

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

NJOY, LLC and NJOY HOLDINGS, INC.,
Petitioners,

v.

JUUL LABS, INC.,
Patent Owner

U.S. PATENT NO. 10,130,123

**DECLARATION OF JOSEPH C. M^CALEXANDER III IN SUPPORT OF
PETITIONERS' REPLY TO PATENT OWNER'S RESPONSE**

**NJOY Exhibit 1043.001
NJOY v. Juul
IPR2024-00231**

TABLE OF CONTENTS

I.	INTRODUCTION	1
II.	MATERIALS CONSIDERED	2
III.	QUALIFICATIONS	3
IV.	RELEVANT LEGAL STANDARDS	3
V.	LEVEL OF ORDINARY SKILL IN THE ART	4
VI.	GROUND 1: WORM ANTICIPATES CLAIMS 14, 27 AND 32 OF THE '123 PATENT	7
A.	Worm is an Anticipatory Reference	7
B.	Worm Discloses the Claimed “Sealed Air Flow Path”	13
VII.	GROUND 2: WORM IN VIEW OF THE KNOWLEDGE OF A POSA RENDERS OBVIOUS CLAIMS 14, 27 AND 32 OF THE '123 PATENT	25
VIII.	GROUND 3: WORM IN VIEW OF LEVITZ RENDERS OBVIOUS CLAIMS 14, 27, AND 32 OF THE '123 PATENT	27
A.	Worm In View Of Levitz Discloses The Claimed “Sealed Air Flow Path”	27
B.	A POSA Would Have Been Motivated to Modify Worm in View of Levitz to Include Side Air Inlets	30
IX.	GROUND 4: THORENS AND WEIGENSBERG IN VIEW OF THE KNOWLEDGE OF A POSA RENDERS OBVIOUS CLAIMS 14, 27, AND 32 OF THE '123 PATENT	33
A.	A POSA Would Have Been Motivated to Use Weigensberg’s Pressure Sensor Assembly	34
B.	Modified Thorens Does Not Require Significant Changes	34
C.	Weigensberg’s LED Cap is a Gasket	39
X.	SECONDARY CONSIDERATIONS DO NOT SUPPORT NONOBVIOUSNESS	43
A.	The JUUL System Does Not Practice the '123 Patent	45
B.	Long-Felt Need	49
C.	Unexpected Results	53
D.	Industry Acclaim/Praise of Others	55
E.	Commercial Success	56

F. Copying.....	58
XI. DECLARATION.....	61

I, Joseph C. McAlexander^{III}, hereby declare:

I. INTRODUCTION

1. I have been retained by Weil, Gotshal & Manges on behalf of Petitioners NJOY, LLC and NJOY Holdings, Inc. (collectively, “Petitioners” or “NJOY”) as an independent expert witness in the above-captioned *inter partes* review (“IPR”), in which NJOY has requested that the U.S. Patent and Trademark Office cancel as unpatentable claims 14-16, 18, 27-29, and 31-32 of U.S. Patent No. 10,130,123 (“123 Patent”).

2. I previously submitted a declaration in this matter, which I understand was submitted as EX1003 (“Initial Declaration”), for consideration on behalf of Petitioners in support of the Petition for IPR, incorporated herein by reference in its entirety.

3. I understand that the Board issued an Institution Decision. *See* Paper 15. I have reviewed the Board’s Institution Decision.

4. I understand that Patent Owner submitted a Response in this IPR, including a supporting declaration from Dr. John Collins (EX2053). I have reviewed Patent Owner’s Response (“POR”) and Dr. Collins’ Declaration.

5. I provide this declaration in support of Petitioner’s Reply and to respond to certain issues raised in Patent Owner’s Response and in the declaration of Dr. Collins.

6. I continue to be compensated at the hourly rate of \$625.00 for my work on this case, which is my ordinary and customary consulting rate for my work. I have received no additional compensation for my work on this case, and my compensation does not depend upon the contents of this declaration or the outcome of these proceedings.

II. MATERIALS CONSIDERED

7. In preparing this declaration, I considered Patent Owner's Preliminary Response, Patent Owner's Response, Dr. Collins' declaration in support of Patent Owner's Preliminary Response, Dr. Collins' declaration in support of Patent Owner's Response, and the Institution Decision, as well as the materials cited therein. I also reviewed the deposition testimony of Dr. Collins. In addition to these and the materials cited in my Initial Declaration, I reviewed the following materials:

EX1038	Levitz Annotated Figures 16 and 18, Ex. 1038 of Deposition Transcript of John Collins, IPR2024-00231, dated Nov. 7, 2024
EX1039	Declaration of Dr. John M. Collins, IPR2014-01300, dated Aug. 15, 2014
EX1040	Deposition Transcript of John Collins, IPR2024-00231, dated Nov. 7, 2024
EX1041	Excerpts from Mark's Mechanical Engineering Handbook
EX1042	Declaration of Ingrid Hsieh-Yee, Ph.D. regarding Excerpts from Mark's Mechanical Engineering Handbook
EX1043	Declaration of Joseph C. McAlexander ^{III} In Support of Petitioners' Reply To Patent Owner's Response
EX1044	U.S. Patent No. D825,102

EX1045	Excerpts of Initial Determination, Inv. No. 337-TA-1368, dated Aug. 23, 2024
EX1046	Excerpts from Petitioner for Inter Partes Review, IPR2024-00160, dated Nov. 8, 2023
EX1047	Excerpts from Petitioner for Inter Partes Review, IPR2024-00161, dated Nov. 8, 2023
EX1048	RX-1245
EX1049	U.S. Patent No. 10,709,173
EX1050	U.S. Patent No. 11,134,722
EX1051	U.S. Patent No. 11,606,981

III. QUALIFICATIONS

8. I previously summarized aspects of my educational background and other qualifications in my Initial Declaration. EX1003, ¶¶4-8. I incorporate that discussion by reference here.

IV. RELEVANT LEGAL STANDARDS

9. I provided my understanding of the applicable legal standards in Paragraphs 11 to 28 of my Initial Declaration. EX1003, ¶¶11-28. I incorporate that discussion by reference here.

10. In addition, I understand that, for secondary considerations to be accorded substantial weight in an obviousness analysis, the evidence of secondary considerations must have a nexus to the claims. I further understand that presuming nexus is appropriate only if the asserted objective evidence is tied to a specific product that embodies the novel, claimed features and is coextensive with the claims. I further understand that if the presumption of nexus does not apply, the patent owner must demonstrate that the evidence of secondary considerations is the direct result

of the unique characteristics of the claimed invention.

V. LEVEL OF ORDINARY SKILL IN THE ART

11. I understand that, in its Institution Decision, the Board made a preliminary finding adopting my proposed definition of the level of ordinary skill in the art. Paper 15 at 11. Specifically, the Board noted,

[i]n light of the record before us, and for purposes of this Decision, we adopt Petitioner’s proposal regarding the level of ordinary skill in the art. Based on our review of the ’123 patent and the prior art of record, we determine that the definition offered by Petitioner comports with the qualifications a person would have needed to understand the ’123 patent and the prior art.

Id. The Board further indicated that a final determination pertaining to the level of ordinary skill in the art will be made on the full trial record. *Id.*

12. Dr. Collins provides a similar definition of a POSA:

A person of ordinary skill in the art relevant to the ’123 patent at the time of the invention would have a B.S. in mechanical engineering, electrical engineering, or an equivalent degree, and either at least two years of experience designing electro-mechanical consumer products or an advanced degree in mechanical engineering, electrical engineering, or an equivalent field.

EX2053, ¶19.

13. My opinions set forth in this declaration, as well as those set forth in my Initial Declaration, would remain the same regardless of which POSA definition is applied.

14. I understand that Patent Owner has argued that my opinions should be given little weight because “[I have] no experience with ‘vaporizer devices or ENDS

[Electronic Nicotine Delivery Systems] devices’ outside of litigation consulting” and “[I have] no experience in the design of air flow pathways or any experience with aerosol generation or vapor formation.” Paper 21, 3-4. Patent Owner’s criticisms regarding my knowledge of fluid mechanics with respect to e-cigarettes are unfounded. For example, the relevant knowledge or experience with fluid flow / air flow for the disputed issues is basic thermodynamics which is within the knowledge of a POSA under either parties’ definition and was required as part of my own EE degree program. I have extensive experience in the foundational technologies underlying e-cigarettes and the components that are used in e-cigarettes, which provides the necessary knowledge as a POSA to address the technical issues in this Petition. Additionally, I’ve acquired knowledge through experience analyzing e-cigarettes and studying materials that describe e-cigarettes going back years before the critical date of the ’123 Patent. My experience and study of the evolution of e-cigarettes provided the relevant understanding of the knowledge of a POSA in the area of fluid mechanics and airflow properties in these systems at the time of the ’123 Patent invention. My knowledge of fluid mechanics has been recognized in numerous legal proceedings across various technical fields, including tire pressure monitoring systems, PSC blower motors, underwater sound detection and generation, and fan sensors and controls. I worked for years in integrated circuit design and integrated circuit wafer fabrication which included: (1)

profiling, qualifying, and monitoring diffusion furnaces and vacuum chambers wherein the designs comprehended gas flows (*e.g.*, mixtures, pressures and pressure differentials, rates) and laminar flow delivery systems; (2) factory level and equipment level distilled water flow and delivery; and (3) clean air delivery and evacuation. These experiences underscore my comprehensive knowledge of fluid dynamics principles, directly applicable to understanding airflow and vapor formation in e-cigarette devices. *See, e.g.*, EX1027, 11-30.

15. Additionally, I have served as a testifying expert in cases specifically involving electronic cigarette devices, having participated in at least 11 cases over the past four years. EX1027, 24-29. Fluid mechanics was a key issue in many of these cases, including those concerning e-cigarettes with cartridges designed to introduce dispersions into airflow, as in IPR2021-00650, and airflow in e-cigarettes, as in *RAI Strategic Holdings, Inc. et al. v. Altria Client Services LLC et al.*, EDVA-1-20-cv-00393. I also provided a detailed model of airflow in prior art e-cigarettes relevant to the '123 Patent in the 337-ITC-1368 investigation, where I was found to be a POSA over similar objections by the Patent Owner. This experience demonstrates my familiarity with and ability to address the basic fluid dynamics in vaporizer devices and ENDS prior art at issue in this proceeding.

16. Also, as the founder of M^cAlexander Sound, Inc., a registered engineering company that includes a testing laboratory, I have conducted extensive

reverse engineering and testing on prior art and modern day e-cigarette devices and other related technologies during expert engagements. Through my laboratory, I have performed detailed airflow analyses, designing and constructing specialized apparatuses to emulate human breath, allowing for precise activation testing of ENDS devices. These practical applications further strengthen my qualifications to evaluate airflow and vaporization mechanics in ENDS devices accurately and thoroughly.

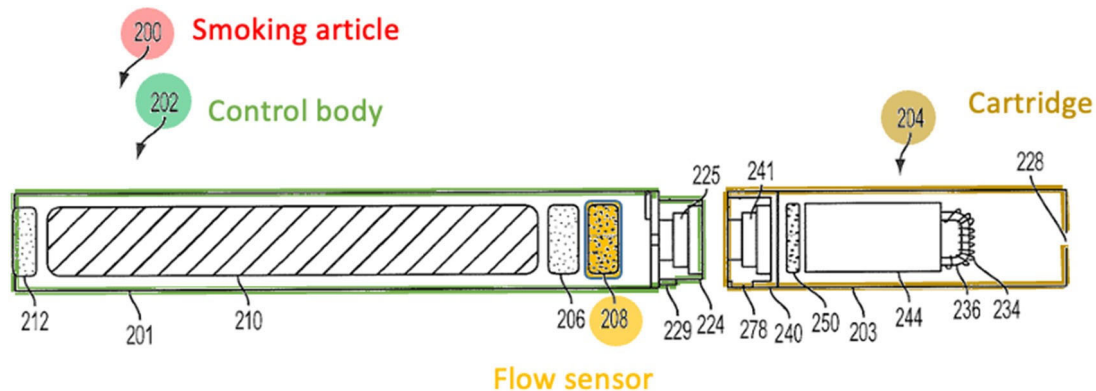
VI. GROUND 1: WORM ANTICIPATES CLAIMS 14, 27 AND 32 OF THE '123 PATENT

A. Worm is an Anticipatory Reference

17. As described in my Initial Declaration, Worm anticipates claims 14, 27, and 32 of the '123 Patent. EX1003, Section V.A. In rendering my opinions, I relied on Figures 2, 5, and 7 of Worm. A POSA would have understood that the embodiments illustrated in Figures 5 and 7 are embodiments of the same vaporizer as in Figure 2 with only minor structural variations. EX1040, 73:7-74:2 (Dr. Collins testifying that Figures 5-7 disclose similar geometries and air inlets).

18. Worm at Figure 2 illustrates the device it calls an electronic smoking article 200. EX1003, ¶40. Worm describes Figure 2 as “a sectional view through an electronic smoking article comprising a cartridge and control body.” EX1004, [0014]. The device includes a control body 202 and a cartridge 204. The control body includes a coupler 224 that has a cavity 225 for receiving the cartridge and

mechanically coupling the control body to the cartridge. EX1004, [0056]. Worm's electronic smoking article 200 includes a pressure sensor 208 within the control body 202. EX1004, [0053].



