

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

R.J. REYNOLDS VAPOR COMPANY,
Petitioner,

v.

HEALTHIER CHOICES MANAGEMENT CORP.
Patent Owner.

Case IPR2024-01458
U.S. Patent No. 9,538,788

**DECLARATION OF CHARLES A. GARRIS, JR., PH.D., P.E.
IN SUPPORT OF PATENT OWNER'S RESPONSE**

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I, Charles A. Garris, Jr., do hereby declare:

I. INTRODUCTION

1. I submit this Declaration on behalf of Patent Owner, Healthier Choices Management Corp., (“HCMC”), in the matter of the *Inter Partes* Review (“IPR”) of U.S. Patent No. 9,538,788 (the “‘788 Patent”) brought by Petitioner, R.J. Reynolds Vapor Company (“RJR”).

2. I have been retained by Berger Singerman LLP and Cozen O’Connor, counsel for HCMC, to provide my expert testimony in this proceeding. Specifically, I have been asked to provide my opinions on the question of validity of claims 1, 7, 8, and 11. (the “Challenged Claims”) of the ‘788 Patent.

3. I am being compensated for my work on this matter at my customary rate of \$495 per hour. My compensation does not in any way depend on the outcome of the IPR or any related proceeding.

II. BACKGROUND AND QUALIFICATIONS

4. The following is a brief summary of my background and qualifications, the full extent of which can be found in my resume. Ex. 2002.

5. I am a Professor of Mechanical and Aerospace Engineering in the Department of Mechanical and Aerospace Engineering at The George Washington University. I have a Bachelor of Engineering degree (1965) in Marine Engineering from State University of New York, Maritime College. I also have an M.S. (1968)

and a Ph.D. (1971) in Mechanical Engineering from the State University of New York at Stony Brook. I am a Professional Engineer licensed in the Commonwealth of Virginia.

6. I am a Fellow of the American Society of Mechanical Engineers, a Fellow of the National Academy of Inventors, and an Associate Fellow of the American Institute of Aeronautics and Astronautics. I am a member of the American Intellectual Property Law Association, Sigma Xi, American Society of Engineering Education, and Pi Tau Sigma. I am registered to practice before the United States Patent and Trademark Office (Reg. No. 45,346).

7. I am currently a Professor (with tenure) in the Department of Mechanical and Aerospace Engineering at The George Washington University, where I teach Combustion, Convective Heat and Mass Transfer, Thermodynamics, Thermal System Designs, Fluid Mechanics, Mechanical Engineering Lab, Applied Aerodynamics, Compressible Flow, Hydrodynamics, Turbomachinery, and Viscous Flow, among others. My heat and mass transfer courses included two phase flow of the type encountered in wicking and aerosol generation, and the design of products requiring the control of heat transfer and maintaining temperatures at prescribed levels, including the type of devices considered in this IPR. I also teach a course in History and Economic Impact of the U.S. Patent System.

8. In my research work, I have done a considerable amount of research in

the area of electric smoking devices, including liquid-based electric cigarettes. I have published papers on the mechanics of fire spread, smoldering combustion, and reducing the risk of fires. Since a high percentage of home fires are caused by cigarettes, my research has focused on the vaporization of substances for electric smoking devices. I have studied both theoretically and experimentally heating devices used for vaporizing liquid and solid substances in e-cigarettes. In doing so, I have designed systems utilizing electric heating means to conduct various types of experiments to vaporize substances through conduction and convection heating, including those discussed in this IPR.

9. I have served as a consultant in the development of a smokeless cigarette device which included analyzing prior art patents, producing prototypes, and consulting with other scientists in connection with the project. I have been an expert in other cases of patent litigation involving electric smoking devices and the process of design in developing such products.

10. I am the sole inventor of seven issued patents. U.S. Patent Nos. 4,875,623, 4,969,598, 5,647,221, 6,138,456, 6,434,943, 6,663,991, and 7,497,666.

11. I have served as a Program Director of Heat Transfer at the National Science Foundation, where I was charged to make funding decisions and monitor grants in the area of heat and mass transfer. Research projects under my direction included heat transfer by conduction, convection, and radiation and the development

of cutting edge energy systems which include electric heating devices of many types.

12. The foregoing education and professional experience, a large portion of which was completed before the relevant time for assessing the patentability of the ‘788 Patent, qualify me as a person of ordinary skill in the art at the relevant time. In addition, I worked with people that were persons of ordinary skill in the art. From my personal experience working on combustion, electric devices, heat transfer, and smokeless cigarettes, I understand the types of problems and the knowledge that a person of ordinary skill in the art would have confronted and known at the relevant time. Further, in view of my education and experience both before and after the relevant time, I am an expert in combustion, heat transfer, and electrical heating device design, with knowledge and skill in the art of the ‘788 Patent that is well beyond the level of knowledge and skill of a person of ordinary skill in the art of the ‘788 Patent.

III. MATERIALS REVIEWED

13. In forming the opinions set forth in this Declaration, I reviewed the ‘788 Patent (Ex. 1001) and relevant portions of its file history (Ex. 1002). I considered the Petition submitted by RJRV (Paper 1) and the exhibits (Exs. 1002-1025) and grounds presented therein. I have also considered the Declaration of Mr. Kelly Kodama (Ex. 1003) – including his CV and all other exhibits thereto, as well as the transcript of the deposition of Mr. Kodama (Ex. 2003). In addition, I reviewed the

March 12, 2025, Institution Decision (Paper 7) of the Patent Trial and Appeal Board (the “Board”). I have also relied upon my education, experience, and knowledge of engineering practices and principles involved in combustion, electric devices, heat transfer, including in the context of electronic cigarettes, as well as my understanding of the applicable legal principles described below.

14. A complete list of the materials I considered in forming my opinions can be found in Appendix A.

IV. SUMMARY OF MY OPINIONS

15. In my opinion, the Petition does not demonstrate that Claims 1, 7, 8, and 11 (the “Challenged Claims”) of the ‘788 Patent are unpatentable as being anticipated or obvious in view of the prior art.

16. Further, I disagree with the Petitioner’s and Mr. Kodama’s analysis of the prior art relied upon in the grounds, i.e., Gilbert, Lee, Levin, Cohen, and Weigensberg, as well as their comparison of those references to the challenged claims of the ‘788 Patent. As described below, Gilbert, Lee, Cohen, Levin, and Weigensberg do not teach each and every limitation of the Challenged Claims, alone or in combination. What is more, one skilled in the art would not have been motivated to combine these alleged prior art references to arrive at the invention claimed in the ‘788 Patent, nor would one skilled in the art have reasonably expected to successfully achieve the claimed invention of the ‘788 Patent based on the

disclosures of the prior art references proposed by the Petitioner and Mr. Kodama.

V. INSTITUTED GROUNDS

17. The following table summarizes the Challenged Claims of the ‘788 Patent by RJRV, and the basis and references providing grounds for institution of this IPR:

Ground	Claims	Basis
Ground 1a	1, 11	§ 103 based on U.S. Patent No. 3,200,819 to Gilbert (“Gilbert”) and U.S. Patent Pub. No. 2011/0036346 to Cohen <i>et al.</i> (“Cohen”)
Ground 1b	7-8	§ 103 based on Gilbert and Cohen and U.S. Patent No. 9,943,107 to Weigensberg <i>et al.</i> (“Weigensberg”)
Ground 2a	1, 11	§ 103 based on Korean Patent Pub. No. 10-2012-0080287 to Lee (“Lee”) and Gilbert and U.S. Patent Pub. No. 2013/0298905 to Levin <i>et al.</i> (“Levin”)
Ground 2b	7-8	§ 103 based on Lee and Gilbert and Levin and Weigensberg

18. In addition to my experience as a patent agent, it has been explained to me that 35 U.S.C. § 103 refers to the section of the patent statute pertaining to obviousness. My understanding of the legal standards for obviousness are set forth below.

VI. LEGAL STANDARDS

19. The opinions I am expressing in this Declaration involve the application of my knowledge and experience of the evaluation of the '788 Patent and certain art with respect to the '788 Patent. While I am a registered patent agent, I am not an attorney, and I do not consider myself to be an expert in patent law. Thus, counsel has explained to me certain legal standards that I have relied upon in forming the opinions set forth in this Declaration. I do not offer any legal opinions in this Declaration.

20. I understand that to be patentable, an invention claimed in a U.S. Patent must not be anticipated or obvious. It is my understanding that a claim is unpatentable as "anticipated" under 35 U.S.C. § 102 if a single prior art reference discloses every reference does not anticipate a claim, however, when it discloses multiple, distinct teachings that a person of ordinary skill in the art might somehow have to modify or combine to achieve the claimed invention.

21. I understand that a claim is unpatentable under 35 U.S.C. § 103 if the claimed subject matter as a whole would have been obvious to a person of ordinary skill in the art at the time of the alleged invention.

