Id. at Fig. 1 (color added for source 122, controller 124, flow passage 128, and valve 130).

The liquid aerosol formulation is supplied from source 122 to the flow passage 128 via a valve 130. *Id.* at [0039]-[0040], [0050]. More specifically, to effect the “delivery of the liquid from the source 122 to the flow passage 128,” a “controller 124 is operably connected to the power source 126, the sensor 127 and valve 130.” *Id.* at [0040]. Under the control of the controller 124, “[t]he valve 130 is operable to deliver a volume of fluid, such as a predetermined dose, from the source 122 to the flow passage 128” (*id.* at [0039]), with fluid being “*fed into* the flow passage 128 at a substantially constant pressure and/or in a predetermined volume.” *Id.* at [0050]. “The valve 130 may be opened either prior to or

subsequent to detection by the sensor 127 of vacuum pressure applied to the mouthpiece 132 by a user attempting to inhale aerosol from the aerosol generating device 120.” *Id.*

Gupta thus describes use of the controller 124 and valve 130 to *actively supply* “a desired volume of liquid material” at “a substantially constant pressure and/or in a predetermined volume” from the source 122 to the flow passage 128. *Id.* at [0050] (liquid is “fed into” flow passage 128); *see also* [0039] (valve 130 is used to deliver a “predetermined dose” to the flow passage 128). Howell, cited by Petitioner as being incorporated into Gupta in its entirety (Pet. at 1), similarly describes actively supplying a desired amount of liquid to a flow passage at a predetermined flow rate. *See, e.g.*, Ex. 1008 at 6:66-7:1 (describing arrangements with pumps, valves, and other components for “facilitat[ing] delivery of liquid material to [a heating] tube 123 at a desired flow rate”). U.S. Patent No. 6,234,167 to Cox (“Cox”), cited alongside Howell and incorporated by reference into Gupta (Ex. 1007 at [0048]), describes a valve and pressurization arrangement for “causing material in [a] source 37 ... to be introduced into the tube 27.” Ex. 2007 at 3:61-4:9. Cox, like Gupta and Howell, thus describes components and techniques for *actively* feeding liquid from a source into a heating tube. Such active feeding of “a desired volume of liquid” at “substantially constant pressure” and a “desired flow rate” is contrary to the passive action of wicking.

Ground 2A argues that Gupta anticipates the challenged claims, but the absence of wicking in Gupta renders this ground deficient. *Connell v. Sears, Roebuck & Co.*, 722 F.2d 1542, 1548 (Fed. Cir. 1983) (“Anticipation requires the presence in a single prior art disclosure of all elements of a claimed invention arranged as in the claim. A prior art disclosure that ‘almost’ meets that standard ... does not ‘anticipate.’”) (internal citation omitted). Gupta’s lack of wicking is also dispositive of Ground 2B’s failure, since Petitioner only applies the secondary reference Takeuchi for the “controller” limitation and thus it cannot remedy Gupta’s deficiency for the “wicked into contact” limitation. Pet. at 52-58. And Petitioner’s attempts to fill the gaps in Gupta based on its mention that the flow passage is “capillary sized” fail for the reasons explained in the following section.

2. Petitioner Has Not Established That Liquid Would Necessarily Wick In Gupta’s Flow Passage

The Petition does not identify any disclosure of wicking in Gupta. *See* Pet. at 45-47. Instead, Petitioner argues:

Because Gupta teaches that heated flow passage 128 “comprises a capillary sized flow passage[”] and alternatively refers to the flow passage as a “capillary passage,” the liquid aerosol formulation stored in source 122 and flow passage 128 would be capable of wicking into contact with Gupta’s electrical resistance heater through heated flow passage 128. For example, forces associated with capillary action can drive the liquid aerosol formulation to flow through Gupta’s heated

flow passage 128 and into contact with the *electrical resistance heater*.

Id. at 47 (emphasis by Petitioner, citations omitted).

