

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Nu Mark LLC
Petitioner

v.

Fontem Holdings 1, B.V.
Patent Owner

Case IPR. No. **Unassigned**
U.S. Patent No. 9,326,550

**Declaration of John M. Collins, Ph.D. in Support of
Petition For Inter Partes Review
of U.S. Patent No. 9,326,550
Under 37 C.F.R. § 1.68**

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I, Dr. John M. Collins, hereby declare as follows:

I. INTRODUCTION

1. My name is John M. Collins. My findings, as set forth herein, are based on my education and background in the fields discussed below.

2. I have been retained on behalf of Petitioner Nu Mark LLC (“Petitioner” or “Nu Mark”) to provide this Declaration concerning technical subject matter relevant to the *inter partes* review petition (“Petition”) concerning U.S. Patent No. 9,326,550 (Ex.1001, the “550 Patent”). I reserve the right to supplement this Declaration in response to additional evidence that may come to light.

3. I am over 18 years of age. I have personal knowledge of the facts stated in this Declaration and could testify competently to them if asked to do so.

II. BACKGROUND AND QUALIFICATIONS

4. I am the Chief Operating Officer at the Consortia for Improving Medicine with Innovation and Technology (CIMIT), a non-profit consortium of Boston’s leading teaching hospitals and universities along with a growing list of national and international affiliates. I am also Chief Technology and Innovation Officer for Reed Collins, LLC. I have worked at CIMIT since 2008. Much of my responsibility is to facilitate collaboration among scientists, engineers, clinicians and entrepreneurs to speed the discovery, development, and implementation of

medical innovations. I focus on assisting investigators in moving technologies from the lab into products and services that improve patient care. For example, I assisted the transition of a simulation technology that helps in the training of Army medics to a leading international simulation company. That product is now being marketed under the name Caesar by CAE Healthcare.

5. I received a Ph.D. (1988) and M.S. (1982) in mechanical engineering from the Massachusetts Institute of Technology (MIT), as well as a B.S. (1980) in mechanical engineering, with a minor in economics, from Rensselaer Polytechnic Institute (RPI). At MIT, I worked in the Fluids Lab under the direction of Professors Asher Shapiro and Roger Kamm. My academic work focused on mechanical engineering with a concentration on heat/mass transfer, with my Ph.D. and M.S. theses applying these principles to pulmonary dynamics. My M.S. thesis was on high frequency ventilation: at the time a novel way to ventilate babies without over-pressurization of the lung, avoiding damage to the lung during ventilator assist. My Ph.D. thesis was on analytical and numerical modeling of forced exhalation from the lung. The results were a computational model of the lung that allowed for more sophisticated diagnostics based on the results of the simple Forced Expiration Pulmonary Function (FEPF) test.

6. I have over 34 years of product design, development and consulting expertise covering a wide range of industries and products. Over that

time, I have had a consistent focus on medical devices and related technologies, which includes my particular expertise in design, fluid mechanics and heat/mass transfer. In addition to doing engineering work, my responsibilities have included assembling and managing teams to develop new consumer, industrial, and professional products. My CV is attached as Ex.1004.

7. Prior to 2008, I held various leadership positions at technology and product development companies. From 1982-1986, I worked at Booz, Allen & Hamilton, where I developed products such as the Regina Rug Scrubber, which utilized a venturi sprayer to dispense a soap and water solution evenly over floor surfaces. After taking time to return to MIT and complete my PhD, I was then employed by Arthur D. Little (“ADL”) from 1988-2002. I joined ADL as a design engineer and helped to form its medical products business. I progressed to being responsible for the Technology and Innovation (T&I) Directorate, with more than 250 staff.

8. From 2002-2008, I worked in close collaboration with CEO and owner, Dr. Kenan Sahin, to form TIAX from the resources of the ADL T&I Directorate. TIAX is a privately held technology transformation organization focused on advancing and developing technologies for commercialization in several core technology areas, including clean energy and materials, health and wellness, appliances and HVAC systems, and enhanced security. During my

tenure at TIAX, part of which I served as president, the World Economic Forum recognized TIAX as a Technology Pioneer in 2002 and as a New Champion in 2007. For a full list of my employment history, see my CV, Ex.1004.

9. My experiences cover a broad technology base across a diverse set of industries, including in the areas of medical devices, energy, consumer products, emission technology for automobiles, and alternative smoking products. By way of example, while at ADL, I worked with Philip Morris USA (“PM USA”)—which I have been informed is affiliated with the Petitioner—on an alternative smoking product called Accord that was battery-powered and puff-activated. Also while at ADL, and then continuing that work at TIAX, I worked on several related projects in conjunction with an affiliate of PM USA called Chrysalis Technologies, Inc. (“Chrysalis”). These projects built off of and utilized prior capillary aerosol generator research and development at PM USA and Chrysalis—the results of which are reflected in patents such as U.S. Pat. No. 5,743,251 to Howell et al.; U.S. Pat. No. US 6,501,052 to Cox et al.; and U.S. Pat. No. 6,491,233 to Nichols—and applied it to efforts to atomize liquid fuel. One application was for a low-power, fuel based electric power generator and another was for a clean emission “coldstart” fuel injector for automobiles. By way of further example, I have worked with General Motors to help develop an anti-lock hydraulic braking systems, Baxter Healthcare to help develop a blood/fluid warmer

based on the analytical optimization of the thermal performance of “conventional” resistance heating technology, Bausch & Lomb to help develop a microsurgical fluid management system that allowed the surgeon to control the flow or pressure of irrigation fluid, General Electric Appliances to help develop a coffee maker that managed the heat applied to water and coffee grounds to deliver high quality coffee without humidity damaging the surrounding cabinets, the Regina Corporation to help develop cleaning technology, and the Engelhard Corporation to help develop a system that applied a liquid-containing metal into a porous substrate and then dry it uniformly.

10. I have also performed services in numerous patent disputes as an independent technical expert and consultant and as an expert witness. I have consulted as an expert in matters involving the design of a variety of medical devices. *See* Ex.1004. Of particular relevance to this matter, I previously filed declarations in support of petitions in IPR2014-01300, challenging U.S. Pat. No. 8,490,628 (“the 628 Patent”), and IPR2014-01289, challenging U.S. Pat. No. 8,393,331 (“the 331 Patent”). Both of those petitions were instituted. In addition, I recently provided declarations in pending IPRs 2016-01283, -01288, -01438, -1641, -1642, -1664, and -1668 which challenge the 628 Patent, U.S. Pat. No. 8,893,726 (“the 726 Patent”), the 331 Patent, U.S. Patent No. 9,326,548 (“the 548 Patent”), U.S. Patent No. 9,370,205 (“the 205 Patent”), U.S. Patent No. 9,326,549

(“the 549 Patent”), and U.S. Patent No. 9,364,027 (“the 027 Patent”), respectively.

Those declarations explain why the patents challenged are invalid for reasons that are similar in substance to those explained in this declaration.

11. I also have experience as an innovator and inventor. I am a named inventor on more than 20 U.S. patents, with foreign counterparts in addition, on new products and manufacturing processes. *See* Ex.1004.

12. I have been retained on behalf of Petitioner and real party in interest Nu Mark to offer opinions generally regarding the validity, novelty, prior art, obviousness considerations, and understanding of a person of ordinary skill in the art in the industry as it relates the 550 Patent.

13. I am being compensated at a rate of \$400 per hour for my services. My compensation does not depend on the outcome of this Petition or on the pending litigation between Petitioner and Patent Owner, and I do not have any financial interest in the Petitioner (or any of its affiliates), the Patent Owner, or the 550 Patent.

14. In developing my opinions below relating to the 550 Patent, I have considered the materials cited and discussed herein and in the accompanying Petition.

III. THE 550 PATENT

15. The 550 Patent, entitled “Electronic Cigarette,” states that it was filed on May 22, 2015 and issued May 3, 2016. The 550 Patent generally describes “an improved electronic cigarette” that consists of “a battery assembly, an atomizer assembly and a cigarette bottle assembly.” *See* Ex.1001 at 1:33-34. The battery and atomizer assemblies are “connected through screw thread electrode[s] into an electronic cigarette.” *Id.* at 1:66-2:1. The “cigarette bottle assembly is inserted into the other end of atomizer assembly.” *Id.* at 1:36-37. According to the 550 Patent, “[u]se of the electronic cigarette reduces cancer risks and fire hazards while providing a simulated smoking experience.” *Id.* at 1:38-40.

16. The challenged claims of the 550 Patent (claims 1-12) are generally directed to a “vaporizing device” that comprises an electronic cigarette with a battery assembly and an atomizer assembly connected via screw thread electrodes. *See id.* at claim 1. The claims also require a “liquid supply in the tubular atomizer assembly housing.” *See id.*

IV. LEVEL OF ORDINARY SKILL IN THE ART

17. I have been instructed for purposes of this Declaration, and unless otherwise noted, to opine on the knowledge and understanding of one of ordinary skill in the art as of the pertinent dates of the prior art reference, applications, and patents discussed herein. I understand that the factors that may

be considered in determining the ordinary level of skill in the art include: (1) the level of education and experience of persons working in the field; (2) the types of problems encountered in the field; and (3) the sophistication of the technology. I understand that a person of ordinary skill in the art is not a specific individual, but rather is a hypothetical individual having the qualities reflected by the factors above.

18. In my opinion, a person of ordinary skill in the aspects pertinent to the 550 Patent would be a person with a Bachelor of Science degree in mechanical engineering, or a similar technical degree, along with at least 3-5 years of experience in designing and developing handheld devices with thermal management and fluid handling technologies. A higher level of education may substitute for a lesser amount of experience, and vice versa. My opinions are based on my engineering experience and my experience in forming and managing development engineering design teams, including the team contributing to the development of electrically heated cigarette products and electrically heated aerosol devices in the year 2000 timeframe. I base this opinion on the level of technical training required to reduce to practice the electronic cigarette embodiment described in the 550 Patent and the relevant prior art, my reading of the 550 Patent, relevant prior art, and technical literature associated with electro- and mechanical engineering generally and thermo-fluid as well as inhalation

technologies more specifically, my own commercial experience in designing and developing consumer products with thermo-fluid management features, my commercial experience working with these types of systems at ADL and TIAX, and my commercial experience consulting and managing in many cases involving these types of systems.

19. For purposes of this Declaration, unless otherwise noted, my statements and opinions below, such as those regarding my experience and the understanding of a person of ordinary skill in the art generally (and specifically related to the prior art reference, applications, and patents I analyzed herein), reflect the knowledge that existed as of the pertinent date of such item. As of all such dates and timeframes discussed herein, I would have qualified as one of skill in the art according to the above definition.