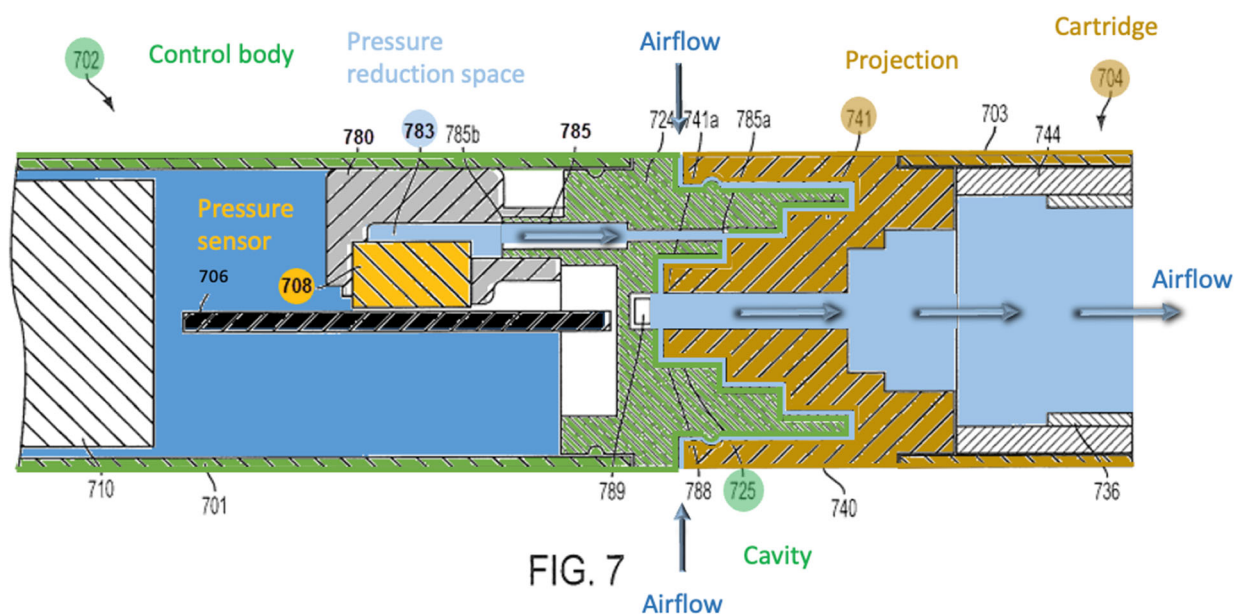
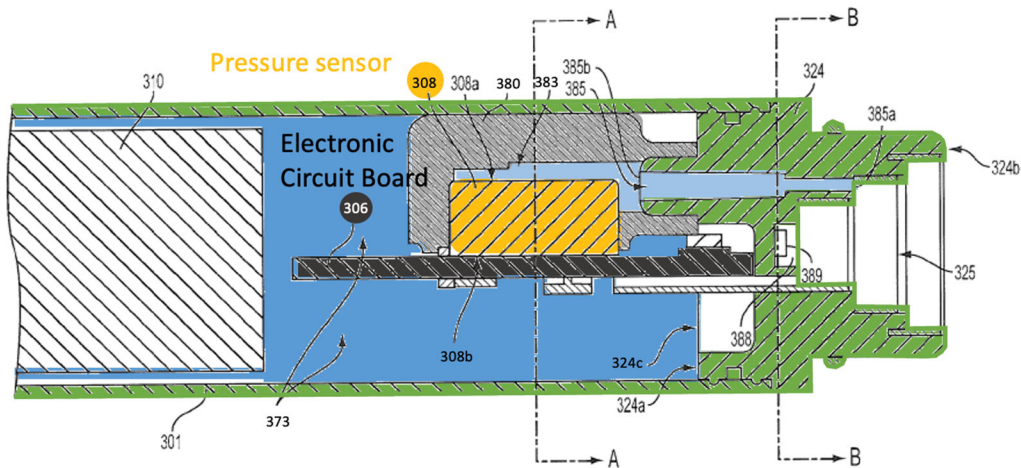
EX1004, Fig. 2

19. While Figure 2 illustrates a high-level overview of the device, a POSA would have understood that Figure 2 does not depict or illustrate all the necessary intricacies details of the device. Worm in fact recites that, “[s]uch components [of Figure 2] are *representative* of the components that may be present in a cartridge and are not intended to limit the scope of cartridge components that are encompassed by the present disclosure.” EX1004, [0053].

20. Figures 5 and 7 are embodiments of Worm's vaporizer that provide more detail of the internal components and the connection between the cartridge and control body for the same vaporizer depicted in Figure 2. There are minor structural differences between these embodiments. Figure 5 is described as “a detailed view of

the proximal end of the control body” and includes a more detailed illustration of the internal components, such as the pressure sensor 308 in Worm’s control body 302. EX1004, [0017]. In this figure, in addition to pressure sensor 308, Worm discloses a normal pressure space that is open to ambient air (dark blue), a pressure reduction space 383 (light blue), a sealing member 380 (grey), and an air inlet aperture 389. EX1004, [0064]; EX1003, ¶41. Notably, Worm notes that aspects of Figure 2, such as the cartridge components and airflow, are incorporated into the discussion of Figure 5 (*e.g.*, the size and shape of the cartridge/cavity connection and the sealed air flow path). EX1004, [0067] (“The cavity 325 can be sized and shaped to receive a projection formed in the base of the cartridge (*see* FIG. 2).”), [0073] (“The air flow pathway further can extend into a cartridge that is attached to the coupler (such as through a cartridge base, as shown in FIG. 2) and out of the cartridge, such as through an opening in an opposing end thereof (*see* element 228 in FIG. 2).”).

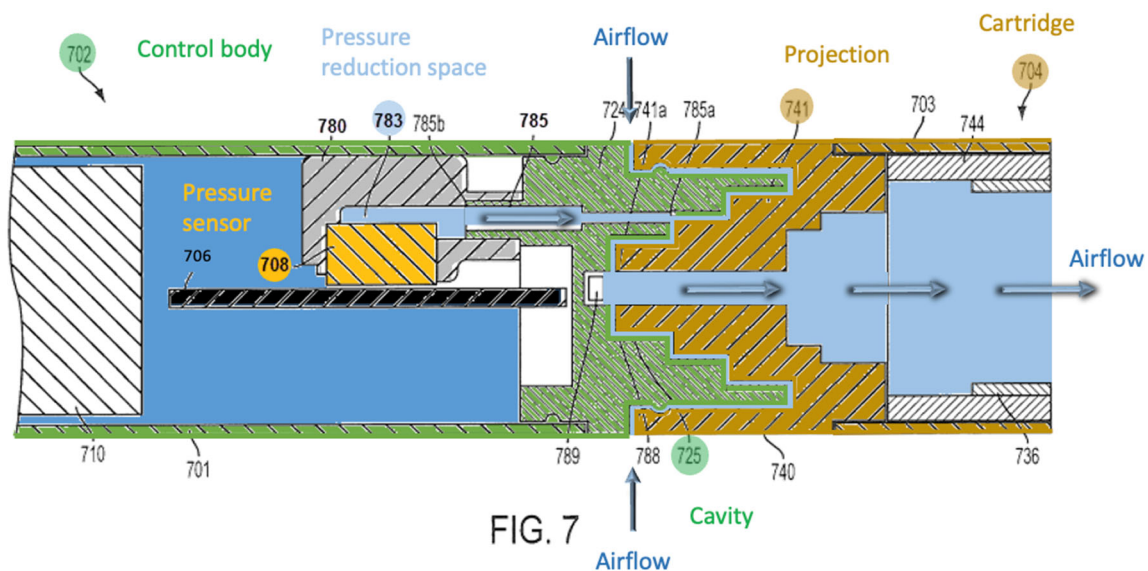
21. Dr. Collins also conceded that Figures 5 to 7 of Worm disclosed similar geometries and air inlets, although he did not look for differences. EX1040, 73:1-20.



EX1004, Figs. 5, 7

22. Figure 7 is described as “a partial sectional view of an electronic smoking article according to a further example embodiment of the present disclosure showing a control body connected to a cartridge” and further illustrates the coupler and pressure sensor in Worm’s device. EX1004, [0020]. Worm describes Figure 7

as providing a “further illustrat[ion]” of the “[t]he spatial relationship of the air inlet channel and the first end of the pressure channel” of Figure 5. EX1004, [0072], [0074]. When a smoker draws on the device, there are different Worm air inlets that provide areas through which air enters the device.. One location is the interface at the connection between the cartridge 704 (*i.e.*, projection 741 of the cartridge) and the receptacle in the control body (*i.e.*, cavity 725). This interface can be seen in light blue where the control body 702 in green meets the cartridge 704 in brown near the “Airflow” arrows added to Figure 7 below. It is described as a non-airtight connection. EX1004, [0076]¶[CITE].



EX1004, Fig. 7

23. The embodiments illustrated in Figures 2, 5, and 7 are of the same vaporizer in Figure 2 with only minor structural variations. As such, a POSA would have understood that the features could be used in in combination in similar

embodiments of Worm’s vaporizer. Worm itself states that, the disclosed device “*can encompass a variety of combinations of components*” useful in forming an electronic aerosol delivery device” (EX1004, [0040]), and “it is to be understood that...modifications and other embodiments are intended to be included within the scope of the appended claims” (*id.*, [0086]). Indeed, Patent Owner and Dr. Collins rely on Figures 2, 4, and 5 when discussing their analysis of Figure 7 of Worm. *See, e.g.*, POR, 60-62, 68-69; EX2053, ¶43, 45, 56. Dr. Collins also testified that Figure 5 has the same geometries as Figure 7. EX1040, 73:7-74:2.

24. Patent Owner contends that Figures 2, 5, and 7 are “disparate embodiments” because Figure 2’s sensor is referred to as a “flow sensor” while the sensor in Figures 5 and 7 is a “pressure sensor.” POR, 59. I disagree with Patent Owner.

25. **First**, as explained in my Initial Declaration, the same components in Worm’s figures are represented by the same last two digits in the different figures in Worm. EX1003, ¶40, FN 5. For example, Figure 2 discloses a “flow sensor” 208 while Figures 5 and 7 disclose “pressure sensor” 308 and 708, respectively. A POSA would have understood that the consistent numbering ending in “08” indicates that these are not distinct components.

26. **Second**, a sensor that *detects* airflow can be a differential pressure sensor. Detecting air flow does not require that the airflow be measured directly and

can be done indirectly. For example, a pressure sensor is used in e-cigarettes to detect a change in pressure, which is associated with airflow. Indeed, “flow sensor 110” in Lamb’s Figure 1 (which is the same as Worm’s Figure 2, *see* Pet. 26-27) is disclosed as a “MEMS pressure sensor.” EX1005, ¶¶26, 43. As Dr. Collins admitted, sensors other than an air flow sensor that measures air flow can detect airflow indirectly (*i.e.*, not *measuring* the airflow or ensuring air is flowing). EX1040, 102:4-103:8. Thus, a POSA would have understood that a flow sensor can be a pressure sensor.

B. Worm Discloses the Claimed “Sealed Air Flow Path”

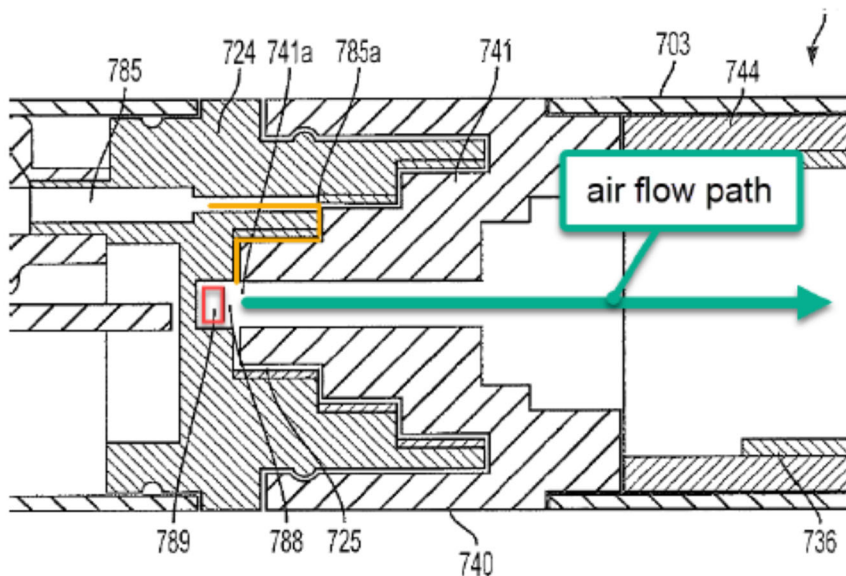
27. As I explained in my Initial Declaration, Worm describes the interface running through the connection between the cavity 725 of control body 702 and the projection 741 of cartridge 704 as not-airtight; and Worm’s Figure 7 depicts a uniform gap between the projection and cavity that extends to the periphery of the device. *See, e.g.*, EX1003, ¶¶ 43-44, 118-127, 129-132. Therefore, a POSA would have understood that air would travel from the air inlet at the periphery, pass through the interface to the center of the cavity where it enters the cartridge and then exit out through an opening in the mouthpiece. Patent Owner and Dr. Collins dispute that Worm discloses the claimed “sealed air flow path,” (*See* POR, 59-61, 64-66; EX2053, ¶46, ¶50, ¶53) but as I discuss below, I disagree with Patent Owner’s and Dr. Collins’ arguments.

28. **First**, Patent Owner and Dr. Collins incorrectly contend that Worm’s

only disclosure regarding air entering the vaporizer is via air inlet apertures 789 and 389. POR, 59-61; EX2053, ¶46. Worm does not limit the device's air intake to air inlet apertures 389/789. In fact, Worm discloses that air inlet apertures 389/789 are optional, so they are only present in certain embodiments. EX1004, [0069].

29. **Second**, Patent Owner and Dr. Collins recognize the gap is shown to extend to the periphery of the device in Figure 7 but argue that its presence does not necessarily indicate airflow because drawings cannot be relied upon to convey specific dimensions or sizes. POR, 63; EX2053, ¶48. I understand that patent drawings alone can be used for relative measurements. Here, Worm shows the gap to be uniform along its entire length and extending to the periphery of the device, which is not only consistent with the description of the non-airtight connection, but conveys to a POSA that it is dimensioned to communicate airflow across its entire length. EX1004, [0076].

30. **Third**, I disagree with Patent Owner and Dr. Collins that there is no disclosure or need for the airflow path to extend further than the path highlighted in orange below. POR, 64; EX2053, ¶51



POR, 65

31. Patent Owner and Dr. Collins ignore that the gap is depicted as a uniform dimension *all the way to the exterior*, which is different from other connections that do not illustrate a gap. A POSA would have understood that the depicted uniformity indicates that the gap is dimensioned to communicate airflow along its entire length and circumference, not just a portion of the connection. EX1004, [0074]. There is no disclosure in Worm to the contrary, and any such interpretation would be inconsistent with Worm's explicit disclosure that the interface is not airtight. EX1004, [0076]. Notably, Worm uses detent structures (devices for positioning and holding one mechanical part in relation to another) in the outer portion of the stepped configuration that insures that the interface is not airtight. EX1004, Fig. 7. I will discuss these detent structures in more detail below as Worm refers to these structures as protrusions/recesses. If the gap provides fluid

communication partway, a POSA would have understood fluid communication is provided all the way to the periphery and, therefore, satisfies the sealed airflow path limitation.