22. I have been informed that when evaluating obviousness, one must consider: (i) the scope and content of the prior art; (ii) the differences between the prior art and the claims at issue; and (iii) the level of ordinary skill in the pertinent

art. I understand that when determining the scope and content of the prior art, a reference is considered “analogous” prior art if it comes from the same field of endeavor or if it is reasonably pertinent to the particular problem faced by the inventor. I further understand that when considering whether a particular reference is “reasonably pertinent,” the question is whether an inventor would look to that specific piece of prior art to solve the particular problem at hand.

23. I understand that a claim is not obvious merely because each of the claimed elements may have been independently known in the art. That is because it is impermissible to use the claimed invention as a template to piece together the teachings of the prior art so that the claimed invention is rendered obvious. Put differently, it is improper to use hindsight to reconstruct the claims.

24. I have been informed that a determination of obviousness requires demonstrating that a person of ordinary skill (“POSA”) would have been motivated to modify or combine the prior art in such a way as to arrive at the claimed invention. I also understand that the obviousness inquiry does not ask whether a skilled artisan *could* modify or combine the prior art references at the time of the invention to address the problem at hand. Additionally, I have been informed that a POSA must have a reasonable expectation of successfully achieving the claimed invention from such modification or combination of the prior art.

25. I understand that an asserted motivation to combine references can be

overcome based on a showing that those references together “teach away” from their combination. I further understand that if the references taken in combination would produce a “seemingly inoperable device,” such references teach away from the combination and thus cannot serve as a basis for obviousness.

26. In addition to my working understanding as a patent agent, it has been explained to me that patent claims can be independent or dependent claims. I understand that an independent claim stands on its own, while a dependent claim is one that refers to another claim, incorporates its limitations, and adds additional limitations. I further understand that if the prior art does not anticipate or render obvious an independent claim, that same prior art cannot anticipate or render obvious any dependent claim that further limits that independent claim.

27. Finally, I understand that in this proceeding, RJRV has the burden of proving a proposition of unpatentability by a preponderance of the evidence.

VII. LEVEL OF ORDINARY SKILL IN THE ART

28. I understand that a person of ordinary skill in the art is a hypothetical person who is presented to have known the relevant art at the time of the invention. Such a person is presumed to be one of ordinary creativity capable of understanding the scientific principles applicable to the relevant field, not an expert.

29. Based on my review of the ‘788 Patent, combined with my own experience, it is my opinion that a person of ordinary skill in the art at the time of

the earliest filing date of the ‘788 Patent would have had a bachelor’s degree in mechanical or electrical engineering, or a related field, an understanding of electronic cigarettes or electronic smoking devices, and three to four years of practical experience. The person of ordinary skill in the art would be familiar with electric smoking devices and the components and design considerations thereof.

30. I understand that the level of ordinary skill in the art proposed by Petitioner and Mr. Kodama is similar to that which I have proposed. *See* Pet. at 1; Ex. 1003, ¶¶ 17-19.

31. Based on my qualifications and experience, I am a person of greater-than-ordinary skill in the relevant art, even at the time of the invention, under either definition. Further, my opinions do not change regardless of which of which definition of a person of ordinary is adopted.

VIII. U.S. PATENT NO. 9,538,788 (EX. 1001)

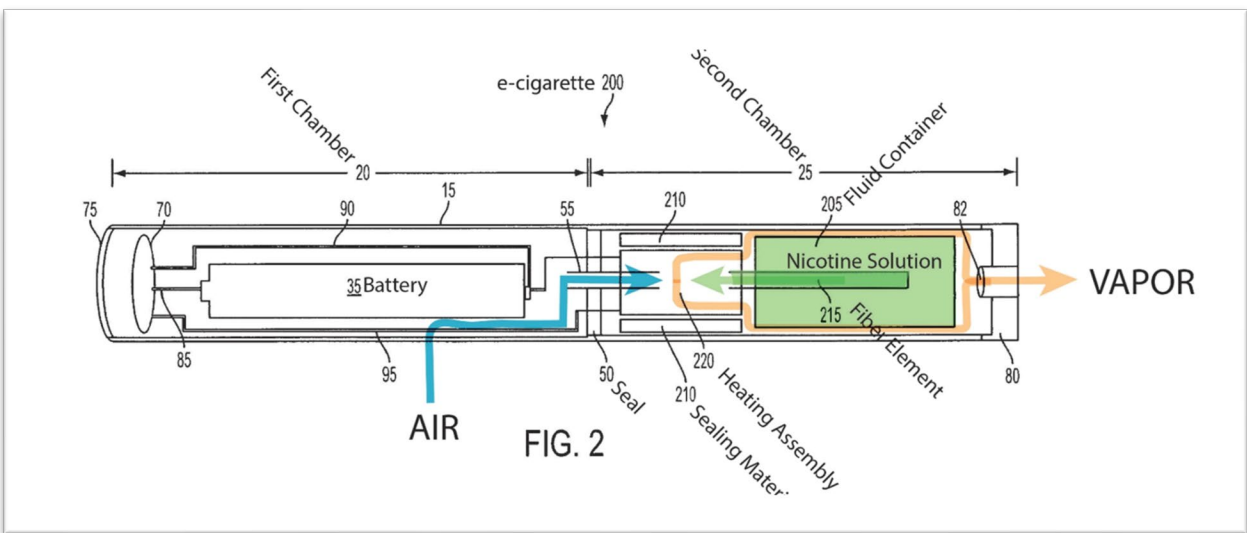
32. The ‘788 Patent, entitled “Electronic Cigarette,” issued on January 10, 2017, to inventors Gilbert Cyphert, Xuandong Huang, and Edwin Balder. Ex. 1001. The ‘788 Patent has a filing date of March 14, 2014, and a priority filing date of March 15, 2013.

A. The Invention of the ‘788 Patent

33. The ‘788 Patent is directed to an electronic cigarette comprising a casing having two chambers located sequentially and coaxially within the casing, a

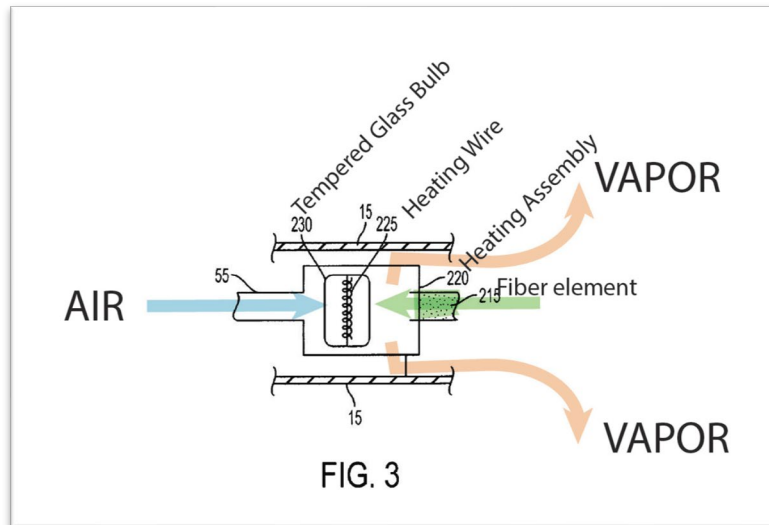
battery in the first chamber, a liquid or fluid in the second chamber, and a heating element in the second chamber. Ex. 1001, 4:62-5:15.

34. I have annotated the figures of the '788 Patent. The annotated figure shows air flow patterns indicated with blue arrows, fluid flavoring (e.g., the nicotine solution) is indicated in green arrows, and mixed air/fluid flavoring is indicated in orange arrows.



35. In the first chamber 20, there is an air inlet in the form of a hole or aperture located in the external wall of the casing 15 allowing the passage of air into the first chamber 20. *Id.* at 4:37-39. In the second chamber there is a fluid container 205 holding a liquid solution, a heating assembly 220 that includes a bulb having a heating element, and a fluid passageway communicating the fluid in the fluid container 205 to the bulb of the heating assembly, which is peripherally sealed 210 as to prevent air flow bypassing the heating assembly 220. *Id.* at 5:8-44. Air, which

is supplied from the exterior through an aperture and into the first chamber 20, is transported into the distal end of the heating assembly 220 through a tube 55 by virtue of the inhalation of the user. *Id.*



36. The heating assembly 220, as seen in figure 3, is axially positioned between the air supply via the air tube 55, entering the heating assembly 220 from the first chamber 20 at the distal end of the electronic cigarette 200, and the fluid passageway 215, which provides the liquid solution from the fluid container 205 at the proximal end of the electronic cigarette 200 in proximity to the inhalation aperture 82 at the end cap 80. Ex. 1001, 5:15-56, Fig. 3.

37. The heating assembly comprises a glass bulb 230 containing a heating wire 225 in communication with the battery 35, which is surrounded by a mixing section where the air and atomized fluid can be heated by the bulb and mixed prior to delivery to the user. *Id.*

38. The glass bulb 230 is heated by the wire 225 which is located inside of the bulb 230. *Id.* at 5:21-23. The heated glass bulb then, in turn, heats the air and vaporizes the liquid solution which passes over the outside surface of the bulb 230. *Id.* 5:25-27. The bulb provides an aerodynamic bluff body which promotes mixing of the air with the atomized solution. The air and nicotine solution are not brought into direct contact with the heating element 225. *Id.* at 5:33-35.