V. CLAIM CONSTRUCTION

20. I understand that in deciding whether to institute *inter partes* review, “[a] claim in an unexpired patent shall be given its broadest reasonable construction in light of the specification of the patent in which it appears.” 37 C.F.R. § 42.100(b). I understand that this claim construction standard is different from—and potentially broader than—that applied in district court (*Phillips* standard). I further understand that “the broader standard serves to identify ambiguities in the claims that can then be clarified through claim amendments.”

Final Rule, 77 Fed. Reg. 48680, 48699 (Aug. 14, 2012). I therefore applied claim constructions that are consistent with the broadest reasonable construction of the claims of the 550 Patent in forming my opinions. Although I have proposed specific constructions for the claim terms below, I have applied the broadest reasonable standard throughout my analysis.

A. “Electronic Cigarette” (Claims 1-8)

21. I understand that in IPR2015-00098 (Ex.1015, “IPR2015-00098”), which challenged the patent (U.S. 8,375,957) that issued from the 550 Patent’s parent application, Patent Owner filed a preliminary response proposing that “electronic cigarette” be construed as “a device that simulates the feel and experience of a cigarette or cigar without burning.” For purposes of this declaration I have adopted and applied that construction.

B. “Atomizer” (Claims 1-8)

22. I also understand that Patent Owner construed the term “atomizer” in IPR2015-00098 as “a component that converts liquid into aerosol or vapor.” For purposes of this declaration I have adopted and applied that construction.

C. “Porous Body” (Claims 1-8)

23. I also understand that Patent Owner construed the term “porous component” in IPR2015-00098 as “a material that is full of interconnected pores

into which liquid or gas is absorbed or diffused.” For purposes of this declaration I have adopted and applied that construction.

VI. LEGAL STANDARDS

A. Anticipation

24. I have been advised that if each and every element or step of a claim is disclosed within the “four corners” of a prior art reference, that claim is said to be “anticipated” by that single prior art reference and is unpatentable under 35 U.S.C. § 102 because the claimed invention is not, in fact, new or novel.

25. I also have been advised that a prior art reference can disclose a claim feature because the feature is expressly described, or because the feature is inherent in the disclosure. I understand that something is inherent in a prior art reference if the missing descriptive matter must necessarily be present, and it would be so recognized by a person of ordinary skill in the art. I also understand that inherency cannot be established by probabilities or possibilities, and that the mere fact that something may result from a given set of circumstances is not sufficient to show inherency.

26. I have been asked to consider the validity of the challenged claims. I have concluded that each of the challenged claims is unpatentable at least under 35 U.S.C. §102 based on the reference described below.

B. Priority Dates and Written Description

27. I have been advised that a patent’s claims are not entitled to an earlier priority date merely because the patentee claims priority. It is my understanding that a patent application is entitled to the benefit of the filing date of an earlier filed application only if the disclosure of the earlier application provides support for the claims of the later application, as required by the written description requirement of 35 U.S.C. § 112. Such a requirement is only fulfilled if disclosure of the prior application conveys with reasonable clarity to those skilled in the art that, as of the filing date sought, the inventor was in possession of the invention as claimed.

28. I have been informed that it is not sufficient for purposes of the written description requirement of § 112 that the disclosure, when combined with the knowledge in the art, would lead one to speculate as to modifications that the inventor might have envisioned, but failed to disclose. That is because the purpose of the written description requirement is to ensure that the scope of the right to exclude, as set forth in the claims, does not overreach the scope of the inventor’s contribution to the field of art as described in the patent specification. Thus, I have been advised that entitlement to an earlier priority date does not extend to subject matter which is not disclosed, even if it would be obvious over what is expressly disclosed.

VII. THE PRIOR ART – HON 745

29. I have analyzed U.S. Publication No. 2009/0126745 (“Hon 745,” Ex.1005), entitled “Emulation Aerosol Sucker,” which was published on May 21, 2009. Hon 745 is the publication of the parent application of the 550 Patent.

VIII. GROUND OF UNPATENTABILITY

30. It is my opinion that Hon 745 discloses each and every element of claims 1-12 of the 550 Patent. As such, claims 1-12 are unpatentable under 35 U.S.C. § 102 on the ground that they are anticipated by Hon 745.

31. Below I explain how Hon 745 discloses each and every limitation of claims 1-12 of the 550 Patent.

A. Claim 1

[1.P] “A vaporizing device comprising”

32. Hon 745 discloses a “vaporizing device,” to the extent the preamble limits the claims. For example, Hon 745 states that, when the device is operating, “air-liquid mixture sprays onto the heating body (305), gets vaporized,¹ and is quickly absorbed into the airflow and condensed into aerosol, which passes through the air intake hole (503) and suction nozzle (403) to form white mist type aerosol.” Ex.1005 at ¶ [0032]; *see also id.* at ¶ [0040] (same). Hon 745 also

¹ All emphasis has been added unless I have noted otherwise.

discloses that “[t]he purpose of this invention is to provide an emulation aerosol sucker” and notes that “[f]or this invention, the aerosol may be regarded as liquid drips suspended in the air. *Id.* at ¶ [0006].

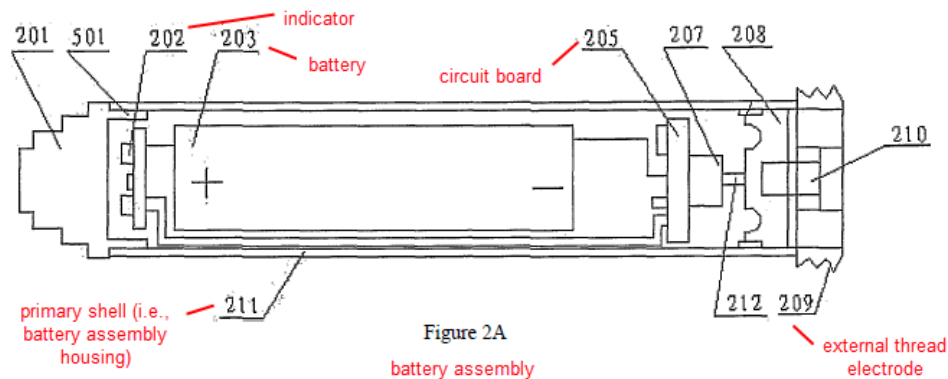
[1.1] “an electronic cigarette including”

33. Hon 745 discloses an electronic cigarette. Hon 745 states that “[t]his present invention relates to an electronic sucker unit, in particular, an emulation aerosol sucker that doesn't contain tar but nicotine.” Ex. 1005 at ¶ [0001]; *see also id.* at ¶ [0006] (“The purpose of this invention is to provide an emulation aerosol sucker that substitutes for cigarettes and helps the smokers to quit smoking. For this invention, the aerosol may be regarded as liquid drips suspended in the air.”); ¶¶ [0008], [0026].

[1.2] “a battery assembly comprising a tubular battery assembly housing having a first end and a second end, with a battery and a micro-controller unit electrically connected to a circuit board within the battery assembly housing”

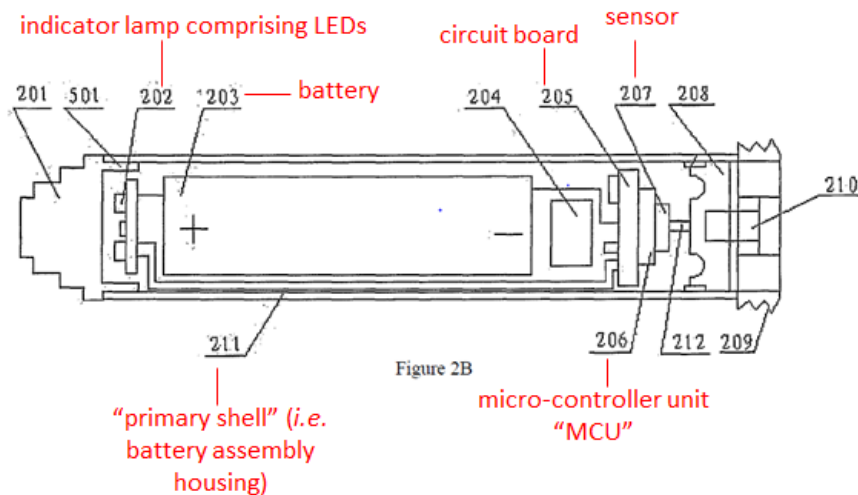
34. Hon 745 discloses a tubular battery assembly having a first and second end, and comprising a battery and a micro-controller unit electrically connected to a circuit board within the battery assembly housing. In the embodiment depicted in Fig. 2A, Hon 745 discloses a “battery assembly” having a first end (with an external thread electrode) and a second end (with an indicator) and containing a battery and circuit board. *See, e.g.,* Ex.1005 at ¶ [0027] (“As shown in FIG. 2A, the battery assembly includes the indicator (202), lithium ion

battery (203), MOSFTET [sic] electric circuit board (205), sensor (207), silica gel corrugated membrane (208), primary screwthread electrode (209), primary negative pressure cavity (210), and primary shell (211). On one end of the primary shell (211) is an external thread electrode (209), while on the other end is an indicator (202), where there is an indicator cap (201) on one side, in which there is a fine hole (501).”).



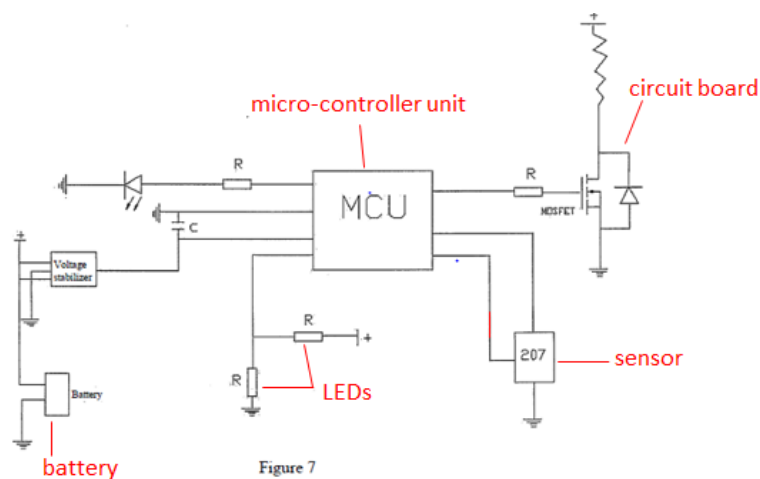
Ex. 1005 at Figure 2A (annotations added in red).