Petitioner thus asserts that because Gupta’s flow passage 128 is referred to as a “capillary passage” and can be “capillary sized,” the flow passage 128 is capable of capillary action, a type of wicking. *Id.* But Petitioner provides no analysis or explanation to support its conclusory assertion. *See id.* Petitioner does not argue or establish, for instance, that “capillary passage” is a term of art referring to a passage that provides wicking, or that the term “capillary sized” would have been understood by a POSA as referring to dimensions for enabling wicking. Dr. Nayfeh parrots the conclusory arguments of the petition nearly verbatim and provides no reasons *why* Gupta’s flow passage 128 necessarily enables wicking. Ex. 1003, ¶142. *See, e.g., Xerox Corp. v. Bytemark, Inc.*, IPR2022-00624, Paper 12 at 5 (PTAB Dec. 10, 2023) (Director Vidal affirming denial of IPR and finding that the panel “was correct in giving little weight to Petitioner’s expert[’s] ... conclusory assertions ... [that] repeated, verbatim, Petitioner’s conclusory arguments”); *TQ Delta, LLC v. Cisco Sys.*, 942 F.3d 1352, 1359 (Fed. Cir. 2019) (“conclusory expert testimony is inadequate to support” an unpatentability holding); *Cephalon, Inc. v. Watson Pharm., Inc.*, 707 F.3d 1330,

1338 (Fed. Cir. 2013) (“largely unsupported” expert testimony “carries little weight”).

Even assuming that some tubes are capable of wicking liquid, Petitioner failed to prove that *Gupta*’s flow passage 128 does so. Gupta provides a variety of details on the flow passage 128 and the liquid aerosol formulation supplied thereto, *e.g.*, the materials used to form the passage 128, its diameter and transverse cross-sectional area, and exemplary liquids supplied to the passage. *See, e.g.*, Ex. 1007 at [0041] (“the heated flow passage 128 comprises an electrically conductive material, such as a metallic tube (*e.g.*, stainless steel), or a non-conductive or semi-conductive tube,” and “the capillary passage can have a transverse cross-sectional area from about $8 \times 10^{-5} \text{ mm}^2$ to about 80 mm^2 , preferably about $2 \times 10^{-3} \text{ mm}^2$ to about $8 \times 10^{-1} \text{ mm}^2$, and more preferably about $8 \times 10^{-3} \text{ mm}^2$ to about $2 \times 10^{-1} \text{ mm}^2$ ”), [0061] (“the [liquid aerosol formulation] can be water and/or propylene glycol (PG)”). These details are relevant to whether liquid would wick in Gupta’s flow passage 128, yet the Petition and Dr. Nayfeh’s declaration do not address them at all. Pet. at 45-47; Ex. 1003, ¶¶139-42. That was a failure of proof warranting denial of IPR. *See, e.g., Hong Kong uCloudlink Network Tech. Ltd. v. SIMO Holdings Inc.*, IPR2019-00857, Paper 14 at 21 (PTAB Sep. 17, 2019) (denying institution where petitioner’s expert did not include facts or analysis to explain *why* a person skilled in the art would read the cited art as expressly or inherently

including the required disclosure, further noting that “[e]xpert testimony that does not disclose the underlying facts or data on which the opinion is based is entitled to little or no weight”) (citing 37 C.F.R. § 42.65(a)).

Grounds 2A and 2B are deficient and should be rejected.

C. Ground 3: The Petition Failed To Prove That Each And Every Limitation Is Disclosed In The Prior Art

In Ground 3, Petitioner argues that claims 1, 3, 8-11, 13, and 15 are anticipated by Takeuchi. Pet. at 65-76. As noted above, the Takeuchi reference has also been asserted against the ’202 patent in other proceedings before the PTAB, specifically PGR2024-00049 and IPR2024-01280, both filed by Ecto World, LLC and SV3, LLC.

Like the other grounds, Ground 3 is deficient because Petitioner failed to show that each limitation of the challenged claims is disclosed in the applied references.

1. The Claimed “Electrical Resistance Heater” Stands In Contrast To Other Types Of Heaters Used In Aerosol-Generating Devices, Like Induction Heaters

Each claim of the ’202 patent requires an “electrical resistance heater.” Ex. 1001 at 32:58-33:18, 34:7-31 (independent claims 1 and 18 reciting this limitation). An electrical resistance heater is a specific type of heater, *i.e.*, one that generates heat by passing a current through an electrically conductive material

(e.g., a wire). *See, e.g., id.* at 21:44-22:8. The claimed “electrical resistance heater” stands in contrast to other types of heaters used in aerosol-delivery devices, such as inductive heaters that use electromagnetic fields to generate heat. Petitioner’s Gupta reference, for example, describes inductive heating as an alternative to electrical resistance heating:

In a preferred embodiment, the flow passage can be heated by passing electrical current through a heater comprising a resistive heating material, such as a section of metal tubing forming the flow passage, or a separate heater can be located along the flow passage....

...