B. The Challenged Claims of the ‘788 Patent

39. The ‘788 Patent contains 13 claims, of which claim 1 is the independent claim.

40. I understand that RJRV has challenged the validity of claims 1, 7, 8, and 11 of the ‘788 Patent, and trial has been instituted for the same claims. Independent claim 1 recites as follows:

1. An electronic cigarette, comprising:
 - [1a] a casing comprising a first chamber and a second chamber, the two chambers located sequentially within the casing;
 - [1b] a battery located in the first chamber;
 - [1c] a fluid containing member located in the second chamber;
 - [1d] a heating assembly located in the second chamber, the heating assembly comprising a bulb containing a heating wire in communication with the battery;
 - [1d] a fluid passageway communicating between the fluid containing member and the heating assembly;
 - [1f] a tube element communicating between the first and second

chambers, with a first distal end of the tube element located in the first chamber, and a second distal end of the tube element located in the second chamber and affixed to the bulb, the tube element providing an air passage between the first and second chambers;

[1g] a sealing element forming a partition between the first and the second chambers; and

[1h] an air inlet provided on an external wall of the casing;

[1i] wherein the heating wire heats the bulb, and wherein the bulb heats fluid introduced to and coming in contact with the bulb through the fluid passageway.

41. Claim 1 of the '788 Patent highlights the features of a heating assembly comprising a bulb containing a heating wire in communication with the battery.

42. Claims 7, 8, and 11 depend from claim 1, respectively, and further limit the claim to include a removable sleeve that covers a portion or the entire casing and the fluid in the fluid containing member consist from a group of glycol fluid, fluid containing nicotine, a water-based flavored fluid, a water based menthol flavored fluid, and combination thereof. Ex. 1001, claims 7-8 and 11.

IX. CLAIM CONSTRUCTION

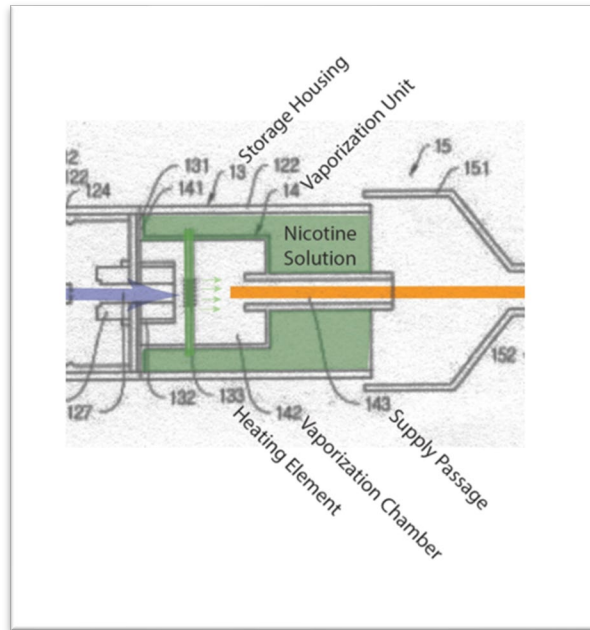
43. I understand that the claims should be construed using the same claim construction standard that would be used to construe the claim in a civil action. Thus, each claim term should be given its ordinary and customary meaning as understood

by a Person of Ordinary Skill in the Art (“POSA”) as of the priority date of the ‘788 Patent, which I understand it to be March 15, 2013.

X. OVERVIEW OF THE ALLEGED PRIOR ART

A. KR 2012-0080287 Lee (Ex. 1005)

44. Lee discloses an invention entitled “External Air Inlet Structure Applied to An E-Cigarette,” which comprises a first housing (or battery assembly 11) and a second housing (or a storage housing 13). Ex. 1005, Summary. The two housings are placed sequentially within the casing to form a cigarette-like device. *Id.* at Figure 1b. Within the first chamber, a battery 112 is located along with other components, such as an electronic circuit board 111, a pressure switch 117, and an LED (L). *Id.* at ¶ 22. At the distal end of the first housing is a tubular connection chamber 113 with a formed screw thread 116 formed on the outer surface for connection to the second housing. *Id.* at ¶ 23. On the outer cylinder surface of the connection chamber 113 is the air inlet hole D which allows air to enter into a guide groove D1 in the second housing, and into the vaporization chamber 142 through the air inlet 127. *Id.* at ¶¶ 24-25. A magnification of the portion of the e-cigarette in the vicinity of the vaporization chamber 142 is shown below, which I have annotated.



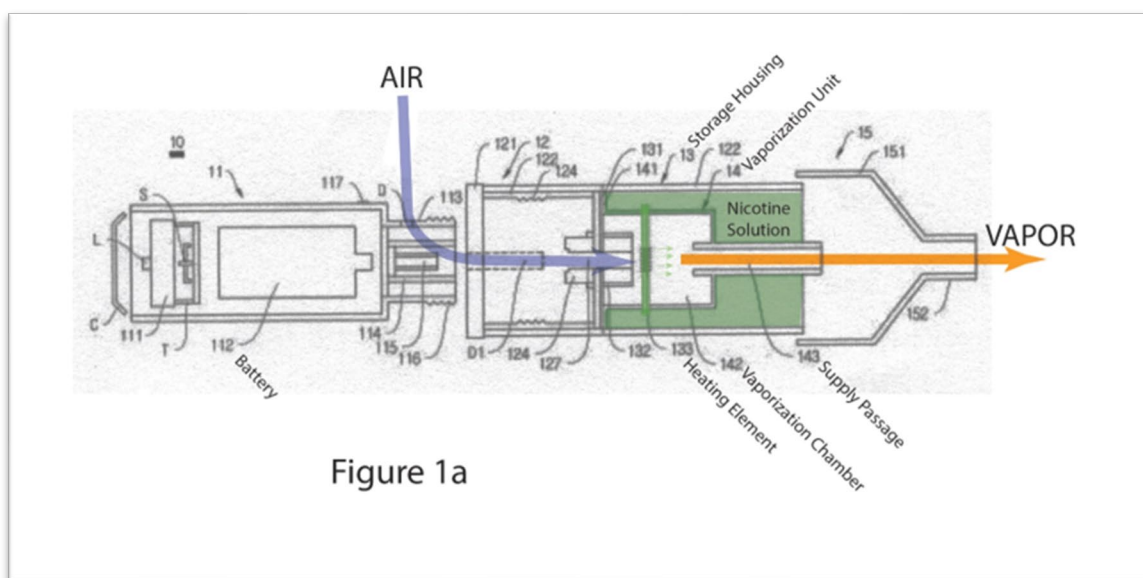
45. As Lee describes in ¶¶ 29-33, the air is introduced into the vaporization chamber 142 through air inlet 27, where it is “supplied to the heating element 133” and is heated. *Id.* Lee describes the heating element 133 as made of a nichrome wire and is shown as a cylindrical helical coil. *Id.* at ¶ 29. Although Lee suggests that other configurations are possible, it is readily apparent to a POSA that the nicotine solution that is being supplied from the storage housing 13 to the heating element 133, is done through a porous fiber aggregate rod F that makes contact with the wire. *Id.* at ¶ 32.

46. The fiber aggregate rod passes through the central interior portion of the helical heating element 133, which is the nichrome wire. *Id.* at ¶ 29. The fiber aggregate rod F acts as a wicking material in transporting the nicotine solution from the storage housing 13 to the interior portion of the coiled heating element 133,

where it is vaporized due to the heating. *Id.* The vaporized nicotine solution then mixes with the air in the vaporization chamber 142, which was directed by air inlet 27 to impinge upon the heating element 133. *Id.* at ¶¶ 28-29.

47. Lee appears to suggest that other configurations are possible. *Id.* at ¶ 29. However, Lee at no point discloses nor teaches other manners of supplying the nicotine solution to the heating wire aside from the shown cylindrical helical coil wrapped around the fiber. Indeed, Lee does not suggest, teach, or otherwise suggest a configuration whereby the nicotine solution is supplied by means external to the nichrome wire heating element.

48. As shown schematically below with my annotations, the air (blue) mixes with the vaporized nicotine solution (green) and is directed to the inhalation part 152 through supply passage 143. The vaporized mixture of heated air and nicotine solution is then inhaled by the user.