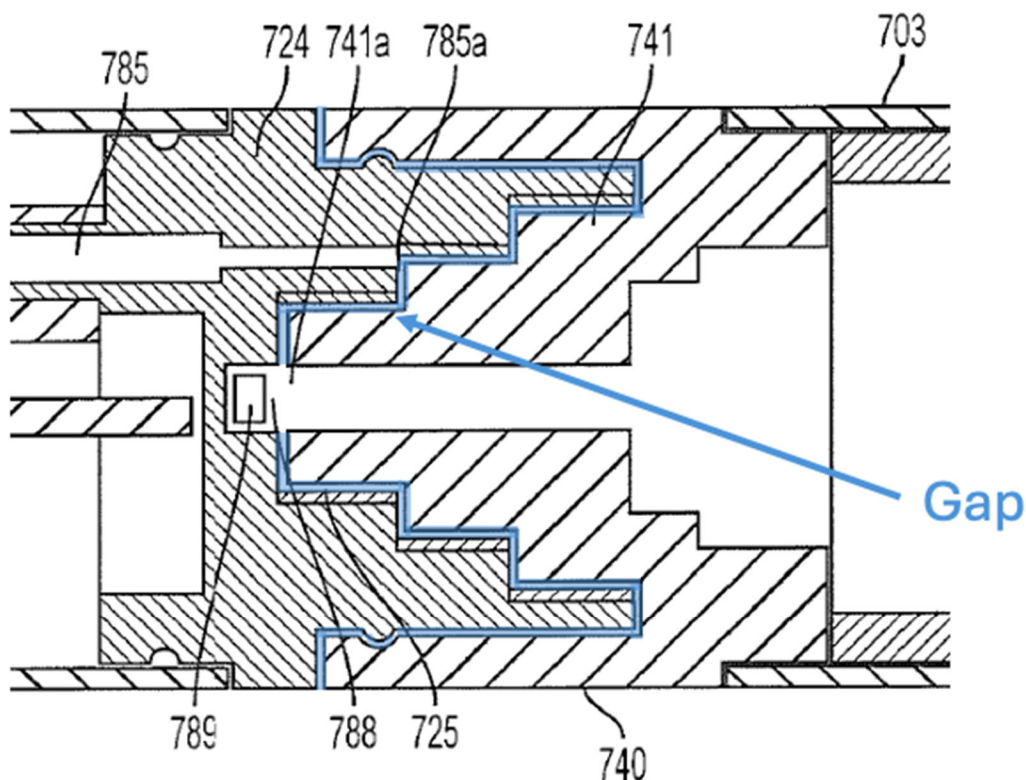


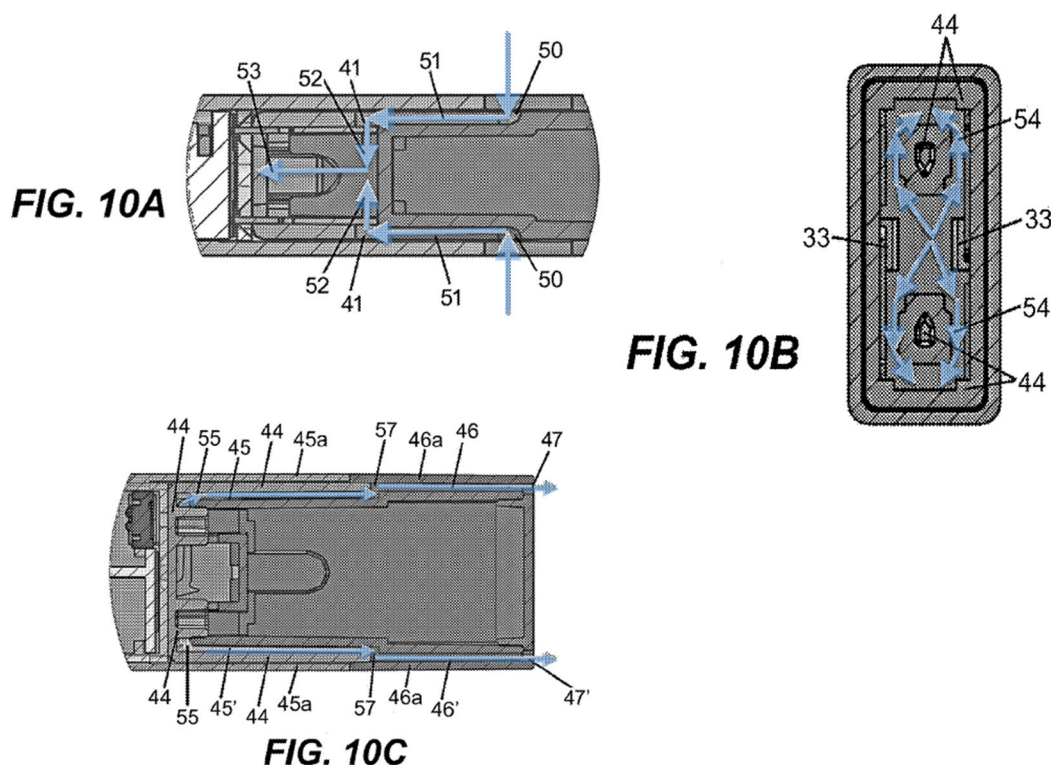
FIG. 7

EX1004, Fig. 7

32. **Fourth**, Patent Owner and Dr. Collins further argue that the “pressure chamber is an ‘isolated segment of the device’” and would no longer be isolated if the air is permitted to enter at the periphery. POR, 64; EX2053, ¶51. This is incorrect. The pressure channel remains isolated because air is not flowing in one part of the

pressure channel and out another part of the pressure channel. EX1004, Abstract, [0005], [0076]-[0077].

33. **Fifth**, Patent Owner and Dr. Collins further allege that “a POSITA would consider the winding path alleged by Petitioners to be ineffective for providing a controlled airflow.” POR, 65-66; EX2053, ¶53. However, the ’123 Patent itself contemplates using airflow paths that have numerous turns similar to those disclosed in Worm, and Dr. Collins admitted that the device is still capable of providing the required airflow. EX1040, 42:10-17.



EX1001, Figs. 10A-C

EX1001, Figs. 10A-C, 13:40-41. EX1040, 34:3-42:17.

34. *Sixth*, Patent Owner and Dr. Collins argue that electrical connections prevent air from flowing through the gap because the electrical contacts on the cartridge must touch those in the receptacle. POR, 61-62, 68-69; EX2053, ¶¶53, 56. But Dr. Collins agrees that the electrical connections cannot block the path to the pressure channel or seal the gap, otherwise, Worm would be inoperable because there would not be fluid communication with the pressure channel. EX1004, Fig. 7, [0058]; EX1040, 69:20-71:13. Figure 7 of Worm does not distinguish between the airflow paths that are shown next to each of the three electrodes—a gap exists between the cartridge and each electrode. If air flows through the interface at the first electrode to permit air to flow to the pressure channel, for consistency, a POSA would understand that air would likewise flow through the interface at the second and third electrodes.

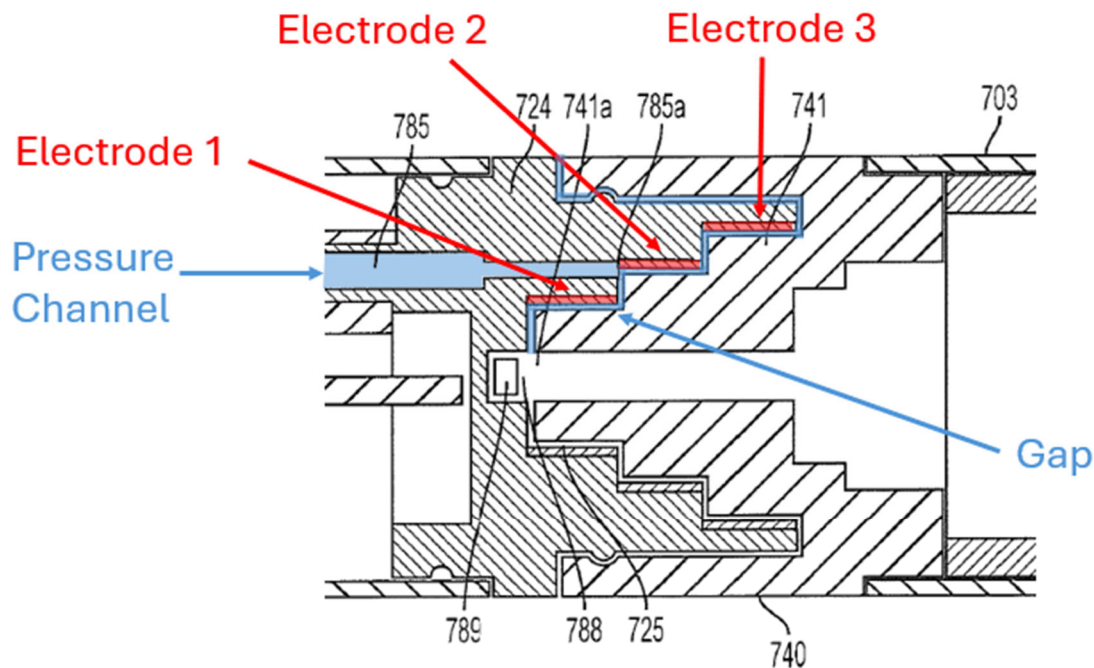


FIG. 7

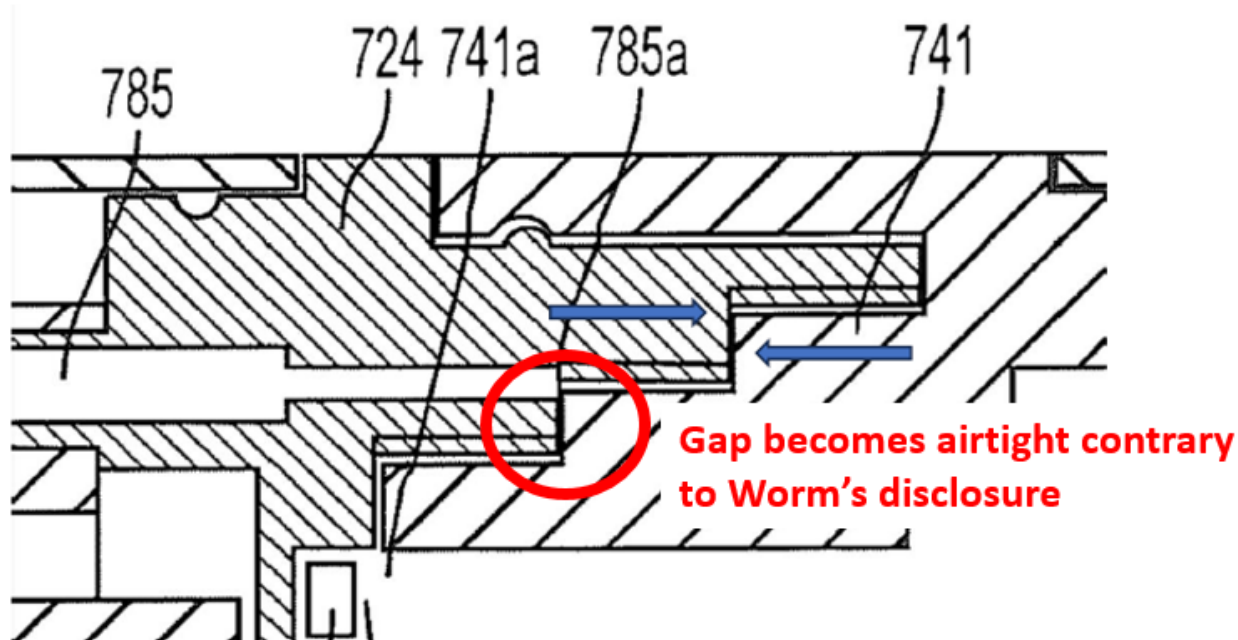
EX1004, Fig. 7

35. Moreover, even if the electrical contacts in the embodiments in Worm restricted airflow, and they do not, Worm discloses that its embodiments are not limited to a particular electrical connection in the figures. EX1004, [0045], [0058] (“The coupler *may* further comprise a plurality of electrical contacts configured to contact terminals associated with the base projection.”¹). As Dr. Collins conceded, electrical contacts can exist in a sealed airflow path without blocking airflow, as illustrated by Patent Owner’s own JUUL device. EX1040, 84:14-24. There is no indication in Worm that the entire gap in Figure 7 is blocked by electrical contacts,

¹ Emphasis added unless stated otherwise.

and Figure 7 illustrates that the gap exists even with the electrical contacts present.

36. *Seventh*, Patent Owner and Dr. Collins contend that “if this gap exists, it would likely be sealed from airflow during a user puff.” POR, 66-67; EX2053, ¶54. There is no disclosure in Worm to support this assertion. In fact, this would be inconsistent with Worm’s disclosure that “cavity 725 and the projection 741 preferably does not substantially form an air tight connection therebetween” *during* a draw. EX1004, [0076]. Under the theory proposed by Patent Owner and Dr. Collins, cavity 725 and projection 741 would form an air tight connection, as illustrated below, thereby rendering the device nonfunctional since the path that transmits air to the pressure channel would be sealed. But this is inconsistent with Worm’s disclosure.



POR, 67 (annotations in red)

37. Patent Owner and Dr. Collins' assertions that the gap would be sealed from airflow during a smoker's puff is further contradicted by Worm's disclosure of detent structures. Worm describes detent structures designed to hold the cartridge in a fixed position, which would maintain the non-airtight interface without blocking air flow. EX1004, Figs. 5, 7, [0057]. Dr. Collins also incorrectly assumes that no detent structures are disclosed in any embodiment other than Figure 2. EX1040, 65:5-66:21.