35. In the embodiment depicted in Fig. 2B, Hon 745 further discloses that the battery assembly includes a micro-controller unit (*i.e.*, “MCU”) as well as the components discussed with respect to Fig. 2A. *Id.* at ¶ [0039] (“As shown in FIG. 2B, the differences of this example from example 1 are as follows: MCU (206) is added between MOSFET electric circuit board (205) and sensor (207).”).



Ex. 1005 at Figure 2B (annotations added in red).

36. Within the battery assembly housing, the battery and micro-controller unit are electrically connected to the circuit board. *See, e.g., id.* at ¶ [0027] (“On the other side, the lithium ion battery (203) and MOSFET (Metallic Oxide Semiconductor Field Effect Tube) electric circuit board (205) are connected successively.”). Electrical connections between the battery, micro-controller unit, and circuit board are depicted in the annotated version of Fig. 7 below.



Ex.1005 at Fig. 7 (annotations added in red).

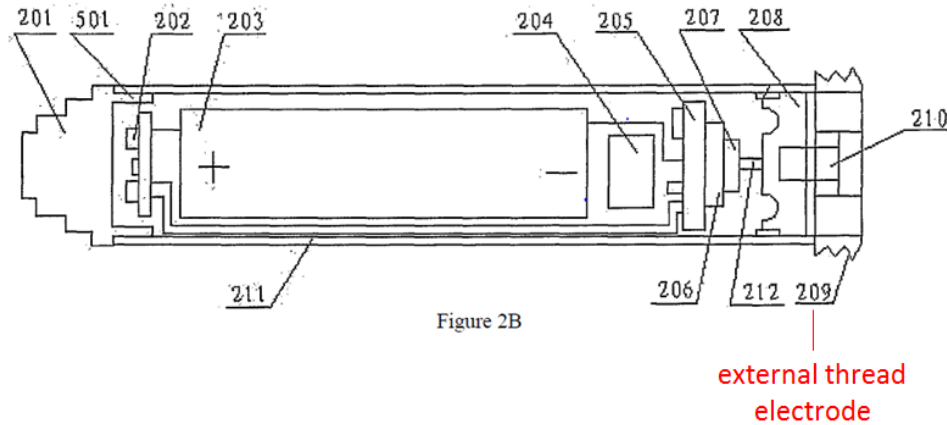
37. Hon 745 further discloses that the battery assembly includes a tubular housing, which Hon 745 refers to as a “primary shell.” *See, e.g., id.* at ¶ [0027] (“As shown in FIG. 2A, the battery assembly includes the indicator (202), lithium ion battery (203), MOSFTET [sic] electric circuit board (205), sensor (207), silica gel corrugated membrane (208), primary screwthread electrode (209), primary negative pressure cavity (210), and primary shell (211).”), ¶ [0039] (“As shown in FIG. 2B, the differences of this example from example 1 are as follows: MCU (206) is added between MOSFET electric circuit board (205) and sensor (207). On the surface of the primary shell (211), there is a screen (204) for display of the power of the lithium ion battery (203) and the sucking times.”).

38. This battery assembly housing (*i.e.*, the “primary shell”) is intended to mimic the appearance of a cigarette and thus is plainly tubular. *See, e.g.,* Ex.1005 at ¶ [0026] (“As shown in FIG. 1, the visual appearance of this invention is similar to a cigarette inserted into the cigarette holder, and includes a battery assembly, an atomizer assembly and a cigarette bottle assembly.”). The “external thread electrode (209)” — which a person of ordinary skill in the art would of course understand to be circular so that it could fit within the mating threads — further underscores the tubular nature of the housing. The tubular battery assembly housing, along with the electronic components it houses, is depicted in the annotated version of Fig. 2B above.

[1.3] “a first screw thread electrode on the first end of the battery assembly housing, with a first through hole at a center of the first screw thread electrode”

39. Hon 745 discloses a first “screwthread electrode” on the first end of the battery assembly housing. *See, e.g., id.* at Ex.1005 at ¶ [0027] (“As shown in FIG. 2A, the battery assembly includes the indicator (202), lithium ion battery (203), MOSFTET [sic] electric circuit board (205), sensor (207), silica gel corrugated membrane (208), primary screwthread electrode (209), primary negative pressure cavity (210), and primary shell (211). On one end of the primary shell (211) is an external thread electrode (209)...”), ¶ [0009] (“The battery assembly includes the indicator, battery, MOSFTET [sic] electric circuit board, sensor, silica gel corrugated membrane, primary screwthread electrode, primary negative pressure cavity, and primary shell. On one end of the primary shell is an external thread electrode...”).

40. The below annotated version of Figure 2B shows the first screw thread electrode – external thread electrode 209 – on the first end of the battery assembly housing.



Ex.1005 at Fig. 2B (annotations added in red)

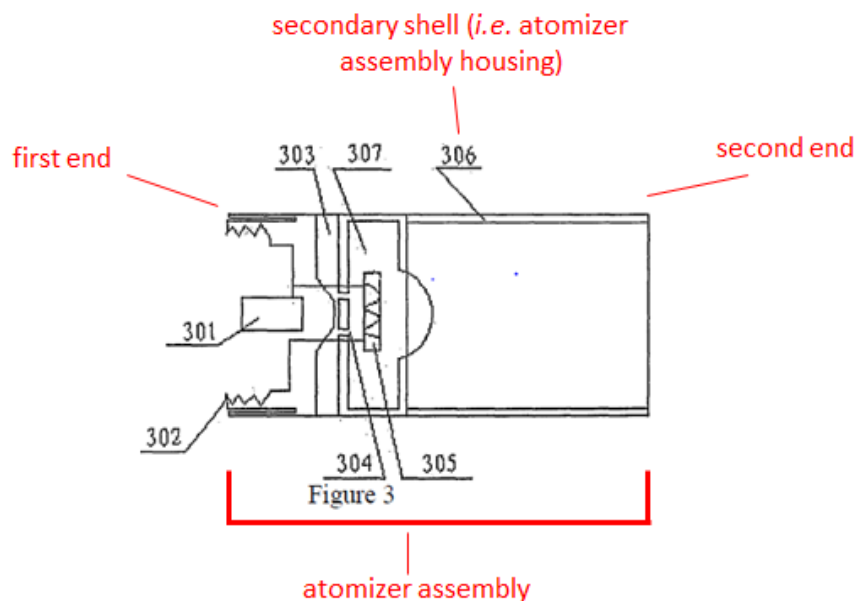
41. The first screwthread electrode (209) of Hon 745 includes a first through hole drilled in the center of the electrode. *Id.* at ¶ [0027] (“The external thread electrode (209) is a gold-coated stainless steel or brass part with a hole drilled in the center.”); ¶ [0029] (same).

[1.4] “an atomizer assembly comprising”

42. Hon 745 discloses an atomizer assembly. Ex. 1005 at ¶ [0026] (“As shown in FIG. 1, the visual appearance of this invention is similar to a cigarette inserted into the cigarette holder, and includes a battery assembly, an atomizer assembly and a cigarette bottle assembly.”); ¶ [0029] (“As shown in FIG. 3, the atomizer assembly includes the internal thread electrode (302), air-liquid separator (303), atomizer (307) and the secondary shell (306). One end of the secondary shell (306) is inserted into the cigarette bottle assembly for connection, while the other end has an internal thread electrode (302), in which there is the secondary negative pressure cavity (301).”).

[1.5] “a tubular atomizer assembly housing having a first end and a second end”

43. Hon 745 discloses a tubular atomizer assembly housing having a first end and a second end. Figure 3 depicts the atomizer assembly with a “secondary shell (306)”, *i.e.* housing, containing a first end (that is connected to the cigarette bottle assembly) and a second end (with an internal thread electrode (302) for connection with the battery assembly). Ex. 1005 at [0029] (“As shown in FIG. 3, the atomizer assembly includes the internal thread electrode (302), air-liquid separator (303), atomizer (307) and the secondary shell (306). One end of the secondary shell (306) is inserted into the cigarette bottle assembly for connection, while the other end has an internal thread electrode (302), in which there is the secondary negative pressure cavity (301).”); Fig. 3.



Ex. 1005 at Figure 3 (annotations added in red).

44. The “secondary shell” or housing of the atomizer assembly of Hon 745 is tubular. *See, e.g.*, Ex.1005 at ¶ [0026] (“As shown in FIG. 1, the visual appearance of this invention is similar to a cigarette inserted into the cigarette holder, and includes a battery assembly, an atomizer assembly and a cigarette bottle assembly.”); Figs. 3, 4, 5A.

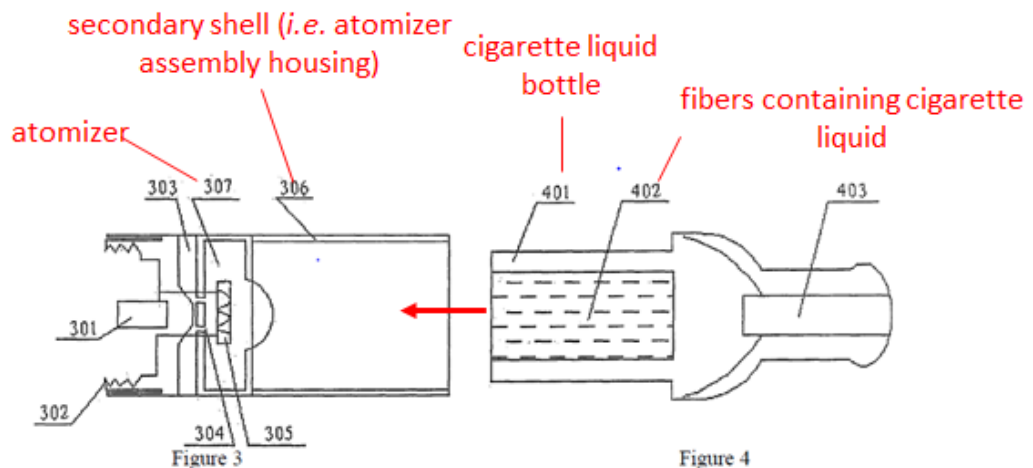
[1.6] “an atomizer having a porous body, and a liquid supply in the tubular atomizer assembly housing”

45. Hon 745 discloses an atomizer assembly which includes an atomizer having a porous body. Ex. 1005 at ¶ [0008] (“The said atomizer assembly includes the internal thread electrode, air-liquid separator, atomizer and the secondary shell.”). The atomizer includes a heating body that may be made of micro-porous ceramics or may be a porous component. *Id.* (“The said atomizer may be capillary impregnation atomizer or spray atomizer, inside which there is a heating body....The said heating body is made of the micro-porous ceramics on which nickel-chromium alloy wire, iron-chromium alloy wire, platinum wire, or other electrothermal materials are wound. Alternatively, it may be a porous component made of electrically conductive ceramics or PTC ceramics and associated with a sintered electrode.”).