49. For Lee to be effective, the external air inflow structure of the e-cigarette must remain intact and unencumbered. The transfer of air from the exterior to the heating element is instrumental so that the nicotine solution being transferred from the fiber wick assembly to the interior of the heating element vaporizes easily. Ex. 1005, ¶ 13. Lee further describes that its external air inlet structure, which facilitates the introduction of air to the heating element (see annotated figure above), simplifies the wiring structure inside of the e-cigarette by ensuring that the air inlet passage has an electrode function to the heating element inside of the device. *Id.*

50. Accordingly, preserving the air inlet structure described in Lee is paramount to the effective operation of the Lee device, as its structural make-up provides an advantage of allowing external air to enter only through the specified air inlet to facilitate the inhalation of vaporized nicotine solution. *Id.*

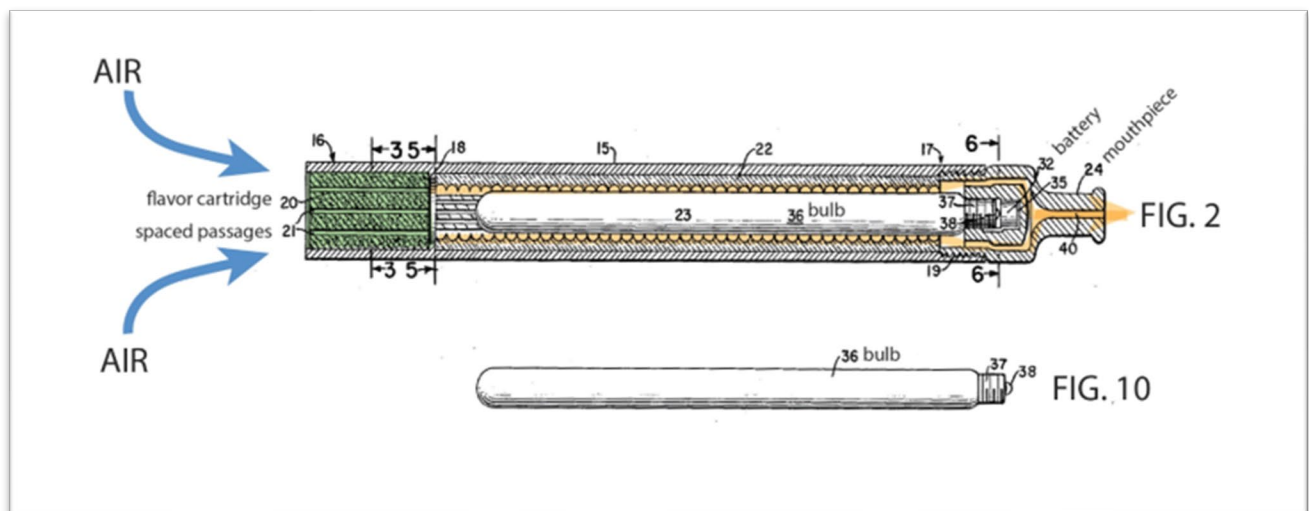
B. U.S. 3,200,819 Gilbert (Ex. 1004)

51. Gilbert discloses an electric (not electronic) smokeless nontobacco cigarette and has as an object to provide a safe and harmless means for smoking by replacing burning tobacco and paper with heated moist flavored air or by inhaling warm medication into the lungs in case of a respiratory ailment under the direction of a physician. Ex. 1004, 1:6-12.

52. The device is an article of manufacture resembling a cigarette by which air may be drawn through a porous substance of a cartridge which has been

moistened with a chemically harmless flavoring preparation combining moisture and taste. *Id.* at 1:5-35. The moist and flavored air passes through a section of the device heated by a suitable heating element, so the warm, moist, and flavored mixture air is drawn into the mouth and, if desired, into the lungs of the user. *Id.*

53. This is shown in the accompanying patent figures 2 and 10, reproduced below with annotations, where air flow patterns are indicated with blue arrows, flavor solution is indicated in green, and mixed air/solution vapor flows are indicated in yellow.



54. Gilbert's device comprises a cartridge connected axially and sequentially to a tube 15 and a mouthpiece 24. *Id.* at 1:62-70. Gilbert discloses the tube includes two sequential chambers that are subdivided by internal shoulders 18 into two chambers: a relatively short chamber, and (2) a substantially longer chamber. *Id.* at 1:65-71. Within the more forward chamber, proximate to the mouthpiece 24, the tube includes an insert 22 that includes a diameter to fit within

the insert 22 a bulb or tube 36, similar to a light bulb. *Id.* at 2:11-54. Within the first chamber, a cartridge 20 is disposed and abutted against the outer edge of the internal shoulders 18 of the tube. *Id.* at 2:6-10.

55. The outer end portion 16 includes a detachably fitted flavor cartridge 20. *Id.* at 2:3-10. The flavor is provided by some suitable absorbent material, preferably having longitudinally spaced passages 21 therethrough of a small diameter. *Id.* The cartridge 20 is abutted against the outer edge of the internal shoulder 18 and is of the external diameter to fit snugly into the outer end portion so that it will be held therein by friction or other suitable means. *Id.*

56. Gilbert discloses that a mouthpiece 24 is affixed to the inner portion 17 of the tube, and a battery 32 for powering a heating element comprising a heating bulb 36 is provided at the mouthpiece end of the cigarette. *Id.* at 2:16-72. The heating element is preferably a vacuum tube or bulb 36 having a screw plug 37 for detachably engaging with the socket in the screw plug 37. *Id.* The structure of the bulb 36, as disclosed by Gilbert, is similar to a light bulb and is preferably elongated and of a diameter to fit within the insert 22 in such a manner as to provide an elongated heating passage throughout the length of the bulb and around the complete circumference of the bulb 36. *Id.*

57. In operational use, inhalation will cause ambient air to be drawn through the passages 21 of the cartridge 20 which has been impregnated with suitable

flavoring material which is mixed with the inhaled air, and such air then passes into the heating chamber and is caused to flow around the heating bulb 36. *Id.* at 3:9-35. The heated and flavored air finally passes through the mouthpiece 24 into the mouth and, if desired, into the lungs. *Id.*

58. Gilbert expressly discloses that the tumbling of the air around the heat source provides for uniformity of heat transfer. *Id.* at 3:19-22. Therefore, the purpose of the bulb is to raise the temperature of the inhaling mixture, not the flavoring material in the cartridge 16. *Id.* at 3:9-16.

C. U.S. Pub. 2013-0298905 Levin (Ex. 1009)

59. Levin discloses an electronic vaporizing device that includes a heating unit, a power source, a grinding chamber, and sensors. Ex. 1009, ¶¶ 54-57. The heating unit comprises a heating element and a reflector that is positioned at a distal end of the coil of the heating element to reflect and direct radiant heat in the device. *Id.* at ¶ 49. The heating unit is a micro-convection heater that is designed in conjunction with its reflector to increase the heating efficiency inside of the device. *Id.*

60. Levin describes that the device “includes a bulb heater mounted on a lamp holder within a bulb chamber,” and that “[t]he bulb may be any bulb suitable for sufficiently heating the substance to vaporize an active ingredient therein for inhalation by the user.” *Id.* at ¶ 56. Levin also explains that “[i]n an embodiment

utilizing conductive heating in combination with radiative and convective heating, the bulb heater may protrude directly into the cavity or into the grinding cavity so that the glass bulb directly contacts the contents of the grinder.” *Id.*

61. Levin further discusses the vaporization of substances through convection, “has significant advantages over vaporization methods” that utilize conduction as a means for heating a substance. *Id.* at ¶ 35. Levin discloses the significant drawbacks for using conduction vaporization, stating that it can cause uneven heat distribution, undesirable overheating of the substance to be vaporized, or, in addition to the foregoing, caking or baking of the substance on the conductive material. *Id.* A POSA would understand the meaning of caking or baking to mean the accumulation of residue of the substance that builds up over time on the heating element.

62. Levin discloses several embodiments that include a distal grinder that includes a grinding cavity, and the grinder is configured to receive a substance in a cartridge that can be ground in preparation for vaporizing. *Id.* at ¶ 43. The cartridge includes a “conductive mesh” to conduct heat throughout the interior of the cartridge. *Id.* at ¶ 96. The mesh is disposed at the exit of the grinder portion to “prevent ground debris from falling out of the grinding chamber into the heating unit.” *Id.* at ¶ 74.

63. The heating element, which comprises the micro-convection heater,

makes contact with the mesh and, together with the reflector, heats the substance in the cartridge. *Id.* at ¶ 96. The substance does not make contact with the heating element and prevents the significant drawbacks of caking or baking. *See Id.* at ¶ 35.

D. U.S. Pub. 2011-0036346 Cohen (Ex. 1007)

64. Cohen discloses a personal inhalation device comprising an outer shell housing, an atomizing unit 14, a cartridge 16, and an electronic section 12. Ex. 1007, ¶ 17. The electronic section 12 includes a pressure transducer 28 comprising a reed switch disposed in a casing designed to react to pressure fluctuations in the first housing of the device and actuate the control electronics on the circuit board 40, amongst other electronic components therein. *Id.* at ¶ 21.

65. Cohen discloses that the electronic section 12 is connected to the atomizing unit 14 with the use of a screw-on connector, and that the cartridge of the device is connected to the electronic section 12 on the opposing end of the atomizing unit 14. *Id.* at ¶ 18. Cohen describes that the atomizing device is a heating coil positioned adjacent to the air passage 106 of the device, and further describes the atomizing device as “an ultrasonic atomizer.” *Id.* at ¶ 27.