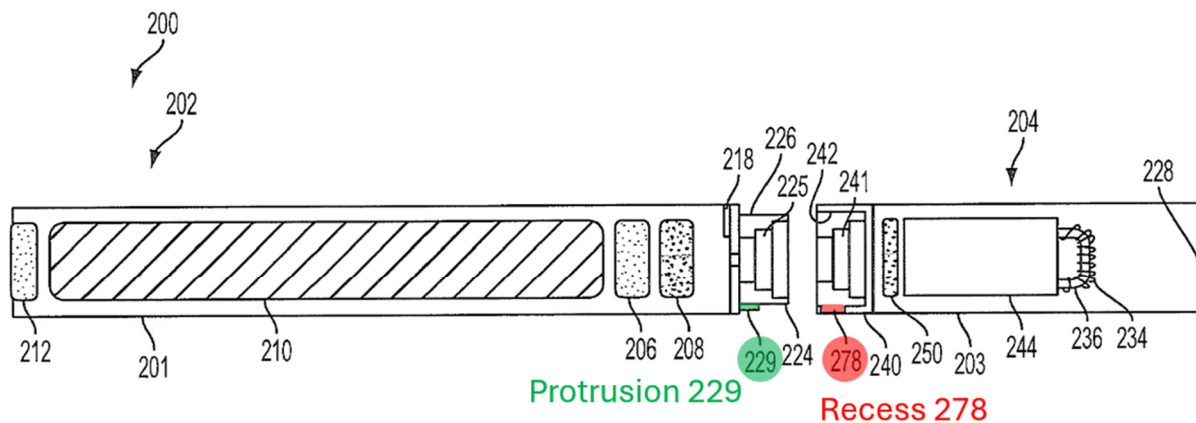
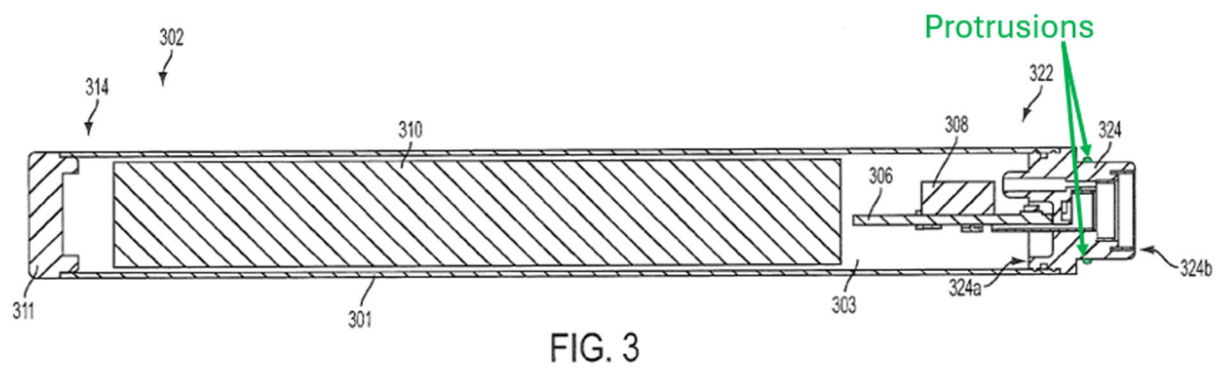


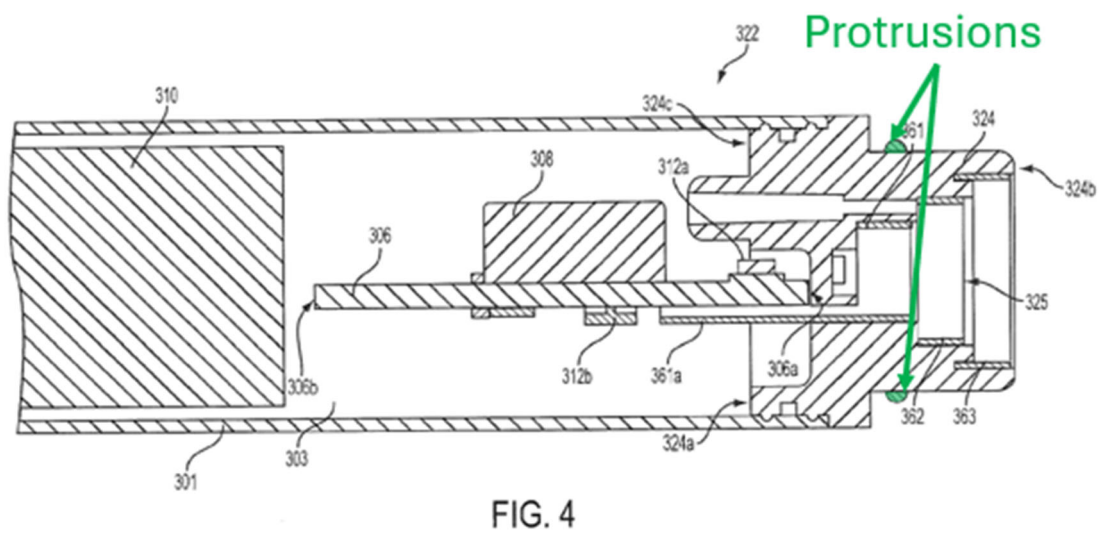
FIG. 2

EX1004, Fig. 2

38. In addition to Figure 2, a POSA would have recognized that detent structures are also disclosed in Figures 3, 4, 5, and 7.



EX1004, Fig. 3



EX1004, Fig. 4

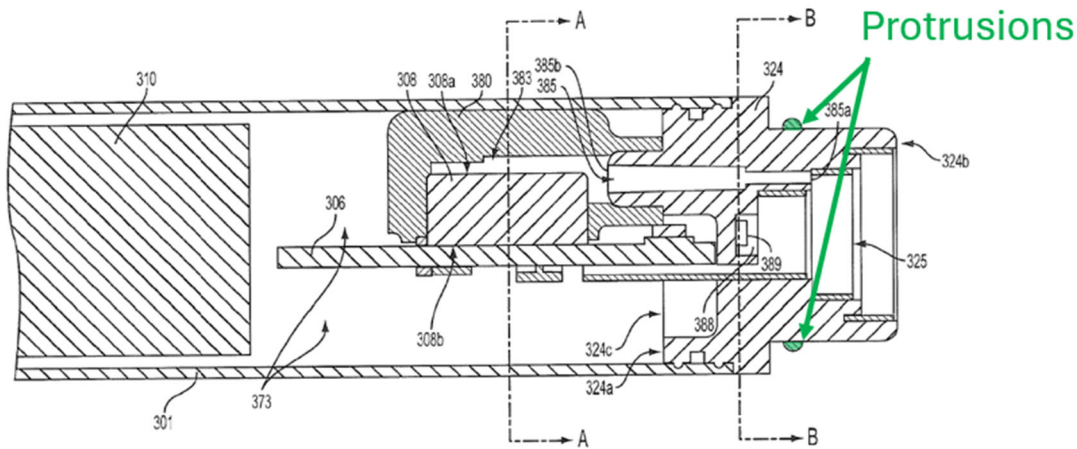


FIG. 5

EX1004, Fig. 5

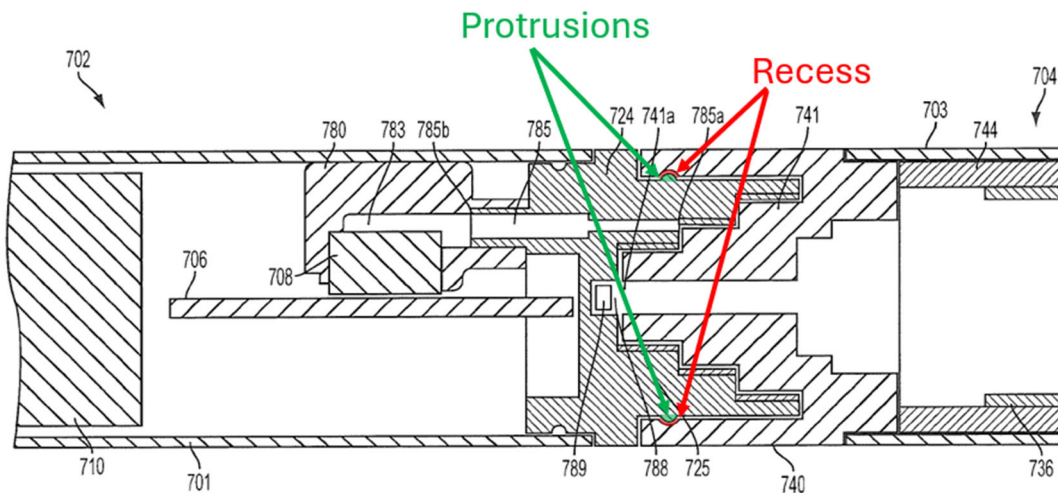


FIG. 7

EX1004, Fig. 7

39. Thus, all evidence demonstrates a gap dimensioned for air flow which is not airtight and extends to the periphery of the device.

40. ***Eighth***, Patent Owner and Dr. Collins argue that little air flows into the gap because it is the “smallest area limiting airflow.” POR, 66; EX2053, ¶53.

This contention is based on unsupported assumptions. *First*, Dr. Collins admitted that a POSA would have known how to properly size passages such as the gap in a vaporizer in order to achieve the desired airflow. EX1040, 51:13-16, 79:19-80:10. *Second*, the gap occupies three-dimensional space, but only two dimensions of the gap are depicted in Figure 7. The gap thus exists throughout the entire matched coupling except for an occasional protrusion/recess which may or may not be further restricted. *Third*, as discussed above, Worm expressly describes the gap as not being airtight. EX1004, [0076].

41. Patent Owner and Dr. Collins also argue that there would be variability in the size of the gap and the air inlet that would affect vapor formation and draw resistance. POR, 68, 70-72; EX2053, ¶¶55, 60-61. Patent Owner and Dr. Collins exaggerate the difficulty and importance of minimizing variation to achieve certain vapor formation and draw resistance. A POSA would have known how to design and manufacture the passages “to create a resistance that [] results in a pleasant use cigarette, e-cigarette,” as Dr. Collins conceded during his deposition. EX1040, 42:4-44:1, *see also id.*, 79:19-80:10. Moreover, Patent Owner’s Co-founder characterized the JUUL product (which Patent Owner alleges is coextensive with the ’123 Patent), which has an airflow path defined by a gap between the exterior surface of the cartridge and the receptacle, as having a flawed air path design but nonetheless suitable for the consumer. EX1048.

This impacts both device and pods. I'd say our design is flawed, in that the air path is defined by the gap between broad surfaces of two parts (extrusion and pod tank). So we've made this challenging for ourselves, but we have to live with it due to FDA and our install base, etc.

EX1048

42. Patent Owner and Dr. Collins also assert that the inventors of the '123 Patent designed the JUUL System to be "tightly controlled." POR, 71; EX2053, ¶62. However, [REDACTED] [REDACTED]. EX2003, 26. That such a broad draw resistance range was deemed acceptable for the JUUL System further supports that even substantial variation in airflow would be considered acceptable for an e-cigarette.

VII. GROUND 2: WORM IN VIEW OF THE KNOWLEDGE OF A POSA RENDERS OBVIOUS CLAIMS 14, 27 AND 32 OF THE '123 PATENT

43. As explained in my Initial Declaration, it would have been obvious to a POSA that Worm's cartridge receptacle and cartridge form a channel that allows air to enter the gap between the cavity and cartridge projection from the periphery and satisfies the "sealed air flow path" limitation. EX1003, Section V.B.

44. Specific to Ground 2, Patent Owner and Dr. Collins argue that (1) there is no "rationale for why a POSITA would modify Worm to provide such an air inlet and airflow channel" and (2) "a POSITA would find it undesirable to use the alleged gap for airflow because it creates an *additional* source of airflow that is difficult if not impossible to control." POR, 69-70; EX2053, ¶¶58, 60-61. I disagree.

45. **First**, a POSA would have recognized that air flow through the gap serves as a sealed air flow path through which air can flow to the heater and mouthpiece outlet, even in implementations without optional air inlet apertures 389/789. In embodiments that do not use an aperture 389/789, the gap is the only path to exit backflow from the device. Patent Owner and Dr. Collins counter that Worm would be functional without access to ambient air through the gap or air inlet apertures 789 because it could act as a “fuming” type device. EX2053, ¶¶67. At his deposition, however, Dr. Collins conceded that a fuming device still uses an air inlet at the output of the cartridge to mix the air with the vapor that is generated. EX1040, 104:8-18. There is no such disclosure of an air inlet in the location identified Dr. Collins or design as a fuming device in Worm, nor has Patent Owner or Dr. Collins identified any such disclosure. Without an air source, Worm’s device would effectively create a vacuum, impeding airflow and vapor production, and making the device nonfunctional as a vaporizer.

46. **Second**, Patent Owner and Dr. Collins again contend that an air pathway between the cartridge/receptacle interface is undesirable and cannot be tightly engineered or controlled to ensure an optimal user experience. POR, 69-72; EX2053, ¶¶60-64. Patent Owner’s and Dr. Collins’ focus on specific vapor formation and strict draw resistance is again misplaced and exaggerated, as discussed in Section VI.B. Indeed, as noted above, Dr. Collins conceded that a POSA

would have known how to properly size such a channel to achieve the appropriate airflow. EX1040, 42:17-44:1, 79:18-80:13. Moreover, a POSA would have also understood that any potential variations in air intake from the interface are well within acceptable design, as evidenced by the nine-fold variance in draw resistance of the JUUL System.

47. Therefore, Worm in view of a POSA's knowledge discloses the claimed "sealed air flow path" limitations and renders claims 14, 27, and 32 obvious.