46. Hon 745 also discloses a liquid supply in the tubular atomizer assembly housing. Specifically, Hon 745 discloses that a cigarette bottle assembly—containing a bottle and liquid-soaked fiber—can be inserted within the

tubular atomizer assembly housing (shell 306) such that it is in contact with “atomizer (307),” which is enclosed by the tubular atomizer assembly housing. *See, e.g.*, Ex.1005 at ¶ [0031] (“As shown in FIG. 4, the cigarette bottle assembly includes the cigarette liquid bottle (401), fiber (402) and suction nozzle (403). The fiber (402) containing cigarette liquid is located on one end of the cigarette liquid bottle (401), and this end is inserted into the secondary shell (306) and lies against the atomizer (307).”). Hon 745 thus discloses a “liquid supply in the tubular atomizer assembly housing” when the cigarette bottle assembly is inserted within the atomizer assembly housing.

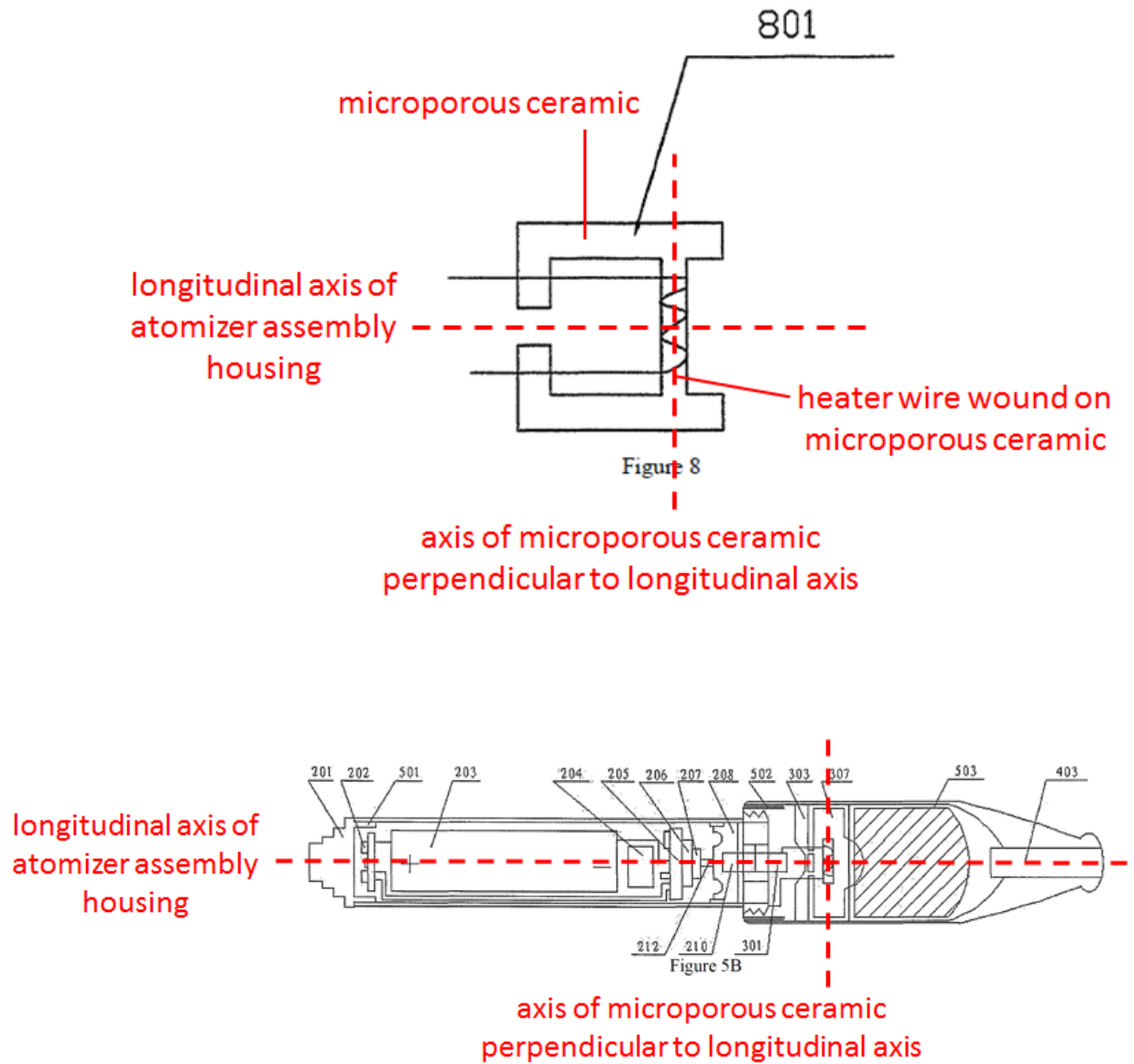
47. The annotated versions of Figures 3 and 4 below depict how the cigarette bottle assembly disclosed in Hon 745 is inserted into the tubular secondary shell of the atomizer assembly such that it is contact with atomizer 307.



Ex.1005 at Figs. 3 and 4 (annotations added in red).

[1.7] “with the atomizer including a heater wire wound on a part of the porous body which is perpendicular to a longitudinal axis of the tubular atomizer assembly housing”

48. Hon 745 discloses that the atomizer (307) includes a “heating body 305” that may comprise a wire wound around “micro-porous ceramics (801),” such that the wire coil and porous body are positioned perpendicular to a longitudinal axis of the tubular atomizer assembly housing. *See, e.g., id.* at ¶ [0032] (“The fiber (402) inside the cigarette liquid bottle (401) contains cigarette liquid, which soaks the micro-porous ceramics (801) inside the atomizer through the fiber (402).”), ¶ [0034] (“The heating body (305) is made of the micro-porous ceramics on which nickel-chromium alloy wire, iron-chromium alloy wire, platinum wire, or other electrothermal materials are wound.”), ¶ [0020] (“FIG. 8 is the diagram of the structure of the capillary impregnation atomizer of this invention.”). Hon 745 depicts the heating wire wound around micro-porous ceramic (801) as being perpendicular to the longitudinal axis of the atomizer assembly, as the annotated versions of Figures 8 and 5B below demonstrate.



Ex.1005 at Figs. 5B and 8 (annotations added in red).

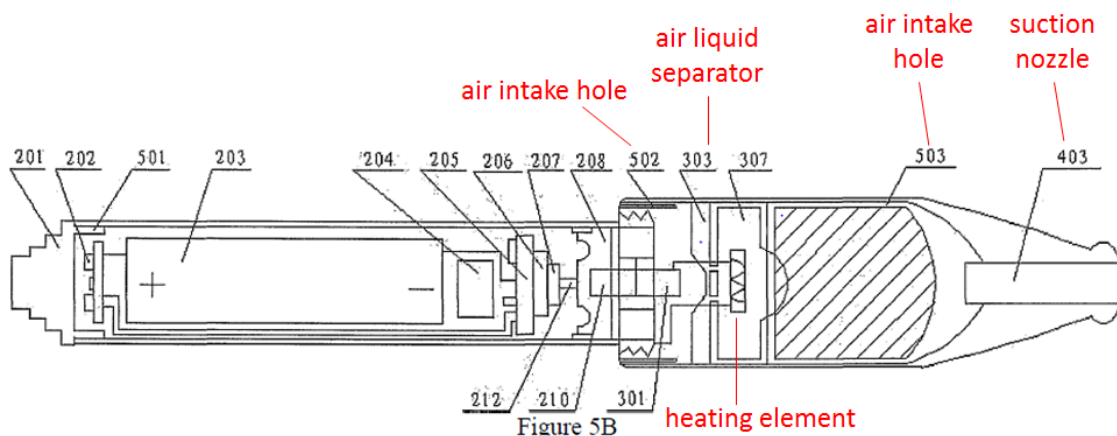
[1.8] “an airflow path through an opening in the atomizer to a suction nozzle at the second end² of the tubular atomizer assembly housing”

49. Hon 745 discloses an airflow path through an opening in the atomizer to a suction nozzle at the end of the tubular atomizer assembly housing. Specifically, Hon 745 discloses that air enters the device through an “air intake hole (502)” on the atomizer assembly housing, passes through a through-hole, mixes with and then “sprays” onto heating element (305) (which, as set forth above, can take the form of a wire coil) before exiting the device through air intake hole (503) and suction nozzle (403). *See, e.g.*, Ex.1005 at ¶ [0040] (“The air enters through the air intake hole (502), passes through the run-through hole on the air-liquid separator (303), and helps to form air-liquid mixture in the spray nozzle (304) of the atomizer (307). The air-liquid mixture sprays onto the heating body

² My analysis assumes that “second end” can be corrected to read “first end.” Limitation [1.9] requires the screw thread electrode on the “second end” and there is no support in the 550 Patent specification for a device that has the suction nozzle and screw thread electrode on the same end of the atomizer assembly. Instead, the 550 specification shows that the suction nozzle (which is part of the cigarette bottle assembly inserted into the atomizer assembly) and screw thread electrode are at opposite ends. Ex.1001 at 2:33-54, Figs. 3, 4, 5A, 5B, 12.

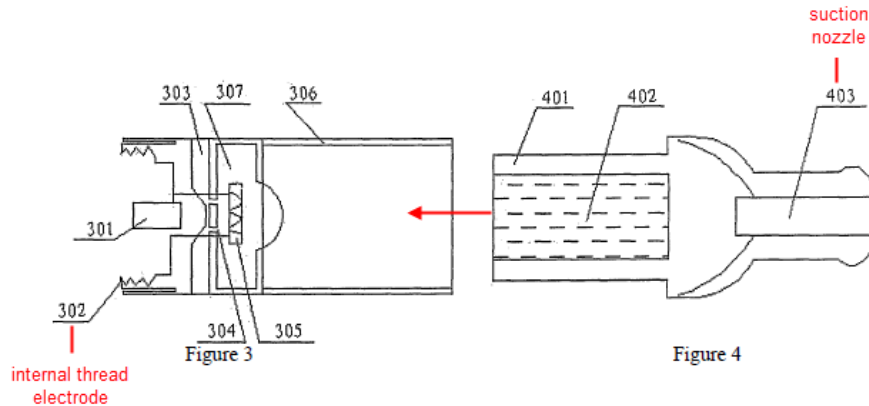
(305), gets vaporized, and is quickly absorbed into the airflow and condensed into aerosol, which passes through the air intake hole (503) and suction nozzle (403) to form white mist type aerosol.”).