66. According to Cohen, the device includes a cartridge 16 that is configured to store a deliverable medium, such as a fluid, to the atomizing unit 14 when the user draws on the inhalation device 10. *Id.* at ¶ 28. The cartridge in a disclosed embodiment includes a reservoir 118 that is mounted in the device in such

a manner as to allow air to flow around the reservoir 118 to the orifice 18 where the user draws on the device. *Id.* Inside the device is a wick 114 that is supported by a strut 110 that supports a metal mesh 112, with the wick extending toward the atomization chamber 104. *Id.*

67. Cohen discloses that when the device is in use, air flows through the air passage 106 into the atomization chamber 104 and the air is heated as it flows over the atomizing heating coil 108. *Id.* at ¶ 31. The heated air then passes over the wick 114, causing the substance that has been absorbed into the wick to be atomized, thereby creating a vapor containing the mixture of the substance and air. *Id.*

E. U.S. 9,943,107 Weigensberg (Ex. 1006)

68. Weigensberg discloses an electronic cigarette comprising, amongst other things, a first compartment for a battery 106 and a cartomizer 113 containing an atomizer 112, and a second compartment for an e-liquid. Ex. 1006, 3:43-65.

69. Weigensberg discloses that the e-liquid is atomized via air flow 108 that is generated when the user inhales on the device, thereby creating a pressure difference within the device that removes the e-liquid droplets from the e-liquid 110. *Id.* The cartomizer 113, as disclosed by Weigensberg, comprises the atomizer and the e-liquid and is referred to throughout the disclosure as a cartridge. *Id.* at 3:50-56

70. The e-liquid of the electronic cigarette includes a flavor enhancement flavor to the e-cigarette. *Id.* at 1:12-15. And the electronic cigarette includes a

removable wrap that envelops the flavored cartridge, which as disclosed by Weigensberg, is the cartomizer, sealing in and preserving the flavor of the e-liquid during storage or between uses of the device. *Id.* at 7:40-44.

XI. THE ASSERTED GROUNDS DO NOT RENDER OBVIOUS THE CHALLENGED CLAIMS OF THE ‘788 PATENT

A. Gilbert, either alone or in View of Cohen Do Not Render Obvious Claim 1 of the ‘788 Patent

71. I understand that Petitioner and Mr. Kodama have asserted that Gilbert alone, or in combination with Cohen discloses all of the elements of claim 1 of the ‘788 Patent. I disagree for the reasons discussed below. Consistent with my analysis, it is my opinion that a person of ordinary skill (“POSA”) would not have found that the challenged claim can be rendered obvious by Gilbert and Cohen.

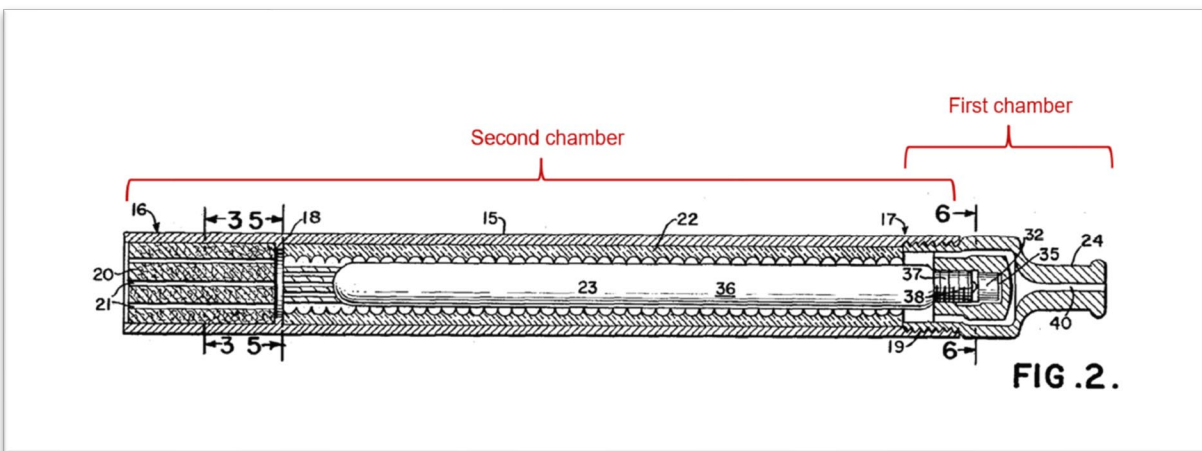
i. Gilbert does not disclose element [1c] of claim 1 - “fluid containing member located in the second chamber”

72. Element [1c] of claim 1 of the ‘788 Patent claims that “a fluid containing member [is] located in the second chamber.” Ex. 1001, 8:64. Petitioner alleges that Gilbert discloses element [1c]. Pet. 40. I disagree. While I agree with the Petitioner that Gilbert discloses a casing having an internal space that is subdivided into chambers, I do not agree with how the Petitioner has decided to forgo or otherwise ignore Gilbert’s explicit teaching as to how the internal space is separated into a “relatively short” chamber and a “substantially longer” chamber. Ex. 1004, 1:65-71. As expressed by Gilbert, the short and longer chambers are subdivided by

a partition wall, which Gilbert refers to as internal shoulders 18. *Id.* at 2:6-10, Fig. 7.

73. The internal shoulders 18 divide the internal space of the electric cigarette to provide a first chamber for the bulb 36 and battery 32, and a second chamber for the cartridge 20. *Id.* at 2:6-54. The cartridge 20 is disposed and abutted against a side of the outer edges of the internal shoulders of the tube. *Id.* This can be seen in Figure 2 of Gilbert. In light of this, a POSA would understand member 18 to be the element that partitions the first and second chambers.

74. In attempting to suggest that Gilbert teaches element [1c], Petitioner takes a self-serving reading of Gilbert and alleges that the second chamber comprises the length of the substantially long chamber together with the relatively short chamber. Pet. 42-43. For reference, reproduced below is the figure that Petitioner provides.



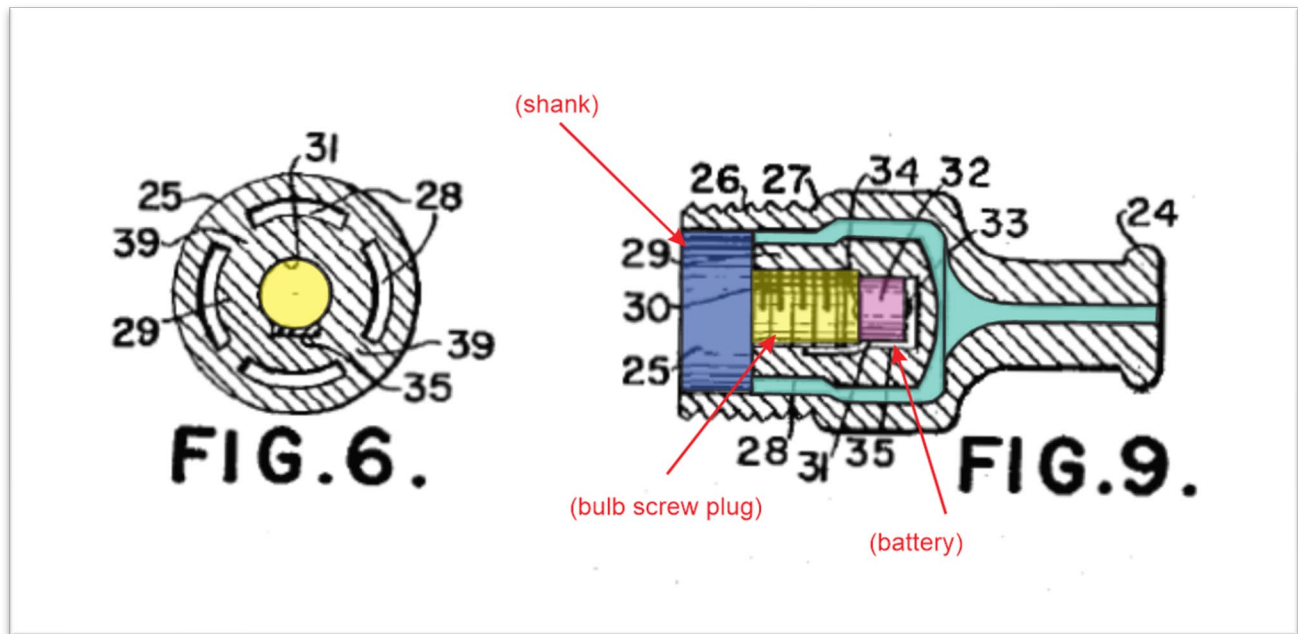
Id.

75. In support of Petitioner's view, Mr. Kodama opines that Petitioner's

assertion as to what separates the first chamber from the second chamber in the Gilbert device is the shank 25, and states “[a]s shown in Figures 6 and 9, the hollow shank portion 25 of the mouthpiece 24 (the first chamber) communicates with the tube 15 (the second chamber) through ‘air draft spaces 28 between the hollow shank 25 and connected therewith by radial arms.’” Ex. 1003, ¶ 94 (citing Ex. 1004, 2:31-36). According to Mr. Kodama, it is the shank 25 that partitions the chambers. Ex. 1003, ¶ 94. I disagree. Not only does Mr. Kodama point to the wrong element in his declaration (see annotated Fig. 2 after paragraph 96 in Mr. Kodama’s declaration), but the shank does not partition, in my opinion, the chambers as alleged.