VIII. GROUND 3: WORM IN VIEW OF LEVITZ RENDERS OBVIOUS CLAIMS 14, 27, AND 32 OF THE '123 PATENT

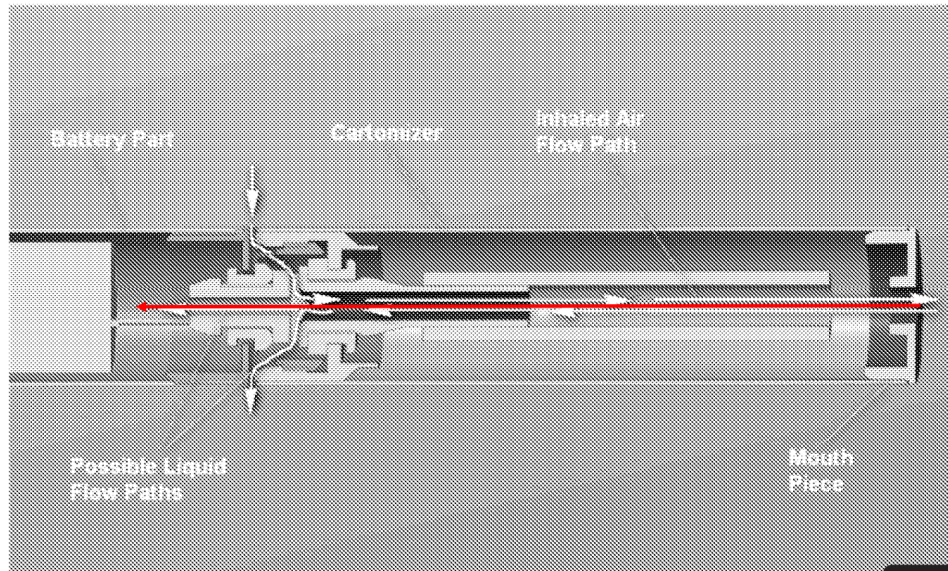
A. Worm In View Of Levitz Discloses The Claimed "Sealed Air Flow Path"

48. As explained in my Initial Declaration, the "sealed air flow path" would have been obvious to a POSA based on Worm in view of Levitz. EX1003, Section V.C. In particular, "a POSA would have been motivated to modify Worm so that outside air enters the interface at the connection between the control body 702's cavity 725 and the projection 741 of its cartridge 704." EX1003, ¶168. I disagree with Patent Owner's and Dr. Collins' arguments to the contrary, as explained below.

49. **First**, Patent Owner and Dr. Collins contend that Levitz does not cure Worm's alleged lack of disclosure of a sealed air flow path because the proposed combination only adopts Levitz's teaching of side air inlets. POR, 6-7; EX2053, ¶68.

Patent Owner and Dr. Collins misunderstand the proposed combination in Ground 3. The combination relies on Levitz’s express teaching that a side air intake at the cartridge/receptacle interface improves air in-flow and out-flow by providing potential exit paths for backflow. EX1010, ¶2, Figure 16. A POSA would have readily understood the straightforward solution of using air inlets to provide airflow to a channel formed at the cartridge/receptacle interface.

50. ***Second***, Patent Owner and Dr. Collins also contend that the airflow path in Levitz’s Figure 16 embodiment is undesirable. POR, 8-9; EX2053, ¶¶70, 77-78. In particular, Dr. Collins argues that a POSA “would not look to Levitz’s Figure 16 which does not solve backflow problems. Instead, Levitz provides a different embodiment in Figures 17 and 18 that is ‘designed to minimize this problem.’” EX2053, ¶70. Dr. Collins’ opinion is based on a misunderstanding of Ground 3. The proposed modification does not include using Levitz’s coupler—only its side air inlets into the cartridge/receptacle interface. The Levitz Figure 16 embodiment uses the side inlets to reduce backflow; it does not attribute the side inlets as the cause of backflow issues. As Dr. Collins admitted during his deposition, Levitz explains that there may be backflow issues with the Figure 16 embodiment because the reduced pressure channel is directly aligned with the cartridge airflow passage. EX1040, 88:21-90:5, 91:2-15. This is shown in the annotated figure below.



EX1038.001

51. In Levitz's Figure 18 embodiment, a POSA would recognize that backflow is minimized by not directly aligning the reduced pressure channel with the cartridge airflow path, as shown in the annotated figure below.

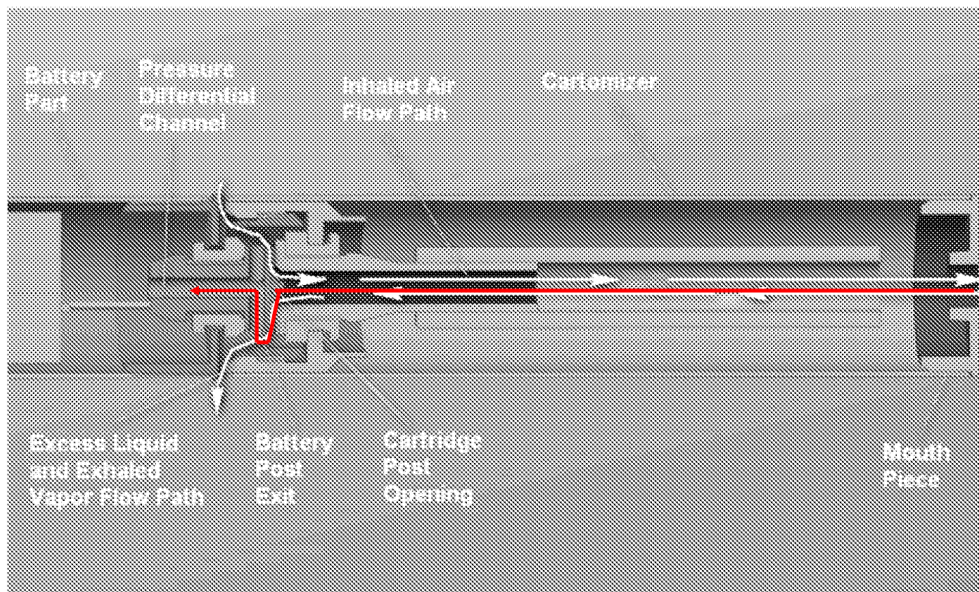


Figure 18

EX1038.002

Yet this embodiment also includes the side air inlets and airflow through the cartridge/receptacle interface, as Dr. Collins confirmed at his deposition. EX1040, 92:17-93:2. Thus, in both the Figure 16 and Figure 18 embodiments, Levitz uses side air inlets at a cartridge/receptacle interface, which a POSA would have understood to be a suitable design in an e-cigarette.

B. A POSA Would Have Been Motivated to Modify Worm in View of Levitz to Include Side Air Inlets

52. As I explained in my Initial Declaration, a POSA would have been motivated to incorporate Levitz's side air inlet at the cartridge/receptacle interface, even when Worm's air inlets 389/789 are present. EX1003, ¶¶172-173. Patent Owner's and Dr. Collins' arguments to the contrary are unsupported and minimize the practical benefits of side air inlets to an accessible airflow channel. POR 8-18; EX2053, ¶¶68-78. Patent Owner and Dr. Collins argue that a POSA would not have been motivated to combine Worm with Levitz because (1) Levitz's air inlets are redundant, (2) Worm already solved the backflow problem, (3) Levitz teaches away from using the intake path for backflow and instead creates more backflow, and (4) the airflow in the gap cannot be controlled. POR, 8-18; EX2053, ¶¶ 69-78. For the reasons below, I disagree.

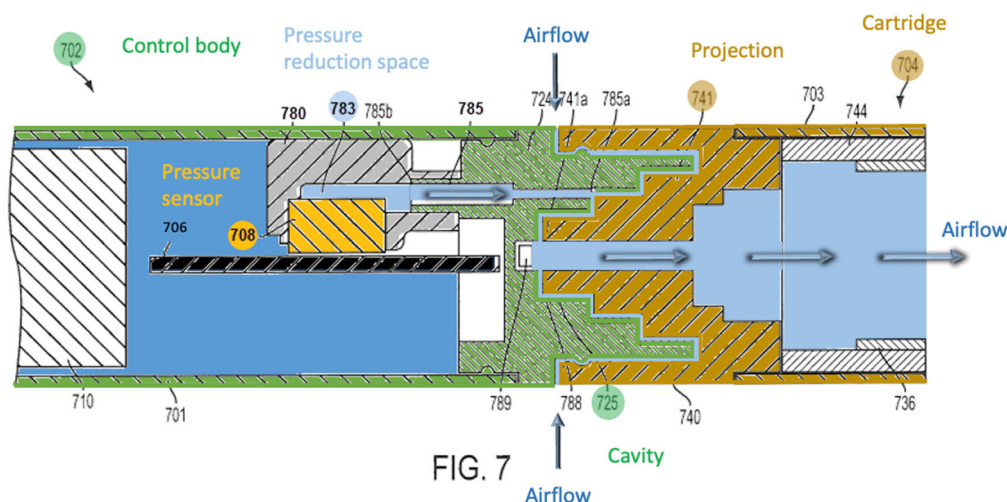
53. *First*, I disagree that Levitz's air path at the cartridge/receptacle interface is redundant of air inlets 789. As described above in Sections VI and VII, Worm discloses that air inlet apertures 389/789 are optional and not in every

embodiment. EX1004, [0069]. And as I explained in my Initial Declaration, modified Worm includes additional pathways for backflow of vapor or liquid to exit the interface at the periphery rather than collect in the negative pressure space. EX1003, ¶¶172-173. Moreover, Dr. Collins agreed that a POSA would have recognized the advantages to having multiple air inlets, including the ability to maintain functionality of the device should one inlet become clogged or blocked.

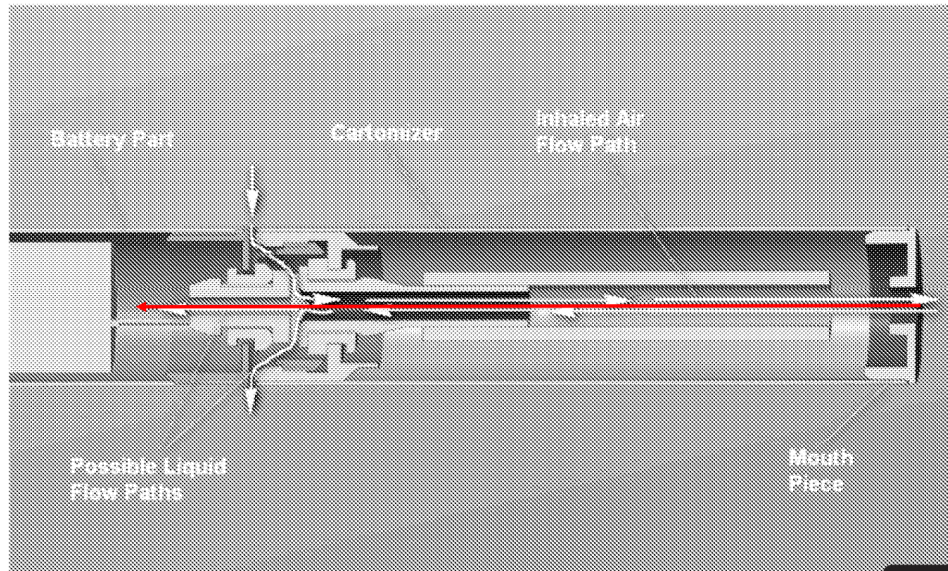
54. ***Second***, Patent Owner and Dr. Collins allege that a POSA would not have been motivated to include Levitz’s side air inlets, which would provide additional pathways for any vapor that backflows to exit the periphery of the connection rather than into the negative pressure space because, “Worm already addresses any backflow issues.” EX2053, ¶75; POR, 14. While Worm acknowledges that its embodiments may ***reduce*** backflow, it does not ***solve*** the backflow issue. EX1004, [0005]. Worm also recognizes that vapor can backflow through the air inlet channel 788 within the coupler, which leads to the buildup of residue in the channel, potentially limiting airflow through the channel even with air inlet aperture 789. *Id.*, [0076]. A POSA would have been motivated to incorporate Levitz’s air path to provide an additional backflow path away from the pressure channel that is easier to access, as I explained in my Initial Declaration. EX1003, ¶172. Moreover, as I also explained in my Initial Declaration, since the air path through the gap is at the interface between the cartridge and receptacle, the air path channel can be easily

cleaned, unlike ones that are completely embedded, such as the air inlet channel connected to air inlet apertures 389/789. *Id.*, ¶173.

55. **Third**, I disagree that Levitz teaches away from using side air inlets to a cartridge/receptacle interface. Levitz's Figure 16 embodiment and Figure 18 embodiment both use side air inlets to a cartridge/receptacle interface, and any concern with backflow in Levitz Figure 16 is not relevant to Worm because Worm's pressure chamber is not in line with the cartridge opening.



EX1004, Fig. 7



EX1037.001

Moreover, Levitz teaches “Possible Liquid Flow Paths” exiting either side of the reduced pressure channel to reduce backflow from entering the reduced pressure channel. EX1010, [0011], [0044], Fig. 16.

IX. GROUND 4: THORENS AND WEIGENSBERG IN VIEW OF THE KNOWLEDGE OF A POSA RENDERS OBVIOUS CLAIMS 14, 27, AND 32 OF THE '123 PATENT

56. As I explained in my Initial Declaration, a POSA would have been motivated to use Weigensberg’s pressure sensor assembly in Thorens, rather than using separate components, and a POSA would have had a reasonable expectation of success in doing so. EX1003, ¶¶179-231. Patent Owner and Dr. Collins allege that: (1) a POSA would not have been motivated to combine Thorens and Weigensberg because the combination lacks any benefits while the proposed modification allegedly results in disadvantages (POR, 75-82; EX2053, ¶¶81-96);

and (2) the combination does not render obvious the “gasket around the pressure sensor” limitation (POR 83-84; EX2053, ¶¶97-100). I disagree with both of these arguments for the reasons explained below.

A. A POSA Would Have Been Motivated to Use Weigensberg’s Pressure Sensor Assembly

57. Patent Owner and Dr. Collins allege that “a POSITA would not be motivated to combine the references because there are significant changes to Thorens’ device which are disadvantageous and they come at the cost of the lack of benefit from replacing Thorens’ air flow sensor with a pressure sensor.” EX2053, ¶81; POR, 75. But Patent Owner and Dr. Collins ignore Weigensberg’s explicit motivation to save space by combining the sensor, integrated circuitry, and LED within Weigensberg’s LED cap, which is desirable in the constrained environment of battery powered electronic cigarettes. *See* EX1006, [0107] (“A sensor unit 209 occupies the interior of the LED cap 207, and is an embodiment of the sensor 24 (FIG. 1), but instead of being inside a plastic housing of its own, the sensor unit 209 is now disposed inside the LED cap 207 *in order to save space.*”). As I explained in my Initial Declaration, there would be several benefits to using Weigensberg’s pressure sensor assembly in the Thorens device. EX1003, ¶190.