50. Air intake hole (503) and suction nozzle (403) are a part of the cigarette bottle assembly. Ex.1005 at ¶ [0031] (“The suction nozzle (403) is located on the other end of the cigarette liquid bottle (401). Between the fiber (402) and interior wall of the cigarette liquid bottle (401) is an air intake hole (503)”). Thus the airflow path “through the tubular atomizer assembly... to an outlet at the second end of the tubular atomizer assembly housing” only exists when the bottle assembly is inserted into the atomizer assembly housing. These structures relating to the air flow path are identified in the annotated version of Figure 5B below. These structures relating to the air flow path are identified in the annotated version of Figure 5B below.



Ex.1005 at Fig. 5B (annotations added in red).

51. As illustrated by Fig. 5B above, and Figures 3-4 below, when the atomizer and cigarette bottle assemblies are connected, the suction nozzle 403 is at the end of the tubular atomizer assembly housing opposite the screw thread electrode 302. *Id.* at Fig. 5B, 3-4.

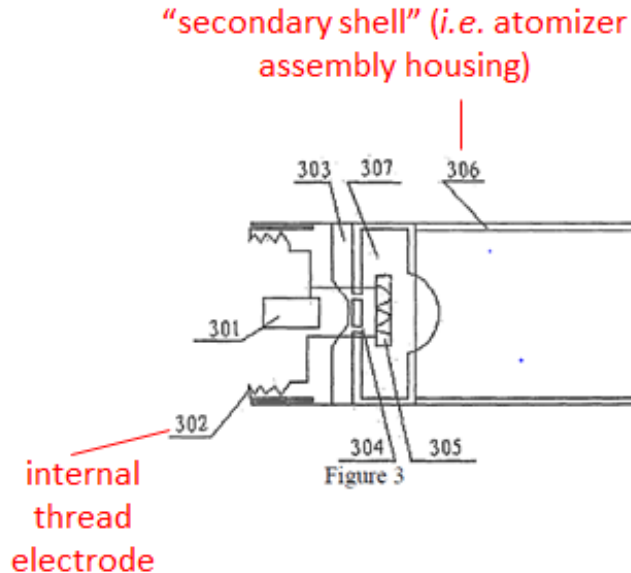


Ex.1005 at Figs. 3-4 (annotations added in red).

[1.9] “a second screw thread electrode on the second end of the atomizer assembly housing, with a second through hole at a center of the second screw thread electrode; and”

52. Hon 745 discloses a “second electrode” located at the second end of the atomizer assembly housing in the form of an “internal thread electrode (302).” See Ex.1005 at ¶ [0029] (“As shown in FIG. 3, the atomizer assembly includes the internal thread electrode (302), air-liquid separator (303), atomizer (307) and the secondary shell (306). One end of the secondary shell (306) is inserted into the cigarette bottle assembly for connection, while the other end has an internal thread electrode (302), in which there is the secondary negative pressure cavity (301). The air-liquid separator (303) and the atomizer (307) are

connected with the internal thread electrode (302) successively.”). The internal thread electrode (302) is depicted in the annotated version of Fig. 3 below.



Ex.1005 at Fig. 3 (annotations added in red).

53. Additionally, Hon 745 discloses that this “second electrode” includes a through hole in the center of the electrode. *Id.* at ¶ [0029] (“The internal thread electrode (302) is a gold-coated stainless steel or brass part with a hole drilled in the center.”).

[1.10] “the battery assembly and the atomizer assembly mechanically connected to form the electronic cigarette by engagement of the first screw thread electrode with the second screw thread electrode, and with electricity conducted from the battery to the heater wire through the first and second screw thread electrodes for heating the heater wire.”

54. Hon 745 discloses that engagement of the threaded electrodes located on the ends of each of the battery and atomizer assemblies link the two

assemblies electrically (as well as mechanically) to form the electronic cigarette. *Id.* at ¶ [0026] (“An external thread electrode (209) is located in one end of the battery assembly, and an internal thread electrode (302) is located in one end of the atomizer assembly. The battery assembly and atomizer assembly are connected through the screwthread electrode into an emulation cigarette. The cigarette bottle assembly is inserted into the other end of atomizer assembly, to form one cigarette type emulation aerosol sucker.”).

55. As a result of the battery assembly-atomizer assembly connection, electricity flows from the battery to the heater wire coil (heating element 305) through the first and second screw thread electrodes in order to heat the heater wire coil. *Id.*; *see also* ¶ [0032] (“At this moment, the indicators (202) are lit gradually; the lithium ion battery (203) electrifies the heating body (305) inside the atomizer (307) through MOSFET electric circuit board (205) as well as the internal and external thread electrodes (302, 209), so that the heating body (305) inside the atomizer (307) produces heat.”); *see also id.* at Figs. 5A, 5B, 12.

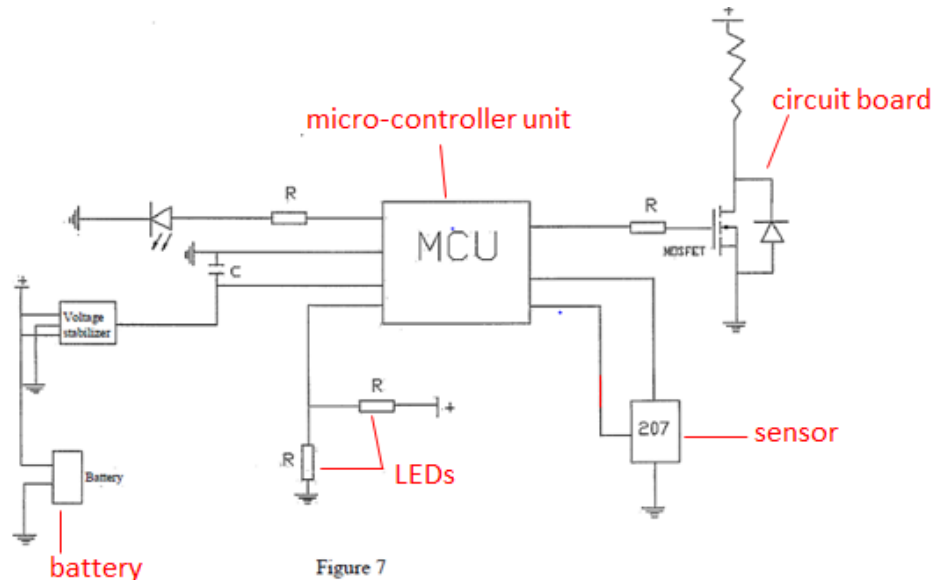
56. Therefore, for the reasons set forth above, Hon 745 discloses each and every element of claim 1 of the 550 Patent.

B. Claim 2

“The device of claim 1 further including a sensor in the battery assembly housing, with the sensor electrically connected to the micro-controller unit.”

57. The vaporizing device disclosed by Hon 745 includes a sensor in the battery assembly housing, with the sensor electrically connected to the micro-controller unit. Hon 745 discloses that the battery assembly housing includes a sensor. Ex. 1005 at ¶ [0027] (“As shown in FIG. 2A, the battery assembly includes the indicator (202), lithium ion battery (203), MOSFTET [sic] electric circuit board (205), sensor (207)...”).

58. Hon 745 also discloses that the sensor is electrically connected to the micro-controller unit, as illustrated in the annotated electric circuit diagram in Figure 7 below. *Id.* at Fig. 7, *see also id.* at ¶¶[0027], [0039].



Ex. 1005 at Figure 7 (annotations added in red).

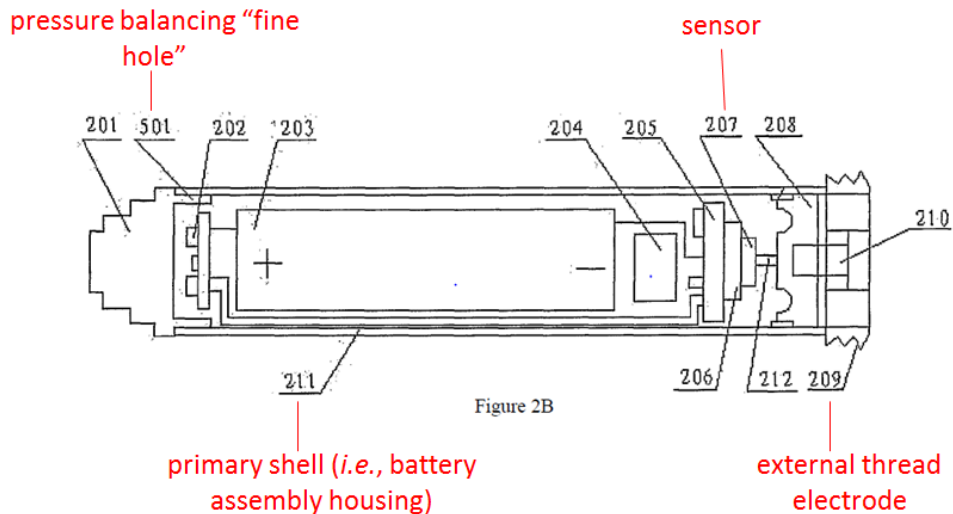
59. Therefore, Hon 745 discloses each and every element of claim 2 of the 550 Patent.

C. Claim 3

“The device of claim 2 further including a pressure balancing hole in the battery assembly housing.”

60. The vaporizing device disclosed by Hon 745 includes a pressure balancing hole in the battery assembly housing. Ex. 1005 at ¶ [0034] (“In the battery assembly, there is a fine hole (501) on the indicator cap (201) for balancing the pressure difference on both sides of the silica gel corrugated membrane (208).”); ¶ [0027] (“As shown in FIG. 2A, the battery assembly includes the indicator (202), lithium ion battery (203), MOSFTET [sic] electric circuit board (205), sensor (207), silica gel corrugated membrane (208), primary screwthread electrode (209), primary negative pressure cavity (210), and primary shell (211). On one end of the primary shell (211) is an external thread electrode (209), while on the other end is an indicator (202), where there is an indicator cap (201) on one side, in which there is a fine hole (501).”).

61. The pressure balancing “fine hole” in the battery assembly “primary shell” (or housing) is identified in the below annotated version of Figure 2B.



Ex. 1005 at Figure 2B (annotations added in red).