76. Gilbert explicitly discloses that the bulb, configured to be disposed within the substantially longer chamber, includes a screw plug 37 with an end contact 38 that is intended to make contact against the outer battery contact 34. Ex. 1004, 2:46-50.

77. As shown in annotated figures 6 and 9, shown below, the hollow shank 25 includes a central aperture 31 (yellow) axially aligned with the substantially longer chamber for receiving therethrough the screw plug 37 (yellow) of the bulb 36. *Id.* at 2:41-45. The space in aqua illustrates the airflow that goes out when the user inhales on the mouthpiece. The battery, shown in purple, as disclosed by Gilbert, must be in contact with the end contact point of the bulb.



78. In light of this, A POSA, having reviewed the Gilbert reference, would have readily understood that the bulb 36 taught by Gilbert, together with the remainder of its disclosure, evidences that the bulb cannot be disposed of in separate chambers as alleged by Petitioner and Mr. Kodama. Therefore, the shank is not a partition that separates Gilbert's internal casing space into the first and second chambers.

79. If a POSA were to accept that the shank 25 in Gilbert's device is the partition that separates the chambers, the chambers would be partitioned in a manner that they'd be radially concentric. For example, the first chamber is where the screw plug (yellow) makes contact with the battery (purple), and the second chamber is where the air flows out (aqua). If that were the case, Gilbert would still fail to read on all of the elements of claim 1. A fact that a POSA would have understood upon

reading Gilbert.

80. For these reasons set forth above, I disagree with the Petitioner and Mr. Kodama that Gilbert discloses element [1c] of claim 1 of the '788 Patent. As discussed above, Gilbert explicitly states that its relatively short chamber and its substantially longer chamber are partitioned by internal shoulders 18, and not the shank 25, as alleged.

ii. Gilbert does not disclose element [1h] of claim 1 - “an air inlet provided on an external wall of the casing”

81. Petitioner asserts that Gilbert discloses “an air inlet provided on an external wall of its casing.” Pet. 46. In support of this, the Petitioner quotes Gilbert’s disclosure as to how the act of inhalation through the mouthpiece draws atmospheric air into the device to be impregnated with flavoring material and subsequently warmed by the heating bulb prior to consumption. *Id.* at 46-47 (citing Ex. 1004, 3:9-18). Alleging that “the air inlets [on the cartridge]... would open to the ambient air through the external wall of the casing.” Pet. 47, Ex. 1003, ¶ 97.

82. The cartridge 20 in the Gilbert device, however, is not a part of the casing. According to Gilbert, the cartridge, which includes the air inlets 21, is a removable, fitted flavor cartridge disposed in the outer end portion 16 of the tube 15. Ex. 1004, 2:3-6.

83. In light of this, I disagree with Mr. Kodama and Petitioner’s assertion that Gilbert’s external casing includes air inlet holes. Mr. Kodama’s declaration

offers nothing more than what is provided by the Petitioner. Ex. 1003, ¶ 97.

84. Moreover, a POSA would understand that Gilbert cannot be modified to include air inlet holes on its casing. Gilbert discloses that “air from the ambient atmosphere is drawn in through the passages 21 of the cartridge 20 which has been impregnated with suitable flavoring material which is picked up by the inhaled air and such air then passes into the heating chamber and is caused to flow around the heating bulb 36.” Ex. 1004, 3:10-15. It is “[t]he tumbling of the air around the heat source [that] provides for uniformity of heat transfer.” *Id.* at 3:19-20.

85. A POSA would not include air inlets on the casing because it would disrupt the airflow pathway from the cartridge through the heating source and into the mouth of the user for inhalation. If the casing included inlet holes, the air inside the substantially longer chamber, chamber 2, would either escape into the atmosphere or cool off as the chamber would no longer be insulated, which is required for the heating bulb to warm the flowing flavored air.

86. To this extent, it is my opinion that a POSA would understand that the external casing cannot include openings because it would otherwise prevent Gilbert’s device from operating as disclosed. For these reasons set forth above, I disagree with the Petitioner and Mr. Kodama that Gilbert discloses element [1h] of claim 1 of the ‘788 Patent, and agree with the Board’s analysis on this point in the Institution Decision. *See* Paper 7, p. 19

iii. Gilbert does not disclose element [1i] of claim 1 - “wherein the bulb heats fluid introduced to and coming in contact with the bulb through the fluid passageway”

87. It is my understanding that element [1i] of claim 1 of the ‘788 Patent claims that the bulb heats fluid from the fluid containing member when the fluid comes into contact with the bulb through the fluid passageway. Ex. 1001, 4:48-55; 5:25-27. Petitioner alleges that Gilbert discloses the same. I disagree.

88. As quoted by Mr. Kodama, Gilbert discloses “air mixed with the flavoring material” is what enters the heating chamber to be heated by the heating bulb of Gilbert. Ex. 1003, ¶ 98. Petitioner also affirms that it is the “inhalation mixture” that enters into the heating chamber to be heated by the heating bulb. Pet. 47.

89. A POSA would understand that the fluid from the fluid container in the Patent Owner’s claim being heated by the bulb is different and not the same as Gilbert’s disclosure of a mixture of air and flavoring. Consistent with this view, Gilbert discloses that the “air from the ambient atmosphere...impregnated with suitable flavoring material” is what “passes into the heating chamber and is caused to flow around the heating bulb.” Ex. 1004, 3:10-15. Therefore, it is not the fluid from the cartridge of Gilbert that makes contact with the bulb.

90. Gilbert cannot be modified to attain element [1i] of the ‘788 Patent either without substantially reconstructing Gilbert. The cartridge, which has been moistened with the flavoring, is designed to be penetrated by atmospheric air when

the user draws on the device. Ex. 1004, 1:14-21. For the fluid soaked into the cartridge, Gilbert's internal shoulder 18, which partitions the first chamber from the second chamber, must be modified to include additional structure to feed the flavored preparation directly to the heating bulb. A POSA, however, would be dissuaded from such a modification because the Gilbert device intends to warm the flavored air by circulating the air mixture around the heating element in a turbulent manner to raise the temperature of the mixture (i.e., convection) and not direct contact between the bulb and the fluid (i.e., conduction). *Id.* at 1:14-29; 3:19-38.

91. To the extent such modification was proposed by a POSA, for argument's sake, the purported modification would render Gilbert's device inoperable. Gilbert discloses an electric cigarette that uses a bulb energized when it makes contact with the battery. As long as the bulb is touching the battery, the circuit is complete, and the heating element is energized. The fluid making contact with the bulb would be continually vaporized, even when the user is not inhaling on the device, until the battery is exhausted. This would result in an unnecessary depletion of the battery and fluid. Therefore, in my opinion, a POSA would not be motivated to make such a change.

92. For these reasons set forth above, I disagree with the Petitioner and Mr. Kodama that Gilbert discloses element [1i] of claim 1 of the '788 Patent.

B. Lee, either alone or in View of Gilbert, and Levin Does Not Render Obvious Claim 1 of the ‘788 Patent

93. I understand that Petitioner and Mr. Kodama have asserted that Lee, either alone, or in combination with Gilbert and Levin renders obvious claim 1 of the ‘788 Patent. Notably, Mr. Kodama opines that claim 1 is invalid because Lee discloses all of the limitation of claim 1 except elements [1d] and [1i], requiring “the heating assembly comprising a bulb containing a heating wire” and “wherein the heating wire heats the bulb, and wherein the bulb heats the fluid introduced to and coming in contact with the bulb through the fluid passageway.” Ex. 1003, ¶¶ 115-119. I disagree for the reasons discussed below. It is my opinion that a person of ordinary skill (“POSA”) would not have been motivated to combine Lee with either Gilbert or Levin.

i. A POSA would not have been motivated to implement the heating element of Gilbert to the Lee device

94. Lee discloses an e-cigarette comprising a first housing for battery assembly 11 and a second housing or a storage housing. Ex. 1005, Summary. The two housings are placed sequentially within the casing to form a device resembling a cigarette. *Id.* at Figure 1b. Within the first chamber, the battery 112 is located along with other electronic components that include an electronic circuit board 111, a pressure switch 117, and an LED (L). *Id.* at ¶ 22. At the distal end of the first housing is a tubular connection chamber 113 with a formed screw thread 116 formed on the

outer surface for connection to the second housing. *Id.* at ¶ 23. On the outer cylinder surface of the connection chamber 113 is the air inlet hole D, which allows air to enter into a guide groove D1 in the second housing, and into the vaporization chamber 142 through the air inlet 127. *Id.* at ¶¶ 24-25.