B. Modified Thorens Does Not Require Significant Changes

58. I disagree with Dr. Collins’ opinion that the proposed combination would require significant changes and “complete re-engineering” of Thorens’

device. EX2053, ¶82; POR, 76.

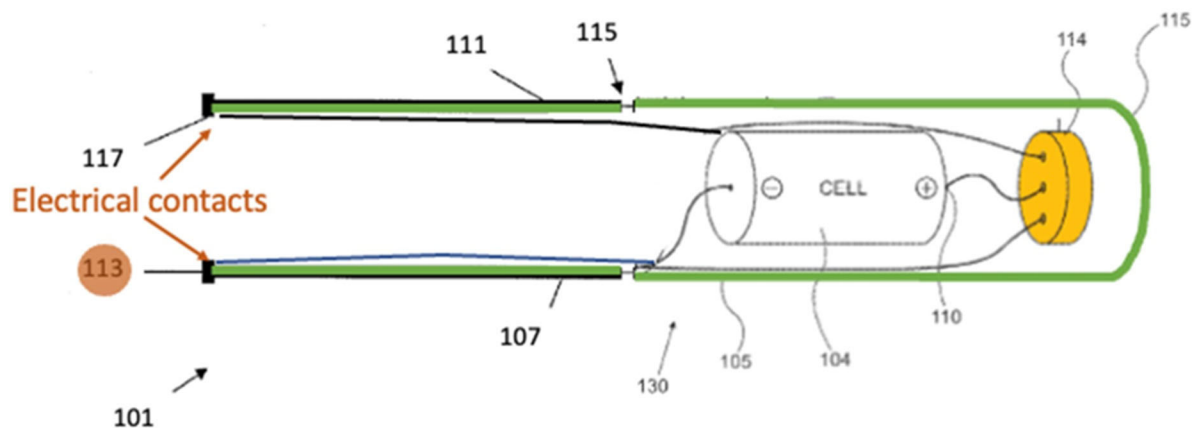
59. **First**, many of Patent Owner’s and Dr. Collins’ arguments are based on the assumption that Thorens’ puff detection system is limited to an airflow sensor that directly measures airflow. EX2053, ¶¶84-85. This is not correct. Thorens discloses a “puff detection system” that **detects** airflow, without restriction to a particular sensor or detection method. Thorens’ “puff detection system” is used to “**detect** air flow indicative of a user taking a puff.” EX1016, [0015]; *id.* [0017] (“In a preferred embodiment, the electric circuitry comprises a sensor to **detect** air flow indicative of a user taking a puff, and the at least one inlet is in the shell, upstream of the sensor.”); [0045] (“In this embodiment, the puff detection system 107 senses the puff and activates the heating coil 209 and switches on the puff indicator 109.”); *see also id.*, [0034].

60. A POSA would have understood that Thorens does not limit its sensor to one that directly **measures** airflow, and instead, would have understood that Thorens’ puff detection system can encompass various sensors that indirectly detect airflow, including differential pressure sensors. A POSA would have understood that a pressure sensor that can detect airflow can be referred to as an airflow sensor. For example, Lamb teaches an airflow sensor that detects airflow using a “MEMS-based **pressure** sensor.” EX1005, Abstract; *see also id.*, [0026], [0043] (describing that “flow sensor 110” is a “MEMS pressure sensor.”). Indeed, Thorens contemplates

that numerous different sensor technologies could be used for its puff detection system, including MEMS based pressure sensors. EX1016, [0015] (“Alternatively, the sensor may be any of: a mechanical device, an optical device, an opto-mechanical device and a micro electro mechanical systems (MEMS) based sensor.”). Thus, contrary to Patent Owner’s assertions, there would not be substantial changes such as replacing a puff detection system with a differential pressure sensor.

61. Patent Owner and Dr. Collins also incorrectly assert that using a pressure sensor in Thorens “could be dangerous as the device may overheat.” POR, 77; EX2053, ¶84. These concerns are unfounded. Patent Owner and Dr. Collins ignore that Thorens discloses temperatures controls that would prevent overheating (*e.g.*, EX1016, [0052]). Additionally, differential pressure sensors were typically used in e-cigarettes at the time and there is no indication or evidence that they were known to cause overheating. *See, e.g.*, EX1022, [0101].

62. ***Second***, Patent Owner and Dr. Collins further assert that the Modified Thorens combination “also has dangerous, exposed wiring.” EX2053, ¶¶82, 87-88; POR, 78-79. This assertion is based on a fundamental misunderstanding of the figure containing a portion of Weigensberg’s “schematic diagram” below that I included in my Initial Declaration.



Modified Thorens

63. The inclusion of Weigensberg’s electrical schematic was solely to illustrate the electrical connections with the existing Thorens electrical system and was not an implementation of the combination. The portion of Weigensberg’s “schematic diagram” incorporated into the above schematic is from Figure 14, which is described as “a schematic diagram of electrical circuitry in an electronic cigarette” EX1006, [0046].

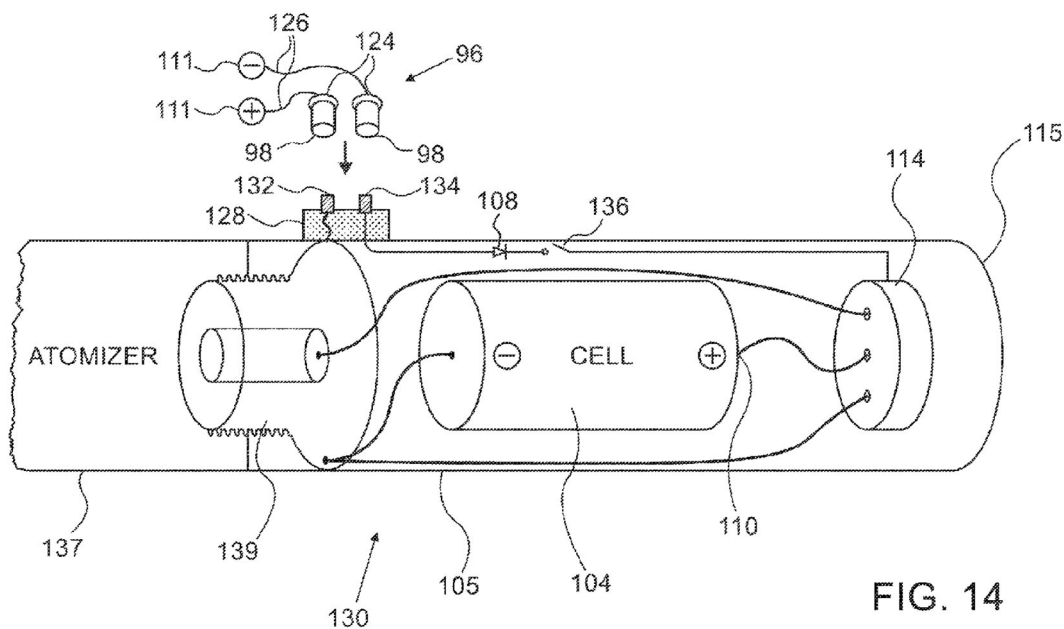


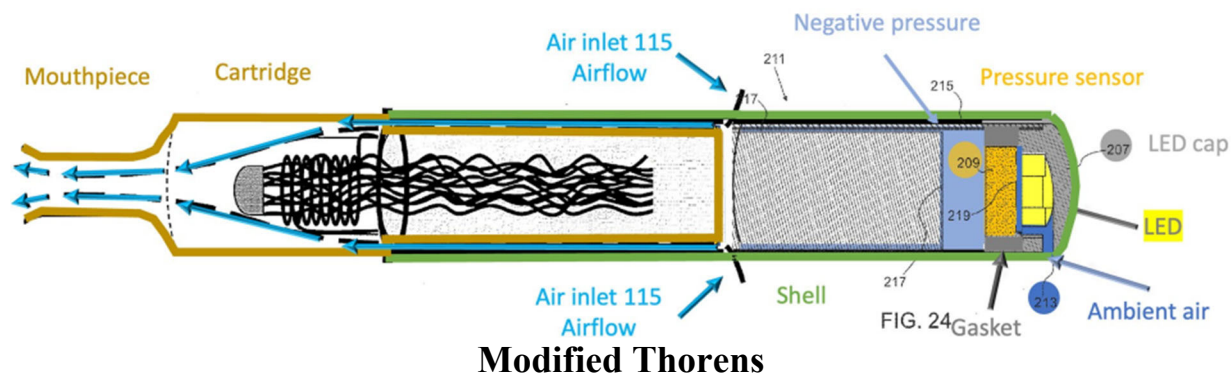
FIG. 14

EX1006, Fig. 14

The schematic in Figure 14 of Weigensberg also does not result in exposed pressure sensor leads. As described in Weigensberg, the pressure sensor assembly is contained in an LED cap. *Id.*, [0107]; Fig. 24.

64. In fact, because the battery is depicted floating in the air in the schematic diagram of the modified device, it is clear that this is not a production device. In any event, a POSA would have recognized that the required connections can be made in a safe and secure manner. For example, a POSA would understand that the Thorens device as disclosed includes electrical wiring running throughout the device. For example, Dr. Collins agreed that, in unmodified Thorens, there exists an electrical connection between the puff detection system 107 and puff indicator 109 consisting of wires 111. EX1040, 98:17-99:6, 99:14-17. Dr. Collins also confirmed that Thorens includes electrical connections between the battery and electrical contacts 113. EX1040, 100:14-21. As I stated in my Initial Declaration, the wiring to Thorens' electrical contact 113 would connect to Weigensberg's pressure sensor assembly. EX1003, ¶187.

65. Therefore, contrary to Patent Owner's and Dr. Collins' assertion about exposed wiring and pressure sensor leads, Modified Thorens maintains the electrical structure of Thorens, as shown in the annotated figure below from my Initial Declaration.



EX1016, Fig. 1

66. Thus, Modified Thorens is no more prone to wiring and potential damage than unmodified Thorens.

67. **Third**, Patent Owner and Dr. Collins contend that “a POSITA would understand that removing [Thorens’ electrical circuitry 105] would leave the device inoperable for its intended purpose—that is, detecting a puff and activating the heating coil to form vapor.” EX2053, ¶90; POR, 80. This contention is incorrect and ignores that Weigensberg’s pressure sensor assembly includes integrated circuitry that controls the device. EX1006, [0107], [0029], [0031], [0059].

C. Weigensberg’s LED Cap is a Gasket

68. As explained in my Initial Declaration, Weigensberg discloses an LED cap that can be made out of a plastic material, which isolates the ambient air pressure path from the device path to allow the differential pressure sensor to detect differences from ambient air. The cap is thereby “a gasket around the pressure sensor, [where] the gasket configured to seal the device air path from the sealed air

flow path.” EX1003, ¶¶212-213; EX1006, [0107] (“The LED cap 207 is mostly inset into the end of the barrel 215 The LED cap 207 may be constructed of a plastic material as described for the member 193 (FIG. 20).”); [0104]-[0105] (“The member 193 has a second function: placing the interior of the body 195 into fluid communication with ambient air as seen in FIG. 21, so as to facilitate operation of a pressure sensor, e.g., sensor 24 (FIG. 1). The member 193 achieves this using a groove or channel 197 formed therein, which emerges onto the exterior of the tip at a point 199 and debouches into the interior of the body 195 at point 201.”).

69. Patent Owner and Dr. Collins contend that “the combination does not render obvious a gasket because Thorens and Weigensberg do not disclose a gasket.” POR, 76; EX2053, ¶81. In particular, Patent Owner and Dr. Collins contend that: (1) the LED cap is not a gasket because it is not called a gasket in Weigensberg, (2) “a POSITA would understand that plastic is not a suitable material for a gasket because it does not provide an airtight seal that a gasket provides,” and (3) Weigensberg’s depictions do not have any space for a gasket. POR, 83-84; EX2053, ¶¶98-99. Patent Owner and Dr. Collins are incorrect.

70. **First**, the claims require “a gasket around the pressure sensor, [where] the gasket [is] configured to seal the device air path from the sealed air flow path.” Patent Owner and Dr. Collins do not dispute the LED cap is around the pressure sensor and configured to “provide[] enough separation” to seal the device air path

from the sealed air flow path such that the “differential pressure sensor [will] work.” EX2053, ¶99. The cap need not be called a gasket for a POSA to have understood that it is in fact a gasket that performs the required function.

71. ***Second***, Patent Owner’s and Dr. Collins’ contention that plastic is not a suitable material for a gasket is entirely unsupported. While I disagree that plastic cannot be a suitable material for a gasket, Weigensberg is not limited to a plastic material for the LED cap, and discloses in an embodiment that the cap “*may* be constructed of a plastic material,” without excluding other materials or limiting the cap to a specific embodiment. *See* EX1006, [0107]. And even if Weigensberg’s cap is limited to a plastic material, neither Patent Owner nor Dr. Collins have shown or identified any supporting evidence that would eliminate all plastic materials from creating an airtight seal. Such materials exist. I understand that Dr. Collins at his deposition agreed that the Mark’s Standard Handbook for Mechanical Engineers is a reliable source of information that describes the standard practice in the field of mechanical engineering and is a resource a POSA would have been aware of in the relevant time period. EX1040, 29:19-31:5. Contrary to Dr. Collins’ opinions regarding plastic being unsuitable for gaskets, the Mark’s Standard Handbook for Mechanical Engineers explicitly states that the “Major Uses” of certain plastics are “gaskets.” EX1041.0022; EX1042.