62. Therefore, Hon 745 discloses each and every element of claim 3 of the 550 Patent.

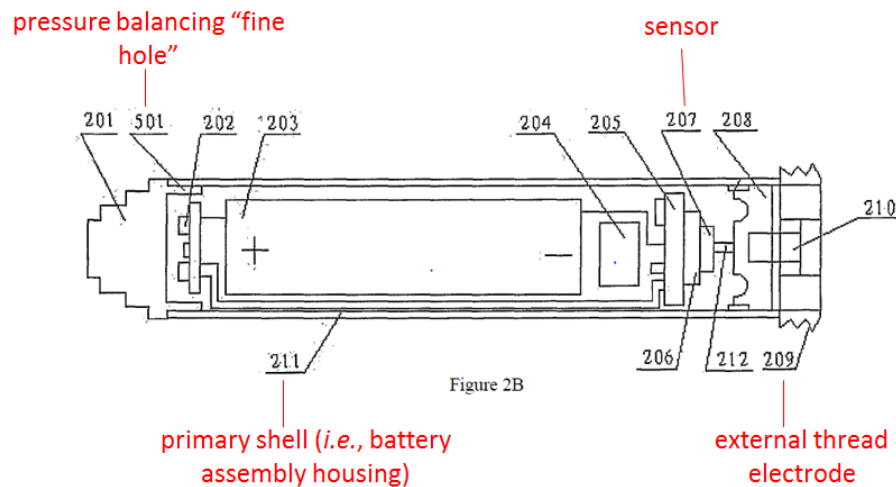
D. Claim 4

“The device of claim 3 with the pressure balancing hole at the second end of the battery assembly housing.”

63. The pressure balancing hole of Han 745 is at the second end of the battery assembly housing. Ex. 1005 at ¶ [0027] (“As shown in FIG. 2A, the battery assembly includes the indicator (202), lithium ion battery (203), MOSFET [sic] electric circuit board (205), sensor (207), silica gel corrugated membrane (208), primary screwthread electrode (209), primary negative pressure cavity (210), and primary shell (211). On one end of the primary shell (211) is an external thread electrode (209), while on the other end is an indicator (202), where there is an indicator cap (201) on one side, in which there is a fine hole (501).”); ¶

[0034] (“In the battery assembly, there is a fine hole (501) on the indicator cap (201) for balancing the pressure difference on both sides of the silica gel corrugated membrane (208).”).

64. The below annotated version of Figure 2B shows the pressure balancing “fine hole” at the second end of the battery assembly “primary shell” (or housing).



Ex. 1005 at Figure 2B (annotations added in red).

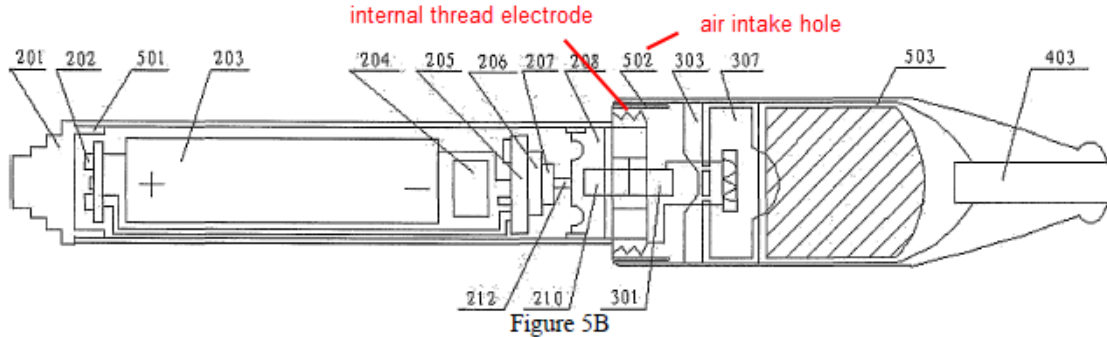
65. Therefore, Hon 745 discloses each and every element of claim 4 of the 550 Patent.

E. Claim 5

“The device of claim 3 further including an air inlet at the second screw thread electrode.”

66. Hon 745 discloses an air inlet at the second screw thread electrode. As discussed above in connection with claim [1.9], Hon 745 discloses a second screw thread electrode on the second end of the atomizer assembly housing.

See also Ex. 1005 at ¶ [0029]; Fig. 3. As illustrated by Figure 5B below, Han 745 also discloses an air inlet at the second screw electrode. *Id.* at ¶ [0029] (“The air-liquid separator (303) and the atomizer (307) are connected with the internal thread electrode (302) successively. On the secondary shell (306), there is an air intake hole (502). The air-liquid separator (303) is made of stainless steel or plastic with a hole drilled. The internal thread electrode (302) is a gold-coated stainless steel or brass part with a hole drilled in the center.”).



Ex. 1005 at Figure 5B (annotations added in red).

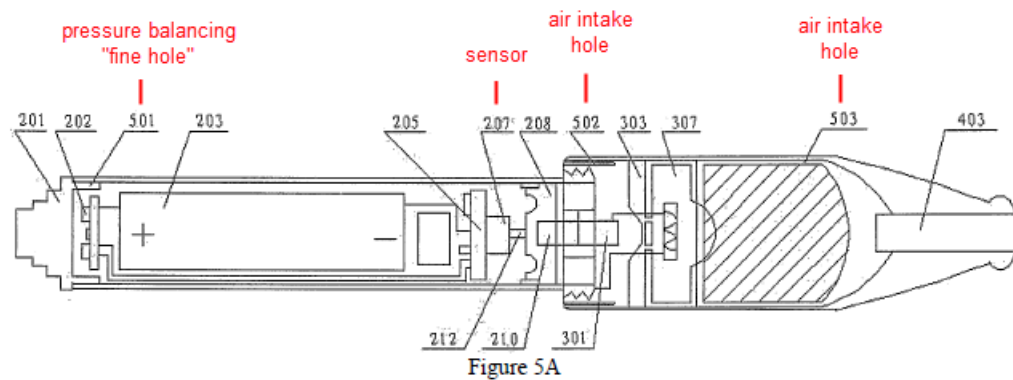
67. Therefore, Hon 745 discloses each and every element of claim 5 of the 550 Patent.

F. Claim 6

“The device of claim 5 with the pressure balancing hole on a first side of the sensor and the air inlet on a second side of the sensor, opposite from the first side of the sensor.”

68. Hon 745 discloses that the “fine hole 501” for balancing pressure is on a first side of the sensor (207) and the air intake hole 502/503 is on a second side of the sensor, opposite from the first side. See, e.g., Ex.1005 at ¶

[0034] (“In the battery assembly, there is a fine hole (501) on the indicator cap (201) for balancing the pressure difference on both sides of the silica gel corrugated membrane (208).”), ¶ [0027] (“On one end of the primary shell (211) is an external thread electrode (209), while on the other end is an indicator (202), where there is an indicator cap (201) on one side, in which there is a fine hole (501). On the other side, the lithium ion battery (203) and MOSFET (Metallic Oxide Semiconductor Field Effect Tube) electric circuit board (205) are connected successively. The sensor (207) is located on MOSFET electric circuit board (205).”); ¶ [0029] (“On the secondary shell (306), there is an air intake hole (502).”); ¶ [0031] (“Between the fiber (402) and interior wall of the cigarette liquid bottle (401) is an air intake hole (503).”). These structures are depicted in the annotated version of Figure 5a below.



Ex.1005 at Fig. 5a (annotations added in red).

69. Therefore, Hon 745 discloses each and every element of claim 6 of the 550 Patent.

G. Claim 7

“The device of claim 1 with the porous body comprising a fiber material.”

70. The atomizer of Hon 745 includes a porous body, for the reasons discussed above in connection with claim [1.6]. *See also* Ex. 1005 at ¶¶ [0008], [0031], [0032], [0034]. Hon 745 discloses that the porous body may comprise a fiber material: “[b]esides the micro-porous ceramics, the liquid supply material of the atomizer (307) may also be foamed ceramics, micro-porous glass, foamed metal, stainless steel fiber felt, terylene fiber, nylon fiber, nitrile fiber, aramid fiber or hard porous plastics.” *Id.* at ¶ [0029].

71. Therefore, Hon 745 discloses each and every element of claim 7 of the 550 Patent.

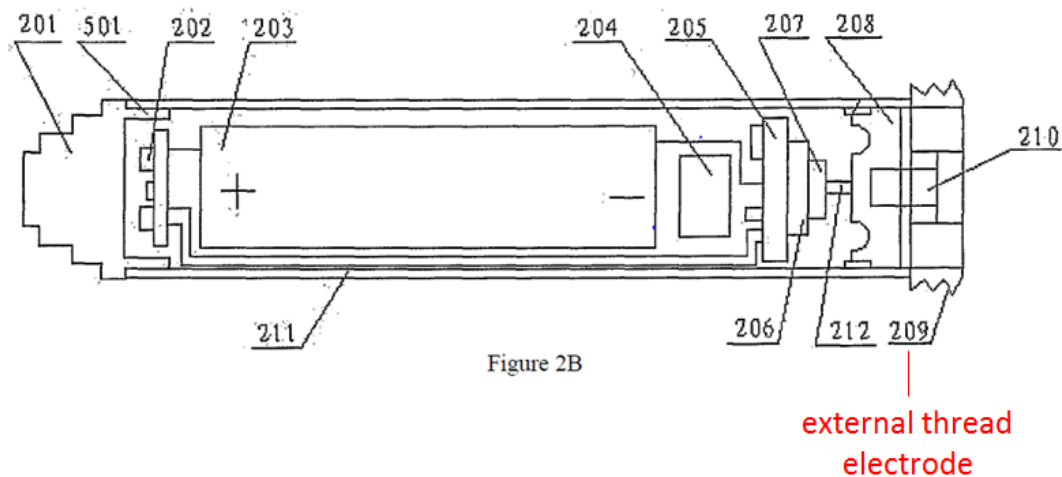
H. Claim 8

“The device of claim 1 with the first screw thread electrode having external screw threads on an outside surface of the tubular battery assembly housing.”

72. Hon 745 discloses that the first screw thread electrode has external screw threads on an outside surface of the tubular battery assembly housing. Ex. 1005 at Abstract (“An external thread electrode is located in one end of battery assembly.”); ¶ [0027] (“As shown in FIG. 2A, the battery assembly includes the indicator (202), lithium ion battery (203), MOSFTET [sic] electric circuit board (205), sensor (207), silica gel corrugated membrane (208), primary

screwthread electrode (209), primary negative pressure cavity (210), and primary shell (211). On one end of the primary shell (211) is an external thread electrode (209)...”); ¶ [0009] (“The battery assembly includes the indicator, battery, MOSFET electric circuit board, sensor, silica gel corrugated membrane, primary screwthread electrode, primary negative pressure cavity, and primary shell. On one end of the primary shell is an external thread electrode...”).