95. The air introduced into the vaporization chamber 142 of the Lee device is through air inlet 27, where it is “supplied to the heating element 133” and is heated. *Id.* at ¶¶ 29-33. Lee’s heating element 133 is a nichrome wire and is shown as a cylindrical helical coil and the liquid nicotine solution that is being supplied from the storage housing 13 to the heating element 133, is done by wicking it through a porous fiber aggregate rod F that makes contact with the wire. *Id.* at ¶¶ 29, 32.

96. Petitioner states that it would have been obvious to a POSA to have modified Lee’s nichrome wire to include a bulb as described in Gilbert. Pet. 56. The proposed motivation for a POSA to embark on such an endeavor would be to explore alternative types of heating elements. While a POSA might have explored alternative heating wires, such as Kanthal as opposed to Nichrome, I disagree that a POSA would have been motivated to modify Lee to use the bulb of Gilbert.

97. As I understand it, Mr. Kodama references several online sources to discuss the motivation for modifying Lee. Ex. 1003, ¶¶ 117-119; Exs. 2004 – 2006. I have reviewed those references Mr. Kodama cites in his declaration, and it is my opinion that those references support the notion that a POSA would have naturally

explored alternative wires to use in the Lee device, as opposed to the nichrome wire wrapped around the fiber aggregate rod. *See* Ex. 1005, ¶ 29. A POSA would have wanted to explore alternative wires to determine whether one wire, as opposed to another, would improve the efficiency of the device – a topic which is what these references demonstrate. I disagree, however, with Mr. Kodama’s opinion that a POSA would add a bulb to the nichrome wire as claimed in his declaration. Ex. 1003, ¶ 118.

98. Mr. Kodama opines that a POSA would have been motivated to implement a heating element covered by a glass bulb to increase the life of the heating element and prevent failure of the device. Ex. *Id.* at ¶ 119. Mr. Kodama, however, provides no life-cycle analysis, cost-benefit analysis, customer acceptability surveys, or any corroborative evidence to support his opinion. As far as I can tell, his conclusion is conclusory and assumes, based on the teachings of the ‘788 Patent, what a POSA would have been motivated to do, i.e., use a glass bulb in lieu of a wire to prolong the life of the device.

99. Nothing that I have reviewed makes it clear that it would have been obvious for a POSA to choose one configuration over the other without extensive analysis and experimentation. On the contrary, Lee’s design, as disclosed to include direct contact of the nicotine solution and the air with the heating coil, diminishes thermal resistance and enables the device to be more responsive. Indeed, the

references Mr. Kodama relies upon to formulate his opinion strengthen the idea that it is more likely that a POSA would be motivated to look for a different wire to replace the nichrome wire at the time of filing the '788 Patent, as opposed to modifying Lee's nichrome wire with a bulb. *See* Ex. 2003, 18:9-19:1, 24:24-25:7, 25:8-13, 26:3-5. It is my understanding that it is impermissible to reconstruct the '788 Patent through hindsight reasoning.

100. I also disagree with Mr. Kodama's opinion that "it would have been obvious to modify the Lee device to include a bulb structure similar to that of the bulb structure in the Gilbert device," as such a modification would render Lee inoperable and go against Lee's intended purpose.

101. As disclosed in Lee, the purpose of the invention is to efficiently transfer air from the exterior to the heating element so that the nicotine solution being transferred from the fiber aggregate rod to the heating element vaporizes easily. Ex. 1005, ¶ 13. Lee further discloses that its external air inlet structure is what facilitates the introduction of air to the heating element. *Id.* An annotated depiction of this is shown below.

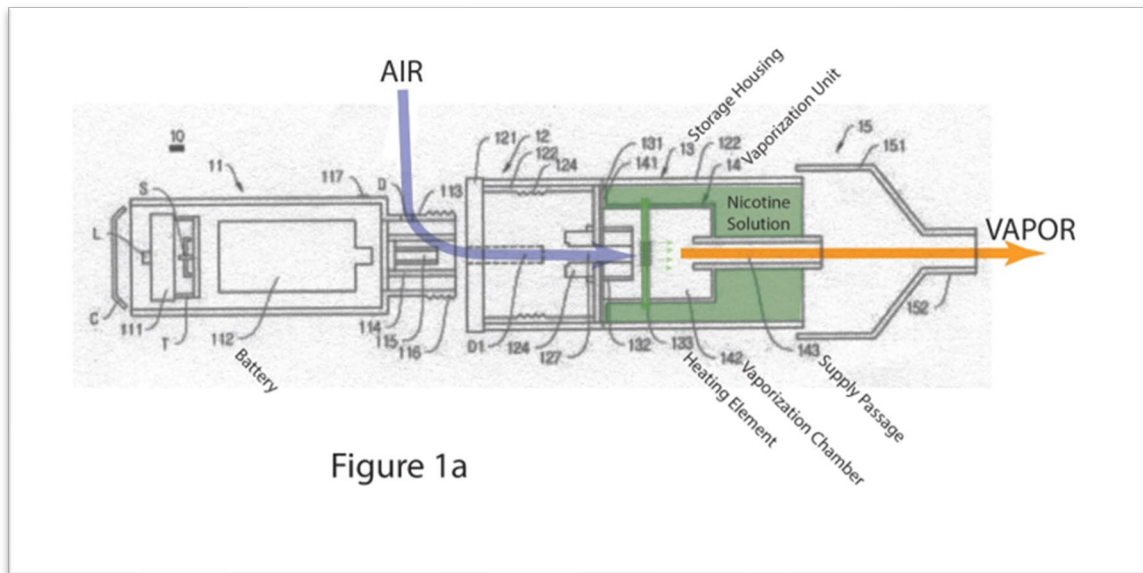


Figure 1a

102. Gilbert discloses “an elongated bulb” to fit within the substantially longer chamber (chamber 2) of the device “to provide an elongated heating passage throughout the length of the bulb and around the complete circumference of the bulb 36.” Ex. 1004, 2:50-54. Lee’s bulb is also designed to make contact with the battery. Ex. 1004, 2:46-50, 2:61-66 (“the bulb 36 [is] mounted to the socket 30 while the mouthpiece 24 is detached from the tube 15”...the bulb 36 includes a screw plug 37 that makes direct contact with the battery contact 38).

103. If a POSA were to modify Lee to include a similar bulb as taught by Gilbert, on one end, Lee’s entire second chamber would be occupied with the bulb. This would disrupt or otherwise obstruct the internal space of the second chamber to the extent that it would obstruct any flavored air from exiting the mouthpiece. On the opposing end, because the bulb described by Gilbert must make contact with the battery, the bulb would have to traverse the air inlet 127, disrupting or otherwise

obstructing the external air flow (in blue) from reaching the heating element.

104. To adapt Gilbert's bulb to Lee, a POSA would understand that Lee would have to be significantly modified to include, at least, an attachment socket to affix the screw plug end of the bulb and the chambers would have to be modified to accommodate the elongated bulb design. Additionally, the battery placement of the Lee device would need to be modified to come into contact with the screw plug end of the bulb, or an additional modification would have to be made to the Lee device so that the bulb makes contact with the battery, as disclosed. Neither Kodama nor the Petitioner explains how the Lee device, as proposed to be modified, would deliver the liquid nicotine solution to the bulb since such a modification would preclude the use of a fiber wick running through the heating coil.

105. Therefore, it is my opinion that a POSA would have known at the time of filing the '788 Patent that Gilbert's bulb cannot be used to modify Lee without either rendering Lee inoperable or requiring that Lee be significantly modified.

ii. A POSA would have been dissuaded from implementing the heating element of Levin to the Lee device

106. In the alternative to Gilbert, Mr. Kodama opines that it would have been obvious to use the bulb heater described in Levin. Ex. 1003, ¶ 120. Mr. Kodama and the Petitioner also assert that the Levin bulb is meant for conductive heating of a solution. Pet. 59, Ex. 1003, ¶ 122 (citing Ex. 1009, ¶ 56). After a careful review of the Levin reference, I disagree.

107. Levin discloses a heating unit comprising a micro-convection heater that includes a heating coil and a reflector designed to rapidly heat the air passing over and through the unit. Ex. 1009, ¶ 49. The micro-unit heater is consistent with Levin’s aversion to conduction heating. *Id.* at ¶ 35 (“[c]onduction can cause uneven heat distributions, undesirable overheating of the substance to be vaporized, and/or “caking” or “baking” of the substance on the conductive material that often results in build-up of the “caked” substance requiring cleaning or replacement of the heating component ... [v]aporizing a selected substance using convection and radiation, in accordance with various embodiments of the present invention, has significant advantages over vaporization methods used in conventional devices...[that] utilize conduction, either as a primary or a secondary heating method”). *Id.*

108. Levin discloses in paragraph 56 that the heating unit may, in one exemplary embodiment, make contact with the contents of the grinder. *Id.* at ¶ 56. This content comprises tobacco leaves, herbal, or plant matter. *Id.* at ¶ 68. In other words, the grinder breaks down dry matter, not fluid, to a physical state that is easier to burn. The heating unit then vaporizes the dry matter. *Id.* Moreover, Levin discloses that a mesh is disposed between the ground debris and the heating unit to prevent the debris from making contact with the heating unit. *Id.* at ¶ 74. Therefore, a POSA would have found at the time of filing the ‘788 Patent that the Levin device was configured to vaporize grounded debris substances without the substance

making contact with the heating unit.