In another preferred embodiment, an inductive heating arrangement can be used, such as the arrangement disclosed in commonly-assigned U.S. application Ser. No. 09/742,323 [the ’323 application] filed on Dec. 22, 2000, the disclosure of which is hereby incorporated by reference in its entirety. In a preferred embodiment, a current is passed through one or more inductive heating coils to produce an electromagnetic flux in an electrically conductive heating element, which is located such that the flux produces eddy currents inside the heating element, which in turn heats the heating element. This heat is then transferred to the liquid within the flow passage 128 either by direct or indirect thermal conduction.

Ex. 1007 at [0043], [0047].

The '323 application cited in the above quote is entitled “Aerosol Generator Having Inductive Heater and Method of Use Thereof,” and issued as U.S. Patent No. 6,681,998 to Sharpe (“Sharpe,” Ex. 2008). Sharpe discloses an “aerosol generator [that] includes an induction heating arrangement to vaporize fluid contained in a fluid passage. The vapor is then expelled from the fluid passage into the air creating a mist that forms the aerosol. The aerosol generator includes an excitation coil that inductively heats a heating element which transfers heat to the fluid in the fluid passage.” Ex. 2008 at Abstract.

Other references confirm that using induction heaters in aerosol-generating devices was known as of the '202 patent's October 2006 priority date. *See, e.g.*, Ex. 2004, U.S. Patent Pub. No. 2008/0038363, entitled “Aerosol Delivery System and Uses Thereof,” describing preferred embodiments using inductive heaters for heating a substrate to generate aerosols; Ex. 2005, U.S. Patent No. 5,613,505, entitled “Inductive Heating Systems for Smoking Articles,” describing (at Abstract) an “induction heating source [that] provides an alternating electromagnetic field which inductively heats a susceptor in thermal proximity with tobacco flavor medium to generate aerosols”; Ex. 2006, U.S. Patent No. 5,060,671, entitled “Flavor Generating Article,” describing (at 10:1-7) the coupling of energy “to the [flavor-generating] article by magnetic or electromagnetic induction.”

As explained below, Petitioner does not prove that Takeuchi's general heater is an electrical resistance heater, as opposed to an induction heater or other type of heater used in aerosol-generating devices as of the '202 patent's October 2006 priority date. The other petitions filed against the '202 patent included grounds based on Takeuchi with the same deficiency, confirming the weakness of Takeuchi against the challenged claims. *See* IPR2024-01280, Paper 9 at 14-19.

2. Petitioner Failed To Prove That Takeuchi's "Heater" Discloses The Claimed "*Electrical Resistance Heater*"

The Petition argues that Takeuchi discloses the claimed "electrical resistance heater," citing 6:4-22 and 8:19-25. But none of the cited portions of Takeuchi discloses an electrical resistance heater. Column 6, lines 4-22 discloses a general "heater," but not the claimed "*electrical resistance heater*":

The upper end portion of the capillary tube 36 protrudes into the upper chamber 121 of the casing 12 somewhat downstream of the squeeze plate 24 and is equipped with the heater 42 serving to gasify the liquid flavor source 34. In the embodiment shown in FIG. 1, the heater 42 consists of a tubular body mounted to the capillary tube 36 and having an inner diameter equal to that of the capillary tube 36. In other words, the outlet port 36a of the liquid passageway 36 is formed by the heater 42 itself. An electric power is supplied from a power source 44 detachably mounted within the lower chamber 122 of the casing 12 to the electric heater 42. It is desirable to use as the power source 44 a DC power source available on the market such as a

primary battery (dry battery), or a secondary battery (rechargeable battery). However, it is also possible to use an AC power source as the power source 44. It is also possible to mount the power source 44 outside the casing 12 or to mount the power source 44 separately so as to use an electric wire connecting the power source 44 to the casing 12.

Ex. 1009 at 6:4-22; Fig. 1 (depicting heater 42).

Column 8, lines 19-25 of Takeuchi likewise discloses heaters, not an electrical resistance heater:

In the modification shown in FIG. 3, a ring-shaped heater 72 is arranged to cover the outlet port 36a of the capillary tube 36.

In the modification shown in FIG. 4, a rod-like heater 74 is inserted into the outlet port 36a of the capillary tube 36.

Further, in the modification shown in FIG. 5, a plate-like heater 76 is inserted into the outlet port 36a of the capillary tube 36.

Id. at 8:19-25; *see also* Figs. 3-5 (respectively depicting heaters 72, 74, 76).