73. Figure 2B below (annotated) illustrates that the first screw thread electrode (209) has external screw threads that are on the outside surface of the tubular battery assembly housing.

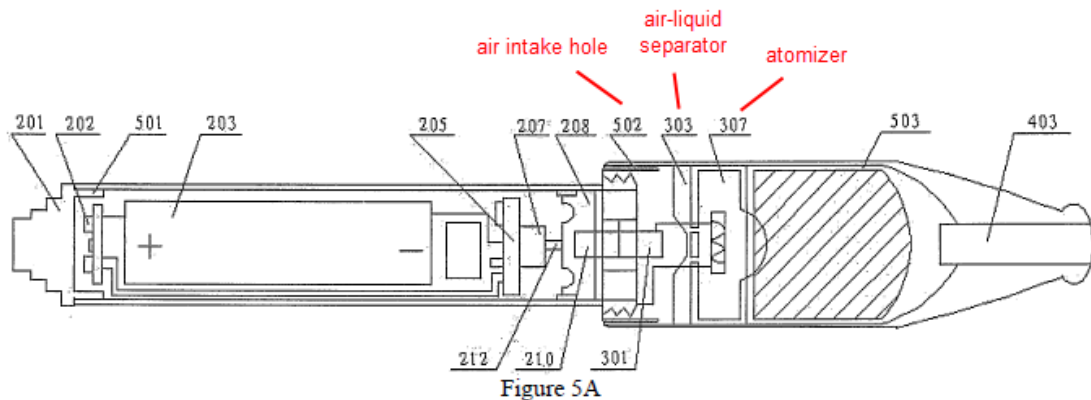


Ex. 1005 at Figure 2B (annotations added in red).

I. Claim 9

[9] “The device of claim 5 further including a separator between the air inlet and the atomizer, with the separator having a run-through hole, and with the air flow path passing through the run-through hole.”

74. Hon 745 discloses an air-liquid separator 303 between the air intake hole 502 and the atomizer 307.



Ex. 1005 at Figure 5A (annotations added in red).

75. The air-liquid separator has a run-through hole through which the air flow passes to form an air-liquid mixture in the atomizer for vaporization. *Id.* at ¶ [0029] (“The air-liquid separator (303) is made of stainless steel or plastic with a hole drilled.”); ¶¶ [0032], [0040] (“The air enters through the air intake hole (502), passes through the run-through hole on the air-liquid separator (303), and helps to form air-liquid mixture in the spray nozzle (304) of the atomizer (307). The air-liquid mixture sprays onto the heating body (305), gets vaporized, and is quickly absorbed into the airflow and condensed into aerosol, which passes

through the air intake hole (503) and suction nozzle (403) to form white mist type aerosol.”).

J. Claim 10

[10] “The device of claim 1 wherein the first screw thread electrode surrounds and is concentric with the second screw thread electrode.”

76. As explained above in connection with limitation 1.10, the battery and atomizer assemblies are connected via an external (first) thread electrode (209) and an internal (second) thread electrode (302). Ex. 1005 at ¶ [0026] (“An external thread electrode (209) is located in one end of the battery assembly, and an internal thread electrode (302) is located in one end of the atomizer assembly. The battery assembly and atomizer assembly are connected through the screwthread electrode into an emulation cigarette.”). As illustrated in Figure 12, the first screw thread electrode surrounds the second screw thread electrode.

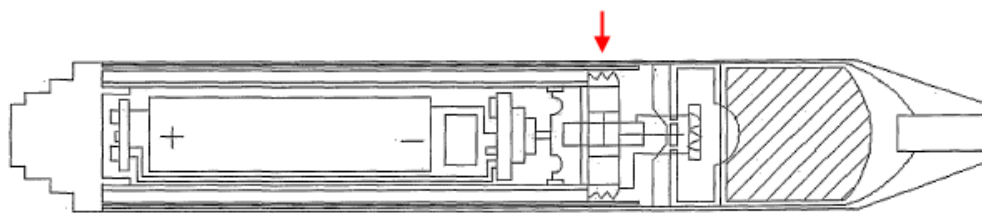


Figure 12

Ex. 1005 at Figure 12 (annotations added in red)

77. The 550 Patent does not describe that “the first screw thread electrode” “is concentric with the second screw thread electrode.” To the extent that the text and figures of the 550 Patent expressly or inherently disclose these limitations—through, for example, the description and depiction of internal thread electrode (302) and the external thread electrode (209) —the limitations are also disclosed by Hon 745 because all of the descriptive matter in the specification of the 550 Patent is also present in Hon 745. *Compare* Ex. 1005 at ¶ [0029] (“As shown in FIG. 3, the atomizer assembly includes the internal thread electrode (302), air-liquid separator (303), atomizer (307) and the secondary shell (306). One end of the secondary shell (306) is inserted into the cigarette bottle assembly for connection, while the other end has an internal thread electrode (302), in which there is the secondary negative pressure cavity (301)... The internal thread electrode (302) is a gold-coated stainless steel or brass part with a hole drilled in the center.”) *with* Ex. 1001 at 2:33-45 (same). In other words, if Hon 745 does not disclose these limitations, then these limitations lack written description support in the 550 Patent.

78. Therefore, Hon 745 anticipates claim 10 to the extent claim 10 has written description support in the specification of the 550 Patent.

K. Claim 11

[11] “The device of claim 10 with the heater wire having a first lead connected to the inner electrode and a second lead connected to the outer electrode.”

79. The 550 Patent does not describe or depict leads connected to inner and outer electrodes. To the extent that the text and figures of the 550 Patent inherently disclose these limitations—through, for example, its description and depiction of the heating wire wound on the micro-porous ceramic portion of the atomizer—the limitations are also disclosed by Hon 745 because all of the descriptive matter in the 550 Patent is also present in Hon 745. *Compare, e.g.,* Ex. 1005 at ¶ [0034] (“The heating body (305) is made of the micro-porous ceramics on which nickel-chromium alloy wire, iron-chromium alloy wire, platinum wire, or other electrothermal materials are wound.”) *with* Ex. 1001 at 3:28-31 (same). In other words, if Hon 745 does not disclose these limitations, then these limitations lack written description support in the 550 Patent.

80. Therefore, Hon 745 anticipates claim 11 to the extent claim 11 has written description support in the specification of the 550 Patent.

L. Claim 12

[12] “The device of claim 11 with the first and second through holes leading into the airflow path.”

81. As described above in connection with limitations [1.3] and [1.9], the internal and external thread electrodes have through holes in the center.

See also Ex. 1005 at ¶ [0028] (“The external thread electrode (209) is a gold-coated stainless steel or brass part with a hole drilled in the center.”); ¶ [0029] (“As shown in FIG. 3, the atomizer assembly includes the internal thread electrode (302... The internal thread electrode (302) is a gold-coated stainless steel or brass part with a hole drilled in the center.”).

82. The holes in the electrodes are adjacent to the air intake hole 502 through which air enters and flows through the run-through hole on the air-liquid separator 303 to the suction nozzle of the atomizer for vaporization. *See, e.g.,* Ex.1005 at ¶ [0029] (“As shown in FIG. 3, the atomizer assembly includes the internal thread electrode (302), air-liquid separator (303), atomizer (307) and the secondary shell (306)...The air-liquid separator (303) is made of stainless steel or plastic with a hole drilled.”), ¶ [0032] (“The air enters through the air intake hole (502), passes through the run-through hole on the air-liquid separator (303), and helps to form air-liquid mixture in the spray nozzle (304) of the atomizer (307). The air-liquid mixture sprays onto the heating body (305), gets vaporized, and is quickly absorbed into the airflow and condensed into aerosol, which passes through the air intake hole (503) and suction nozzle (403) to form white mist type aerosol.”).

83. Therefore, Hon 745 discloses each and every element of claim 12 of the 550 Patent.

IX. THE CLAIMS OF THE 550 PATENT ARE NOT LIMITED TO DEVICES THAT INCLUDE A BOTTLE ASSEMBLY

84. No claim of the 550 Patent recites a “cigarette liquid bottle” or any similar structure for storing liquid. *See generally* Ex.1001 at claims 1-12. Accordingly, I will refer to the 550 Patent’s claims as “bottle-less” because they do not require a bottle (however, I note that these claims do not exclude devices with a bottle).

85. With respect to liquid storage, the claims of the 550 Patent require a “liquid supply.” This term was construed in a prior IPR proceeding (IPR2014-01300) addressing U.S. 8,490,628 to mean “one or more components that supply liquid to the atomizer.” Ex.1008 at p.10. In other words, the prior construction did not require a “bottle.” The 628 Patent has the same named inventor as the 550 Patent.

86. Furthermore, I have been informed that a district court in *Fontem Ventures, B.V., et al. v. NJOY, Inc., et al.*, CV 14-1645-GW, held that the term “liquid supply” in U.S. 8,393,331, U.S. 8,490,628, and U.S. 8,365,742 did not require a construction, and also rejected the defendants’ position that the term “liquid supply” should be limited to a liquid-supplying bottle. Ex.1010 at pp.20-22.

87. I understand, moreover, that Patent Owner has accused bottle-less devices of infringing each claim of the 550 Patent in parallel district court

litigation. Ex.1011 at pp.3-4. Accordingly, in my opinion, a person of ordinary skill would understand that the claims of the 550 Patent are not limited to a device that includes a bottle assembly like that described in Hon 745.

X. THE PARENT APPLICATION TO THE 550 PATENT (HON 745) DOES NOT SUPPORT BOTTLE-LESS DEVICES

88. I understand that the 550 Patent claims priority to an application filed on May 15, 2007 (“the Parent Application”), and that Hon 745 is the U.S. publication of that application. Accordingly, I will cite to Hon 745 in discussing the disclosure of the Parent Application. In my opinion, the Parent Application does not convey (and would not have conveyed as of the filing of the Parent Application) to one of ordinary skill in the art that the applicant was in possession of a device that did not include a “bottle assembly” for storing liquid. In other words, the “invention” disclosed in the Parent Application is limited to an electronic device that includes a bottle assembly for storing the liquid that is ultimately vaporized.

89. This is because the Parent Application uniformly describes the claimed invention as having three assemblies—a battery assembly, an atomizer assembly, and a cigarette bottle assembly—and does not disclose, suggest, or otherwise give any indication that the cigarette bottle assembly is anything but a required part of the invention. Nor does the Parent Application disclose or suggest

any other structure or means for storing liquid other than the bottle contained in the “cigarette bottle assembly.”