Item	Cellulose acetate	Rigid vinyl	Plasticized vinyl
Key properties	Low cost, toughness, clarity, colorability	Compounding flexibility, low cost, chemical resistance	Compounding flexibility, low cost, pliability
Major uses	Door knobs, blister packs, appliance housings	Conduit, pipe, building panels	Tubing, gaskets, upholstery, footwear
Density, g per cc	1.26-1.34	1.35-1.45	1.16-1.35
Tensile strength, psi	1,900-8,300	5,000-9,000	1,500-3,500
Tensile modulus, psi $\times 10^{-6}$	1.0-4.0	4-6	
Maximum continuous-use temp, deg F	140-220	120-160	150-175
Molding temp, deg F	260-490	285-400	285-385
Dielectric strength, volts per mil	200-300	375-750	275-900
Dielectric constant, 1,000 cps	3.5-7.0	3.0-3.3	4.0-8.0
Dissipation factor, 1,000 cps	0.01-0.06	0.01-0.02	0.07-0.16
Water absorption, 24 hr, percent	1.9-6.5	0.07-0.4	0.15-0.75

Item	Cellulose acetate butyrate	Nylon 6, 6	Polymethyl methacrylate (Lucite or Plexiglas)	Polytetrafluoroethylene (Teflon)
Key properties	Impact resistance, clarity, weatherability	Toughness, low coefficient of friction, machinability	Crystal clarity, strength, weatherability, colorability	Thermal stability, low coefficient of friction, chemical resistance
Major uses	Outdoor signs, lenses	Gears, bearings, hinges, fibers	Automotive lenses, shaped glazing, signs	Gaskets, non-stick surfaces, insulation, electrical applications
Density, g per cc	1.15-1.22	1.09-1.14	1.17-1.20	2.13-2.22
Tensile strength, psi	2,600-6,900	7,000-12,000	7,000-11,000	2,000-4,500
Tensile modulus, psi $\times 10^{-5}$	0.5-2.0	2.6-4.0	4.5	0.58
Maximum continuous-use temp, deg F	140-220	270-300	140-190	550
Molding temp, deg F	265-480	470-720	300-500	
Dielectric strength, volts per mil	250-350	340-410	350-400	430

EX1041.0022

72. Moreover, Dr. Collins ignores that other e-cigarette references disclose resilient polymeric gaskets around a pressure sensor. As discussed in my Initial Declaration, Newton766 discloses the use of a gasket (resilient polymeric surround 30) surrounding the pressure sensor at the tip of the electronic cigarette.

EX1003, ¶257; EX1009, 6:6-9. Plastics are polymers, and a POSA would have recognized that resilient plastic materials can form seals sufficient to be used as a gasket, especially when used in conjunction with the Weigensberg's controlled airflow environment.

73. **Third**, Patent Owner and Dr. Collins contend that a POSA would not have used a gasket because there is no space in the LED cap in Weigensberg's figure. Notwithstanding that Weigensberg's LED cap is the claimed gasket, an additional gasket could easily be included. Nor does Weigensberg limit its disclosure of a gasket around the pressure sensor to the LED cap in its embodiments. As I discussed in my Initial Declaration, a gasket around a pressure sensor was a typical design.

74. Thus, Modified Thorens would include a gasket around the differential pressure sensor within the LED cap to seal the sealed airflow path from the ambient air, consistent with the typical e-cigarette design. EX1022, [0101].

X. SECONDARY CONSIDERATIONS DO NOT SUPPORT NONOBVIOUSNESS

75. Patent Owner and Dr. Collins have asserted that nexus should be presumed with respect to the '123 Patent because the claims of each are purportedly coextensive with the Patent Owner's JUUL System. For the reasons set forth below, I disagree

76. The JUUL System does not embody the challenged claims for a number of reasons. First, the JUUL System does not include a sensor that meets the

pressure sensor limitations in the independent claims. Second, Patent Owner previously alleged in the parallel ITC investigation that the MCU and PCB were part of the alleged pressure sensor, and neither are addressed in the POR. EX1045.004. Third, the JUUL System does not include a gasket around what the Patent Owner alleges is the pressure sensor.

77. Also, the '123 Patent claims are not coextensive with the JUUL System because the JUUL System includes numerous features that are not explicitly claimed in the '123 Patent asserted claims (*i.e.*, claims 14, 27, and 32) that are tied to the functionality and secondary consideration evidence that Patent Owner relies on (*e.g.*, commercial success). For example, the '123 Patent asserted claims fail to explicitly recite at least the following features of the JUUL System:

- JUUL's use of nicotine salts and specific nicotine formulation
- Flavors of the JUUL pods
- Translucent pod that allows viewing of the e-liquid
- Closed loop Temperature control system
- Friction fit for coupling the pod to the device
- Reversible pods that can be inserted in either orientation
- Rectangular shape of the JUUL system that resembles a flash drive

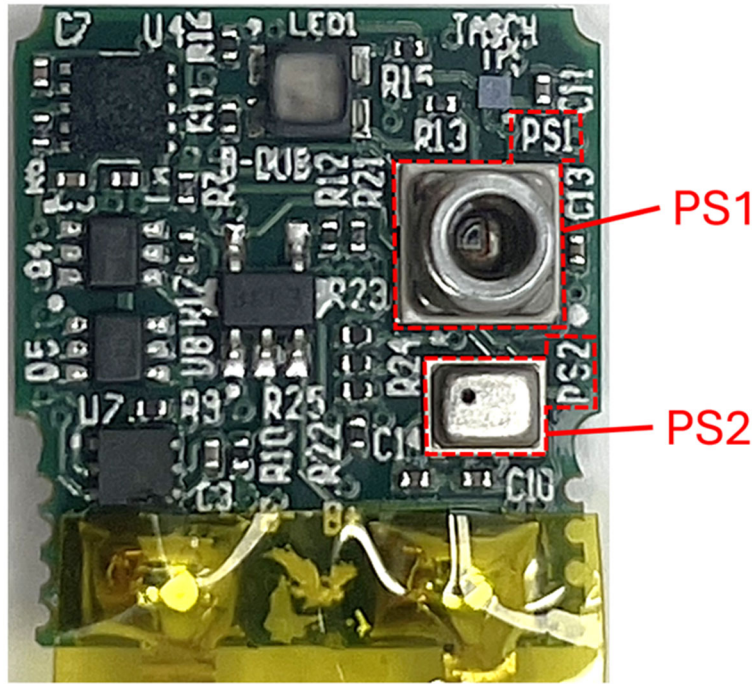
78. Given the number of features in the JUUL System that are not claimed in the challenged claims of the '123 Patent, in my opinion, the '123 Patent asserted

claims are not coextensive with the JUUL System and a presumption of nexus is not appropriate.

A. The JUUL System Does Not Practice the '123 Patent

79. Independent claims 14 and 27 recite “*a* pressure sensor ... wherein a first side of *the* pressure sensor is exposed to a sealed air flow path and a second side of *the* pressure sensor is exposed to a device air path open to ambient pressure.” EX1001, 48:49-53, 49:58-62. In other words, claims 14 and 27 require a *single* pressure sensor having one side exposed to the sealed air flow path, and another side of the same pressure sensor exposed to ambient pressure. No such pressure sensor exists in the JUUL System. Instead, as shown in the picture of the JUUL System’s printed circuit board,² it uses two absolute pressure sensors—labeled PS1 and PS2. Each pressure sensor is mounted directly to the PCB, and each pressure sensor has only one exposed side. Specifically, absolute pressure sensor PS1 has only one side exposed, that being to the air path pressure (*i.e.*, the sealed airflow path), while absolute pressure sensor PS2 has only one side exposed, that being to ambient pressure.

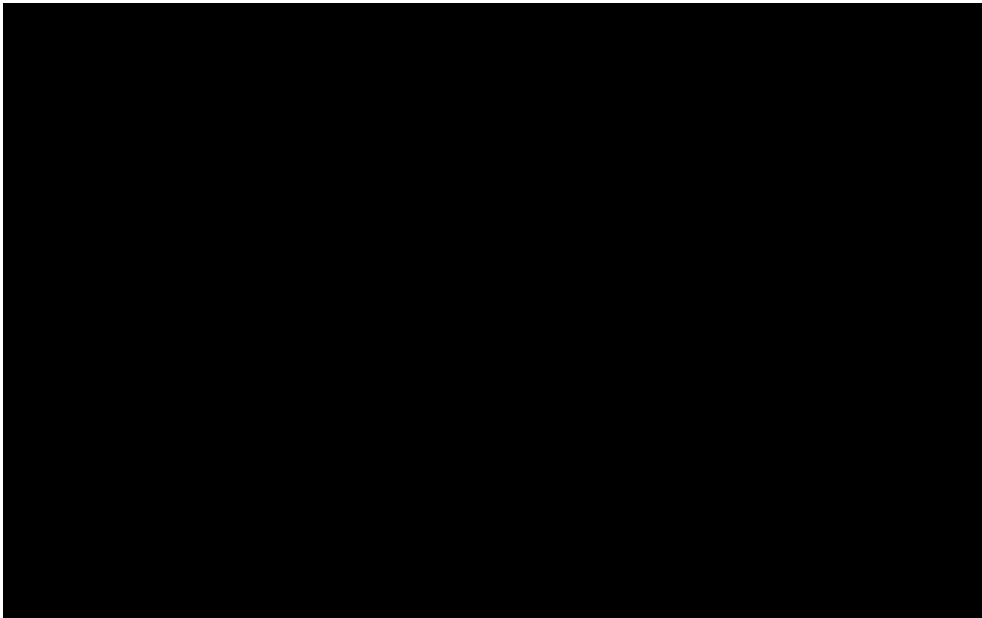
² This picture is the PCB from a JUUL System that I tore down as part of my analysis.



Photograph of JUUL Printed Circuit Board

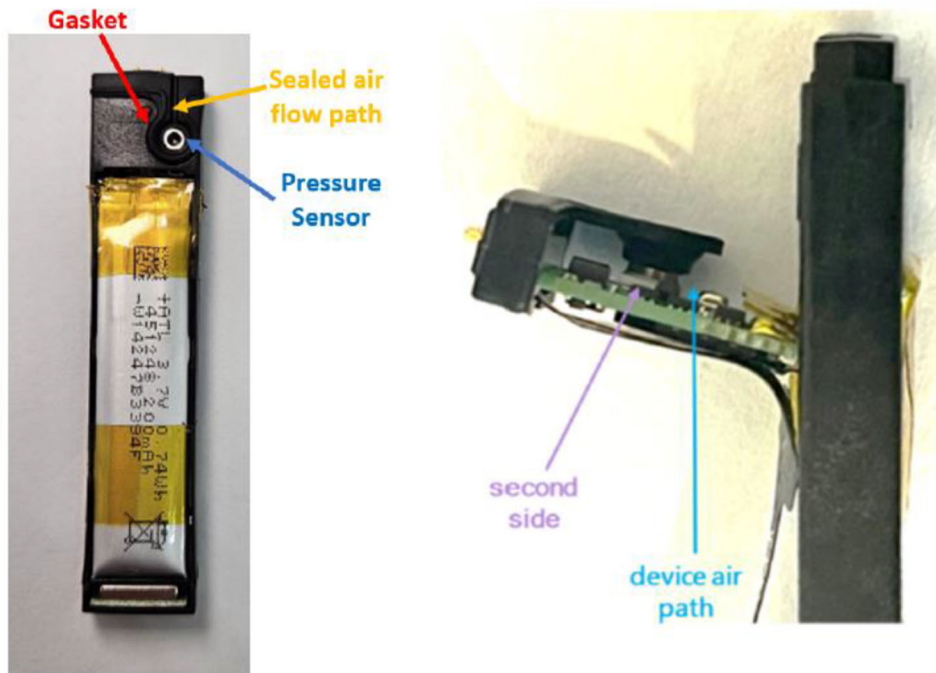
80. That the JUUL System uses two different, discrete pressure sensors—one pressure sensor exposed to pressure communicated from the mouthpiece (*i.e.*, only exposed to a sealed airflow path) and a second pressure sensor exposed to ambient pressure (*i.e.*, only exposed to a device airflow path)—is further confirmed by Patent Owner’s documents. For example, the JUUL System FDA Premarket Tobacco Product Application (EX2003) describes the two pressure sensors in the JUUL System: [REDACTED]

[REDACTED] EX2003, 45.



EX2003, 45

81. Patent Owner and Dr. Collins include the following two annotated photographs showing that the JUUL System includes the claimed pressure sensor allegedly having a second exposed side:



POR, 33; EX2053, ¶115

82. At deposition, Dr. Collins confirmed that the pressure sensor he identified in the annotated figure above corresponds, in his opinion, to the claimed pressure sensor. EX1040, 54:7-20. However, Dr. Collins conceded that that sensor only measures the sealed airflow path pressure (*id.*, 55:1-17), which means that it is only exposed to the sealed airflow path. Thus, the pressure sensor Dr. Collins identified does not have one side exposed to a sealed airflow path and a second side exposed to ambient as required by the claims.

83. Patent Owner separately asserts that the JUUL System practices the '123 Patent either literally or under the doctrine of equivalents because its "pressure sensor comprises two pressure detecting components and associated circuitry." POR at 22-23. Patent Owner, however, fails to explain how this theory would result in

one pressure sensor that has both of the claimed sides. Moreover, Patent Owner's theory fails to address that the claims further require "a gasket **around** the pressure sensor." A POSA would have understood that the plain meaning of the term "around" in the context of the '123 Patent is "surround." For example, the '123 Patent describes that the gasket forms a seal around the pressure sensor case. EX1001, 42:25-32. Thus, even if the claimed "pressure sensor" could be the combination of the two absolute pressure sensors and associated circuitry, which in my opinion it cannot, the JUUL System still cannot practice the '123 Patent challenged claims because there is no gasket around this combination of components identified by Patent Owner. Instead, the identified gasket in the JUUL System is around only one of the absolute pressure sensors (PS1). There is no gasket present around the first and second absolute pressure sensors (PS1 and PS2) or the unidentified associated circuitry.

84. Therefore, the JUUL System does not practice the '123 Patent.

B. Long-Felt Need

85. I disagree with Patent Owner and Dr. Collins that the '123 Patent satisfied a long-felt need. Patent Owner and Dr. Collins only addressed claim 14. As explained above, claim 14 of the '123 Patent is anticipated by Worm. Thus, the

specific combination of features in the '123 Patent was already known in the art.³ Dr. Collins has failed to demonstrate that the features in the asserted claims of the '123 Patent satisfied a long-felt need.