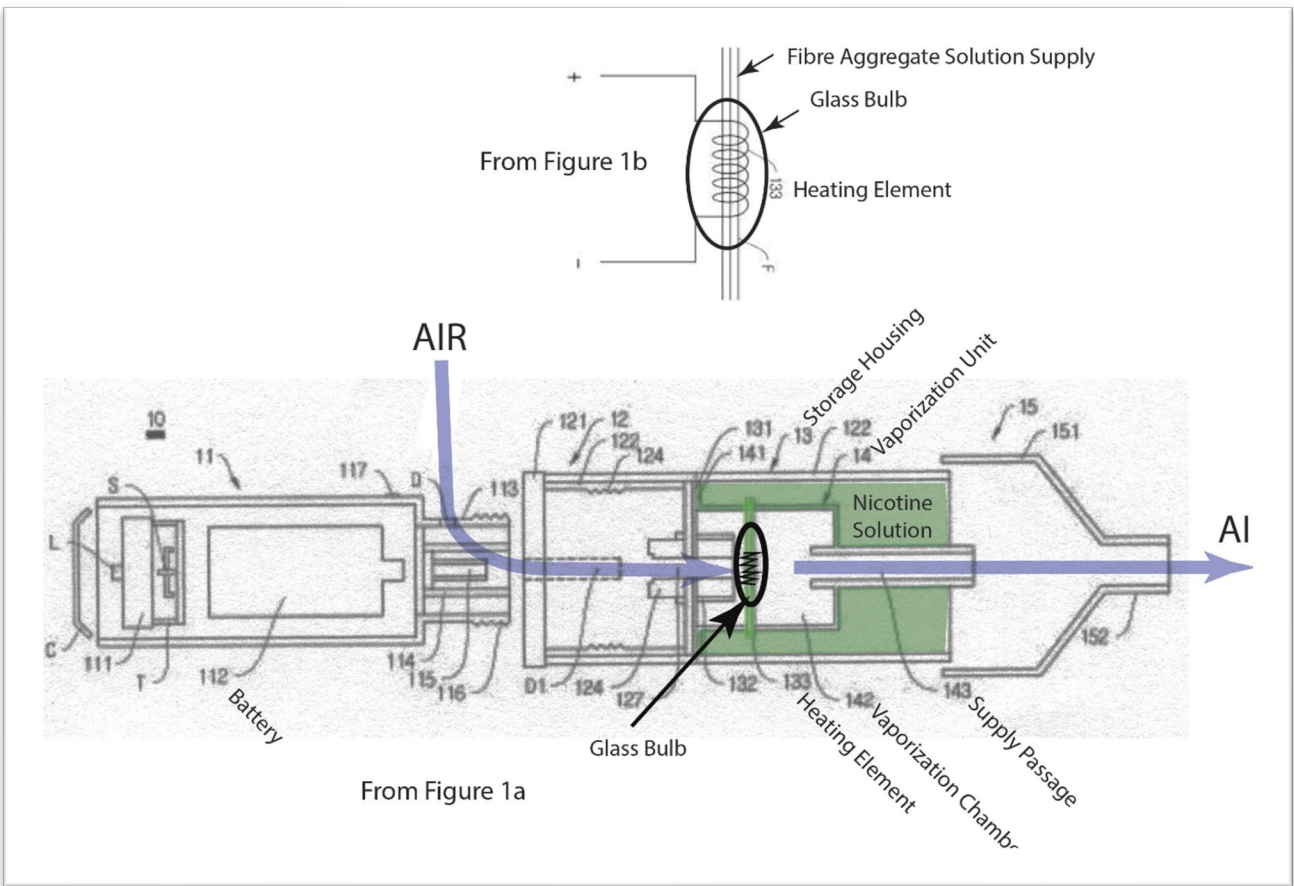
109. I also disagree with Mr. Kodama's assertion that a POSA would have readily implemented a heating element, such as the one taught by Levin, by replacing the nichrome wire in Lee with the micro-convection heater unit in Levin. Ex. 1003, ¶¶ 122-123.

110. Lee expressly discloses that the fiber aggregate rod that passes through the central interior portion of the helical heating element 133, which is the nichrome wire and acts as a wicking material in transporting the nicotine solution from the storage housing 13 to the interior portion of the coiled heating element 133, where it is vaporized due to the heating. Ex. 1005, ¶ 29. With the removal of the nichrome wire, the fiber aggregate rod would also have to be removed. This would prevent the nicotine solution from reaching the heating unit, rendering Lee nonfunctional. Lee would also have to be modified to incorporate the reflector of the heating unit taught by Levin.

111. Alternatively, a POSA might wish to design around this difficulty by modifying the structure surrounding the aggregate rod, which would result in a substantial reconstruction in at least the supply passage, the support structures supporting the nichrome wire and rod, and the vaporization chamber so that there is space for Levin's reflector and Lee's fiber aggregate rod to continue to make contact with the heating unit.

112. This approach, however, would not have been obvious to a POSA because Levin's micro-convection heating unit was not designed to contact the fluid. As described above, Levin's micro-convection heating unit is designed to vaporize fluid through convection.

113. I also disagree with Petitioner's assertion that a POSA would have been motivated to implement Lee's nichrome wire within a glass bulb. Pet. 58. Any attempt to encapsulate the heating element in the Lee design with a glass bulb would also encapsulate the supply of the nicotine solution being supplied from the fiber aggregate rod that passes through the nichrome wire. *See* Ex. 1005, ¶ 28. The result would be a nonfunctional device, as the nicotine solution would not be able to mix with the air. Although air could still pass through the device, the inhaled air would be unflavored. A POSA would not have been motivated to encapsulate Lee's nichrome wire with glass. This is shown in the following modified version of Lee Figs. 1a and 1b, below, which show the resulting flow configuration when the a element 133 encapsulates the nicotine solution supplying member. This demonstrates that the proposed change by Mr. Kodama would render Lee nonfunctional.



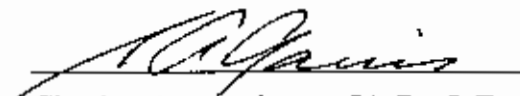
114. A POSA might wish to design around this difficulty, but in doing so would have to uncouple the fiber aggregate rod from the heating element and substantially redesign the vaporization chamber.

115. Therefore, it is my opinion that a POSA would not have been motivated at the time of filing the '788 Patent to modify Lee with Levin.

I declare under penalty of perjury that, to the extent of my knowledge and belief, the foregoing is true and correct. I further declare that all statements made herein are of my own knowledge and 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

understanding that knowing and 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.

Executed on June 17, 2025 in Oakton, Virginia


Charles A. Garris, Jr., Ph.D., P.E.

APPENDIX A

Exhibit No.	Description
1001	U.S. Patent No. 9,538,788 (“Cyphert”)
1002	File History for ‘788 Patent
1003	Mr. Kelly Kodama Declaration
1004	U.S. Patent No. 3,200,819 (“Gilbert”)
1005	KR Publication 2012-0080287 and Certified Translation (“Lee”)
1006	U.S. Patent No. 9,943,107 (“Weigensberg”)
1007	U.S. Patent Application Publication No. 2011/0036346 (“Cohen”)
1008	Mr. Kelly Kodama CV
1009	U.S. Patent Application Publication No. 2013/0298905 (“Levin”)
1010	U.S. Patent No. 1,934,887 (“Robinson”)
1011	U.S. Patent No. 2,204,312 (“Huxter”)
1012	U.S. Patent No. 2,588,471 (“Bauer”)
1013	U.S. Patent No. 2,694,771 (“Cox”)
1014	U.S. Patent No. 7,458,374 (“Hale”)
1015	U.S. Patent Application Publication No. 2013/0220316 (“Oglesby”)
1016	HCMC patent infringement complaint against RJRV
1017	HCMC Motion opposing RJRV Motion to Dismiss complaint
1018	U.S. Patent Application No. 61/7137,847
1019	U.S. Patent No. 2,057,353 (“Whittemore”)
1020	WO Publication No. 2009/132793 (“Thorens”)
1021	U.S. Patent No. 8,314,591 (“Terry”)
1022	U.S. Patent Application Publication No. 2005/0016550 (“Katase”)

1023	U.S. Patent No. 9,408,416 (“Monsees”)
1024	U.S. Patent No. 7,920,777 (“Rabin”)
1025	Challenged Claims Chart for U.S. Patent No. 9,538,788
2001	Declaration of Charles A. Garris, Jr., Ph.D, P.E. In Support of Patent Owner’s Response (“Garris”)
2002	<i>Curriculum Vitae</i> of Charles A. Garris
2003	Deposition Transcript of Kelly R. Kodama, dated March 30, 2025 (“Kodama Tr.”) with
2004	Exhibit F to Kodama Tr.
2005	Exhibit G to Kodama Tr.
2006	Exhibit H to Kodama Tr.