The Petition does not explain why Takeuchi's general heaters allegedly disclose the specifically claimed "electrical resistance heater." *See* Pet. at 69-70. They do not. As explained above, an electrical resistance heater is a specific type of heater, distinct from other types of heaters used in smoking articles (*e.g.*, induction heaters, dielectric heaters, etc.). The Petition does not attempt to explain why Takeuchi's heaters are allegedly electrical resistance heaters. *Id.* Nor

does the Petition attempt to explain why Takeuchi's general heaters could not be alternative types of heaters, like induction heaters. *Id.*

The Petition also does not argue that Takeuchi's general heaters necessarily (*i.e.*, inherently) disclose the claimed "electrical resistance heater." *Id.* Such an argument would be wrong, in any event, because nothing in Takeuchi's disclosure forecloses its heaters from being induction heaters or alternative types of heaters. For example, Takeuchi states that "electric power is supplied from a power source 44 ... to the electric heater 42" (Ex. 1004 at 6:12-14), and this disclosure is consistent with inductive heaters, which require electric power to generate a magnetic field for producing heat. *See, e.g.*, Ex. 2005 at 5:38-65 (describing smoking articles with induction heating source 10 that includes an "appropriate circuit LC connected to a battery or other source of electrical power").

In sum, the Petition failed to show that Takeuchi discloses an "electrical resistance heater."

3. Dr. Nayfeh Does Not Remedy The Deficiencies Of The Petition

Petitioner's declarant Dr. Nayfeh fails to remedy the Petition's deficiencies. Dr. Nayfeh cites to the same portions of Takeuchi (*i.e.*, 6:4-22 and 8:19-25) as the Petition and argues:

[B]ased upon Takeuchi's disclosure, it is clear that each of Takeuchi's heater embodiments (*e.g.*, heater 42, ring-shaped heater 72, rod-like

heater 74, and plate-like heater 76) operate as resistance heaters—especially because Takeuchi states that it is “desirable” for power source 44 to be “a DC power source.” EX1009, 7:48-56, 6:4-22 (“electric power is supplied from the power source 44” to the heater). Here, a POSITA would have readily recognized that Takeuchi’s use of DC power and the wired connection to the disclosed metallic heater element indicates a traditional resistance heater that generates heat through resistance to unipolar current flow (unlike, for example, a traditional dielectric heater that requires a rapid alternating bipolar electric field created by high-frequency AC power).

Ex. 1003, ¶202.

Dr. Nayfeh cites no evidence to support his assertion that “Takeuchi’s use of DC power and the wired connection to the disclosed metallic heater element indicates a traditional resistance heater” (*id.*), and, in any event, his assertion is wrong. Using a DC power source and wired connection does not indicate an electrical resistance heater because other types of heaters (*e.g.*, induction heaters) use these same features. Petitioner’s own evidence demonstrates this: Sharpe, incorporated by reference into Gupta, discloses a “5-15 Volt DC source” and wired connection for “powering an inductive heater.” Ex. 2008 at 4:66-5:20 (making no mention of any wireless connection to the inductive heater). Likewise, U.S. Patent No. 5,613,505 to Campbell discloses an induction heater powered by a battery (*i.e.*, a DC power source) with wired connections to the induction heater. Ex. 2005 at

5:38-65, 14:40-60, Fig. 14 (making no mention of wireless connections to the induction heater).

Thus, contrary to Dr. Nayfeh’s assertion (Ex. 1003, ¶202), “use of DC power and [a] wired connection to the [heater]” does not “indicate[] a traditional resistance heater.” Other types of heaters, such as induction heaters, likewise use DC power and wired heater connections. And even setting aside the merits, Dr. Nayfeh’s assertion is conclusory and not supported by objective evidence, and therefore should be given no weight. *SkinMedica, Inc. v. Histogen Inc.*, 727 F.3d 1187, 1209-10 (Fed. Cir. 2013) (expert’s testimony “deserve[d] no weight” where, among other things, it “lack[ed] any convincing detail”); *Phillips*, 415 F.3d at 1318 (expert testimony is “not useful” if based on “conclusory, unsupported assertions”).

Ground 3 is deficient and should be rejected.

IV. CONCLUSION

For the reasons set forth above, the Board should deny institution of IPR.

Respectfully submitted,

Date: December 30, 2024

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CERTIFICATE OF WORD COUNT

The undersigned hereby certifies that the foregoing Patent Owner Preliminary Response complies with the type-volume limitations of 37 C.F.R. § 42.24(b). Excluding the items listed in 37 C.F.R. § 42.24(a) as not included in the word count, and using the word count of the word-processing system used to prepare the paper (Microsoft Word), the Patent Owner Preliminary Response contains 8,078 words.

Dated: December 30, 2024

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CERTIFICATE OF SERVICE

The undersigned hereby certifies that the foregoing Patent Owner Preliminary Response was served via email on the date below, upon the following:

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