86. Patent Owner and Dr. Collins assert that the JUUL System satisfied a long-felt need because it was “abandoning traditional cigarette iconography altogether, in particular the cylindrical shape, outward-facing, flame-simulating LED, and a screw in cartridge.” POR, 44; EX2053, ¶133. The asserted claims of the '123 Patent, however, are agnostic as to the shape of the device, whether the device includes a flame-simulating LED, or how the cartridge couples to the device (*e.g.*, screw-in cartridge vs. compression fit). Moreover, none of the asserted claims of the '123 Patent recite any features that depart from “traditional cigarette iconography.” Additionally, Patent Owner has numerous patents directed to the shape and look of the JUUL System. *See, e.g.*, EX1044. As such, the asserted claims of the '123 Patent do not address that purported long-felt need.

87. Patent Owner and Dr. Collins further assert that the JUUL System provides “a fundamentally different user experience, including with respect to vapor production and nicotine delivery that satisfied smokers’ cravings.” POR, 44; EX2053, ¶133. Patent Owner and Dr. Collins, however, failed to identify any

³ As explained above, all of the features claimed in the '123 Patent were already known in the art. For this additional reason, none of the secondary considerations identified by Dr. Collins should be attributable to the '123 Patent asserted claims.

evidence, even if true, that vapor production and nicotine delivery of the JUUL System are attributable to the features claimed in the challenged claims in the '123 Patent. For example, Dr. Collins specifically refers to JUUL's "closed-loop temperature control system," EX2053, ¶133, as contributing to vapor production and nicotine delivery, but that feature is not claimed in the '123 Patent. Moreover, internal JLI documents indicate that the JUUL System's vapor production and nicotine delivery is attributable to its unique nicotine chemistry, which is not claimed. EX1035.014 ("At the heart of value proposition is JUUL's unique nicotine delivery profile, enabled by patented chemistry and innovative design. JUUL pods use nicotine salts, derived from tobacco leaves, as opposed to the free-base nicotine that is used by legacy e-cigarettes.").

88. Patent Owner also alleges that the challenged claims do claim these unclaimed features. For example, Patent Owner alleges that limitations "vaporizable material" claims nicotine salts, "heater" includes the closed loop temperature control system, and that the "cartridge receptacle configured to insertably receive a cartridge" excludes the traditional cigarette iconography form factor. However, the limitation "vaporizable material" encompasses more than nicotine salts (*i.e.*, a vaporizer without nicotine salts can still practice the challenged claims), "heater" includes more than a closed loop temperature control system, and the "cartridge receptacle configured to insertably receive a cartridge" does not exclude traditional

iconography. Moreover, “vaporizable material” need not include nicotine, which is a requirement of the dependent claims. *See* EX1001, cl. 32. Dr. Collins confirmed that devices that did not include nicotine salts were included in the “vaporizable material” limitation. EX1040, 45:15-46:4. Therefore, the claims are not coextensive with the JUUL System for this reason since they do not claim these features.

89. The evidence cited by Patent Owner and Dr. Collins confirms that, even if the JUUL System satisfied a long-felt need, which it does not, it is not attributable to the features claimed in the ’123 Patent. Notably, the documents and publications cited by Patent Owner and Dr. Collins do not reference any of the features claimed in the ’123 Patent. POR, 45; EX2053, ¶134. For example, one article describes that the JUUL System was particularly popular with young people because “young people [] can hide the sleek devices from parents and teachers” and because the pods as “filled with nicotine liquids ... available in sweet flavors like crème brulee and mango.” EX2028, 3; POR, 45. A second article describes that the JUUL System was popular because of its “flat rectangular product design, discreet size and powerful pre-filled nicotine pods.” EX2029, 2. A third article describes that the JUUL System included a “flavor strategy,” and that the biggest breakthrough with respect to the JUUL system “was chemical,” including “that by adding benzoic acid to nicotine salts, which occur naturally in tobacco, they could mimic a cigarette’s rapid nicotine delivery.” EX2019, 4.

C. Unexpected Results

90. Patent Owner and Dr. Collins assert that “[a]chieving the unexpected result of a reliable, user-satisfying ENDS system, while departing from industry design norms, and attempting to replicate a smokers experience with conventional cigarettes, providing sufficient vapor production and nicotine delivery, and using a relatively small form factor” was unexpected. EX2053, ¶136; POR, 46. There is no explanation why those results were unexpected or how any of those allegedly unexpected results are attributable to the features claimed in the ’123 Patent. As explained above, none of the claims of the ’123 Patent require a “relatively small form factor.” Moreover, to the extent the JUUL System achieved “sufficient vapor production and nicotine delivery,” internal JLI documents describe that was attributable to unclaimed features, such as JUUL’s nicotine formulation. EX1035.014 (“At the heart of value proposition is JUUL’s unique nicotine delivery profile, enabled by patented chemistry and innovative design. JUUL pods use nicotine salts, derived from tobacco leaves, as opposed to the free-base nicotine that is used by legacy e-cigarettes.”).

91. Patent Owner and Dr. Collins also assert that “providing users with a reliable device that also allowed users to view the current liquid level while the pod was inserted in the vaporizer was unexpected in view of the concern about light degradation of the liquid nicotine formulation.” POR, 46; EX2053, ¶136. The

asserted claims of the '123 Patent, however, do not recite any features that allow users to view the contents of the pod. Therefore, even if that was an unexpected result of the JUUL system, it was not attributable to the asserted claims of the '123 Patent.

92. Patent Owner and Dr. Collins further assert that providing “adequate airflow for satisfying vapor production and accurate pressure sensing to avoid accidental triggering of the device were also unexpected, as was providing a pod-based device with a liquid tank as opposed to prior devices that stored liquid in the wick or other sponge-like absorbent material.” POR, 46; EX2053, ¶136. Patent Owner and Dr. Collins, however, fail to identify any evidence that these purported results were somehow “unexpected,” or that there were any known issues with respect to adequate airflow and accurate pressure sensing in the prior art. Furthermore, the airflow and pressure sensing features claimed in the '123 Patent were already known and disclosed in the prior art, as explained above.

93. Finally, Patent Owner and Dr. Collins assert that “designing a reliable, user-satisfying ENDS system that could be manufactured in a cost-efficient manner was also unexpected.” POR, 46; EX2053, ¶137. There is no explanation as to how this purportedly unexpected result is attributable to a feature in the challenged claims of the '123 Patent. Moreover, in the parallel ITC hearing, JLI’s witnesses testified that the JUUL system has been plagued by reliability problems, including pod

leakage, pressure sensor failures, and other component failures. EX1050, 247:25-249:15.

94. I further note that Patent Owner and Dr. Collins' analysis of purported unexpected results refers to prior investments made by Altria in the e-cigarette space before investing in JLI. Dr. Collins, however, does not explain how this relates to any alleged unexpected results. To the extent that Dr. Collins intends to rely on Altria's prior e-cigarette products as a purported failure of others, I disagree that it would be indicative of such. In particular, I understand that "failure of others" refers to whether others failed at reducing to practice the claims of the patent at issue. Altria's prior products were successfully reduced to practice (which is demonstrated at least by the fact that they were available for sale on the commercial market), so they are not evidence of "failure of others."

95. In sum, Patent Owner and Dr. Collins failed to demonstrate that the JUUL System achieved any unexpected results. But even if it did, Dr. Collins has failed to demonstrate that those results are attributable and have a nexus to the challenged claims of the '123 Patent.

D. Industry Acclaim/Praise of Others

96. Patent Owner and Dr. Collins have likewise failed to demonstrate that any industry praise of the JUUL system is attributable to the challenged claims of the '123 Patent.

97. Patent Owner and Dr. Collins contend that the “JUUL system received widespread recognition from its customers and others in the industry.” POR, 48; EX2053, ¶139. The publications cited by Patent Owner and Dr. Collins, however, do not demonstrate that any purported praise is attributable to the features claimed in the ’123 Patent. For example, one publication refers to JUUL’s “flat rectangular product design, discreet size and powerful pre-filled nicotine pods,” none of which are claimed. EX2029. The other publications, to the extent they praise the JUUL System, do not specifically identify any feature claimed in the asserted claims of the ’123 Patent. EX2031, EX2032.

98. Patent Owner and Dr. Collins have similarly cited to the FTC Findings of Fact and Conclusions of Law (“FTC FOF”) to support his assertion that JUUL has been the subject of industry praise. POR, 48; EX2053, ¶140. The cited excerpts, even if indicative of industry praise, likewise fail to identify any specific features that are set forth in the asserted claims of the ’123 Patent, such as the claimed airflow path or a pressure sensor configuration. Moreover, portions of the FTC Findings of Fact and Conclusions of Law that Patent Owner and Dr. Collins appear to attribute success of the JUUL System to its powerful battery and nicotine salt formulation, neither of which is claimed. POR, 48-49; EX2053, ¶¶139-140.

E. Commercial Success

99. Although Patent Owner and Dr. Collins contend that the JUUL System

was a commercial success, they failed to demonstrate that any such success was attributable to the novel features claimed in the asserted claims of the '123 Patent. Several internal JLI documents, for example, describe that any commercial success of JUUL was attributable to its nicotine salt formula, which is not claimed in the '123 Patent. An email authored by Adam Bowen, who I understand is one of the founders of JLI and was heavily involved in the design of the JUUL System, attributed JUUL's market share to its "[s]alt chemistry" and stated that JUUL "would be lucky to have 5% share" with "conventional chemistry." EX1034. Similarly, an internal JLI memo states that "JUUL's chemical profile creates an experience essentially identical to the sensation of smoking a traditional cigarette. It is this experience that has allowed JUUL to quickly capture over 50% of the e-cigarette category." EX1035, 13. Thus, even Patent Owner has attributed the JUUL System's market share to its nicotine formulation, and not novel features in the challenged claims in the '123 Patent.

100. Patent Owner and Dr. Collins cite to a number of articles regarding the purported commercial success of the JUUL System, but none of those articles attributes sales of JUUL to a novel feature in the challenged claims in the '123 Patent. POR, 49-50; EX2053, ¶¶142-143. Instead, these articles attribute any commercial success the JUUL System may have had to unclaimed features, such as

aesthetics, nicotine salts, and flavors.⁴

101. The other documents cited by Patent Owner and Dr. Collins do not attribute any purported commercial success of JUUL to any particular features, let alone the features claimed in the '123 Patent.⁵

102. For at least these reasons, Patent Owner and Dr. Collins have failed to demonstrate that any purported commercial success of the JUUL System is attributable to the asserted claims of the '123 Patent.

F. Copying

103. Patent Owner and Dr. Collins also contends that alleged copying supports the non-obviousness of the '123 Patent. POR, 51; EX2053, ¶¶144-152. Patent Owner and Dr. Collins, however, failed to set forth any evidence that other companies copied the specific features that are set forth in the asserted claims of the '123 Patent. As explained below, Patent Owner and Dr. Collins have failed to

⁴ EX2028 (describing that the “devices are popular with young people who can hide the sleek devices from parents and teachers” and that “[p]ods filled with nicotine liquids are available in sweet flavors like creme brulee and mango, which critics say appeal to young people....”); EX2032 (explaining that “a huge part of JUUL’s cachet appears to be its pleasing aesthetics, ease of use & nicotine salt e-liquid technology”); EX2038 (describing that JUUL is “different because of its enhanced technology which is based on a nicotine salt....”); EX2035 (describing that JUUL’s use of “nicotine salts” which “provides the consumer with a more satisfying nicotine experience”); EX2036 (describing that the “growing popularity of JUUL seems to be driven by flavored offerings (in particular Cool Cucumber and Mango).”)

⁵ EX2034.

identify any evidence that other companies copied the pressure sensor configuration of the '123 Patent, which the JUUL System does not even utilize.

104. First, Patent Owner and Dr. Collins reference a statement made by an ALJ in a prior ITC Investigation (Inv. 337-TA-1139) (“the 1139 Investigation”) that a “number of competitors, including some respondents, have admitted to using the JUUL system as a reference when manufacturing their own ENDS products.” POR, 51; EX2053, ¶146. Patent Owner and Dr. Collins have not cited any evidence that the Respondents in the 1139 Investigation copied the pressure sensor configuration of the JUUL system. Notably, the patents at issue in the 1139 Investigation do not include the 123 Patent, yet Patent Owner and Dr. Collins relied on the same evidence that is relied on here.⁶ See EX2042. Moreover, Patent Owner asserted three other patents against NJOY in the 1368 Investigation. See EX1038.

105. Second, Patent Owner and Dr. Collins cite to statements made by “industry commentators” as further evidence as purported copying. POR, 51; EX2053, ¶147. Patent Owner and Dr. Collins, however, have not identified any statements in which an “industry commentator” indicated that others had copied a purportedly novel feature in the challenged claims in the '123 Patent. Moreover, the articles cited by Dr. Collins describe that other companies have apparently made

⁶ I understand that the patents at issue in the 1139 Investigation were U.S. Patent No. 10,045,568; 10,058,130; 10,070, 669; and 10,104,915. EX2042, 4.

Pods that are compatible with the JUUL device, but do not indicate that any competitors copied any purportedly novel feature in the challenged claims in the '123 Patent. EX2044, EX2047.

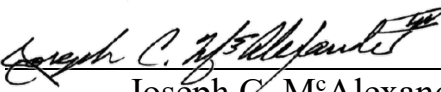
106. Patent Owner and Dr. Collins also refer to Altria's prior development efforts with respect to e-vapor products, Altria's investment in JLI, and discussions between Altria and JLI regarding intellectual property licensing. POR, 52-54; EX2053, ¶¶148-152. There is no explanation how, if at all, these topics relate to copying in general or the '123 Patent. Patent Owner and Dr. Collins, for example, have not identified any Altria products that purportedly copied the JUUL system, let alone any purportedly novel feature in the challenged claims in the '123 Patent. Similarly, Patent Owner and Dr. Collins have not identified any evidence that Altria was specifically interested in licensing the '123 Patent. Notably, JLI's patent portfolio includes many patents other than the '123 Patent. Thus, any licensing discussions between JLI and Altria in 2022, which I understand did not result in an actual license agreement, have not been shown to have any connection to the '123 Patent.

107. Finally, Patent Owner and Dr. Collins state that "Petitioners copied the design and features of the JUUL System." POR, 54; EX2053, ¶152. Neither Patent Owner nor Dr. Collins provide a basis for this assertion. I disagree that NJOY copied the JUUL system.

XI. DECLARATION

108. I declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code.

Dated: November 27, 2024

By: 
Joseph C. McAlexander III