90. The Abstract and “Contents of the Invention” portion of the Parent Application repeatedly refer to the “cigarette bottle assembly” as one of the three “assemblies” making up the invention, make clear that it is a component that is inserted into the atomizer assembly, and include no suggestion that the applicant contemplated (much less possessed) any other structure for storing liquid in the device described:

“An emulation aerosol sucker **includes a battery assembly, an atomizer assembly and a cigarette bottle assembly.** An external thread electrode is located in one end of battery assembly. An internal thread electrode is located in one end of atomizer assembly. Said battery assembly and said atomizer assembly are connected by the screwthread electrode. Said **cigarette bottle assembly is inserted into the other end of said atomizer assembly and both form one cigarette type or cigar type body.**

Ex. 1005 at Abstract.

“The purpose of this invention is fulfilled with the following solution: this invention includes a battery assembly, an atomizer assembly and a cigarette bottle assembly. The battery assembly connects with one end of the atomizer assembly, and the **cigarette bottle assembly is inserted into the other end of the atomizer assembly, thus forming one cigarette type or cigar type body.**”

Id. at ¶ [0008].

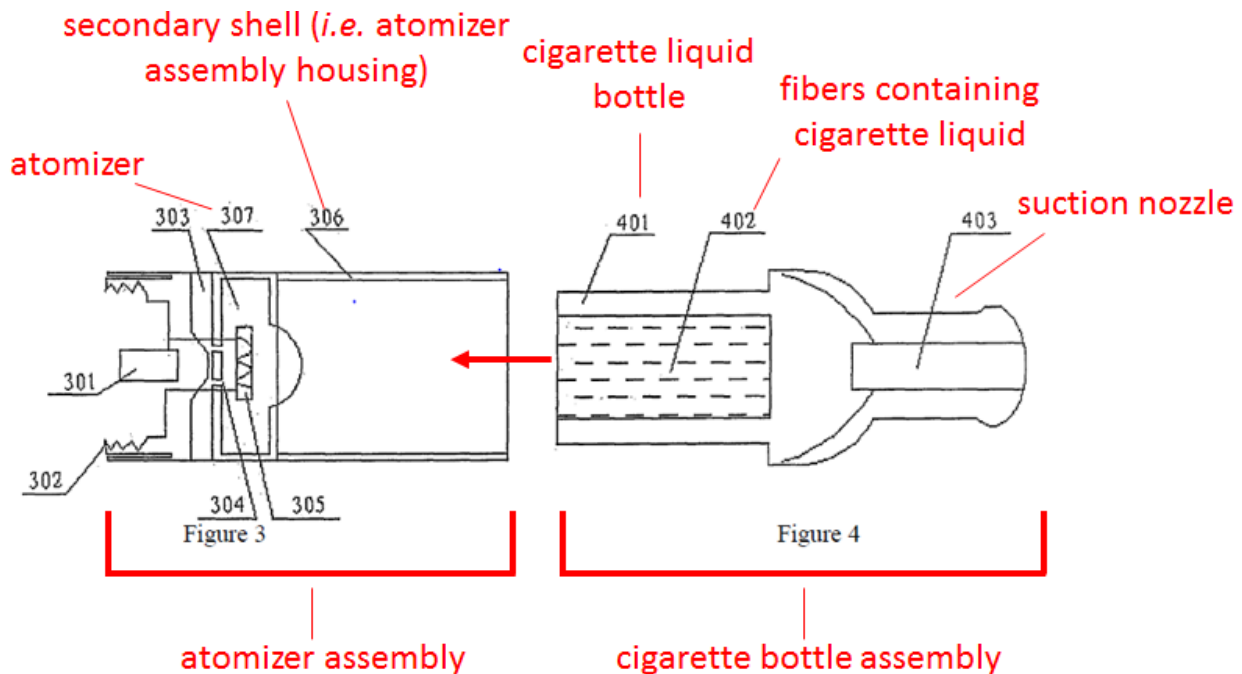
“The said atomizer assembly includes the internal thread electrode, air-liquid separator, atomizer and the secondary shell. **One end of the secondary shell is inserted into the cigarette bottle assembly for connection...**”

Id. at ¶ [0009].

“The **said cigarette bottle assembly includes the cigarette liquid bottle, fiber and suction nozzle. The fiber containing cigarette liquid is located on one end of the cigarette liquid bottle**, and this end is inserted into the secondary shell and lies against the atomizer. The suction nozzle is located on the other end of the cigarette liquid bottle. Between the fiber and interior wall of the cigarette liquid bottle is an air intake hole. The said cigarette liquid bottle and suction nozzle are made of non-toxic plastic.

Id.

91. The “Description of the Drawings” portion of the Parent Application further indicates that the purported invention is limited to the express disclosures in the specification by stating that the figures are illustrations of “this invention.” Ex.1005 at ¶¶ [0011]-[0024]. For example, the Parent Application states that “FIG. 4 is the diagram of the cigarette bottle assembly of **this invention.**” *Id.* at ¶ [0015]. As demonstrated by the annotated versions of Fig. 4 and Fig. 3, which the Parent Application states is the “atomizer assembly of this invention,” the “cigarette bottle assembly” depicted is an assembly that is inserted into the atomizer assembly.



Ex.1005 at Figs. 3 and 4 (annotations added in red)

92. The remainder of the specification of the Parent Application (including the original claims)—like the Abstract, Contents of the Invention, and Descriptions of the Drawings—invariably describes the cigarette bottle assembly as one of the three assemblies (along with the battery and atomizer assemblies) that *together* constitute the “invention”:

As shown in FIG. 1, the visual appearance of this invention is similar to a cigarette inserted into the cigarette holder, and **includes a battery assembly, an atomizer assembly and a cigarette bottle assembly**. An external thread electrode (209) is located in one end of the battery assembly, and an internal thread electrode (302) is located in one end of the atomizer assembly. The battery assembly and atomizer assembly are connected through the screwthread electrode into an emulation cigarette. **The cigarette bottle**

assembly is inserted into the other end of atomizer assembly, to form one cigarette type emulation aerosol sucker.

Id. at ¶ [0026].

As shown in FIG. 5A, **the standby state of this invention** has the fully charged battery assembly shown on FIG. 2A fastened onto the atomizer assembly shown on FIG. 3, **which is then inserted into the cigarette bottle assembly shown on FIG. 4.**

Id. at ¶ [0032]; *see also id.* at ¶ [0040].

1. An emulation aerosol sucker includes a battery assembly, an atomizer assembly **and a cigarette bottle assembly**; the **said cigarette bottle assembly includes the cigarette liquid bottle**; the said atomizer assembly includes an atomizer; **the cigarette bottle assembly is inserted into one end of the atomizer assembly**, thus forming one cigarette type or cigar type body.

Id. at claim 1; *see also* claims 2-32 (incorporating the limitation of claim 1).

93. Nothing in the specification or claims, moreover, suggests that the bottle assembly is optional or could be replaced with some alternative structure for storing liquid. The absence of such disclosed alternatives with respect to the bottle assembly is in contrast to the express disclosure of alternative embodiments for the atomizer. *See* Ex.1005 at ¶ [0009] (“**The said atomizer may be capillary impregnation atomizer or spray atomizer**, inside which there is a heating body.”). Although the Parent Application does disclose that liquid is stored using a fiber material, this is not an alternative to the bottle assembly because the same disclosures make clear that the *fiber is located within the bottle*, which in turn is a

part of the bottle assembly. *See, e.g.*, Ex.1005 at ¶ [0009] (“The said cigarette bottle assembly includes the cigarette liquid bottle, fiber and suction nozzle. **The fiber containing cigarette liquid is located on one end of the cigarette liquid bottle**, and this end is inserted into the secondary shell and lies against the atomizer.”), ¶ [0034] (“**The cigarette liquid bottle (401) and suction nozzle (403) in the cigarette bottle assembly are made of non-toxic plastic, and inside them is the fiber (402) made of polypropylene fiber or nylon fiber to absorb cigarette liquid.**”).

94. Similarly, the term “liquid supply material of the atomizer” that appears in paragraph [0034] of the Parent Application does not refer to an alternate structure providing a supply of liquid that could replace the bottle. On the contrary, this language refers to the micro-porous ceramics of the atomizer (a portion of which, as discussed above, may be wound with a heating wire) and indicates that the porous ceramic material may optionally be replaced with a fiber material. *See* Ex. 1005 at ¶ [0034] (“Besides the micro-porous ceramics, the liquid supply material of the atomizer (307) may also be foamed ceramics, micro-porous glass, foamed metal, stainless steel fiber felt, terylene fiber, nylon fiber, nitrile fiber, aramid fiber or hard porous plastics.”). The Parent Application expressly discloses that the liquid flows from the bottle to the micro-porous ceramics, and discloses no other way in which the micro-porous ceramics would be exposed to or

contain liquid other than by receiving it from the liquid bottle. *See id.* at ¶¶ [0032] (“The fiber (402) inside the cigarette liquid bottle (401) contains cigarette liquid, which soaks the micro-porous ceramics (801) inside the atomizer through the fiber (402).”), [0040] (same). A person of ordinary skill in the art would thus recognize that the “liquid supply material of the atomizer” in the Parent Application is simply a means for moving liquid from the bottle to the heating element, and not a substitute for the bottle. This is also clear from the claims of the 550 Patent which separately require a “liquid supply” (claim 1) and a “porous body comprising a fiber material” (claims 1, 7). The “porous body comprising a fiber material” corresponds to the structure described in ¶ [0034] of Hon 745 (*see also* col. 3:24-28 of the 550 Patent).

95. I also note that paragraph [0043] of the Parent Application includes what I understand to be common “boilerplate”-type language stating that specification does not necessarily restrict the scope of the invention and that “equivalent modification or decoration made on the basis of the design spirit of this invention shall fall into the scope of protection of this invention.” Ex.1005 at ¶ [0043]. In my opinion, a person of ordinary skill in the art would view this language as far too general and vague to constitute a suggested modification of any specific component of the device. Any modification that involved discarding the cigarette bottle assembly, moreover, would not be in keeping with the “design

spirit” of the invention, given the uniform recital of the bottle assembly as a key part of the invention that I have described above. Finally, I understand that a demonstration of “possession” of an invention requires an actual or inherent disclosure of all of its limitations. In my opinion, nothing in paragraph [0043] amounts to actual or inherent disclosure of any particular modification, much less a modification as significant as wholesale removal of the “bottle assembly.”

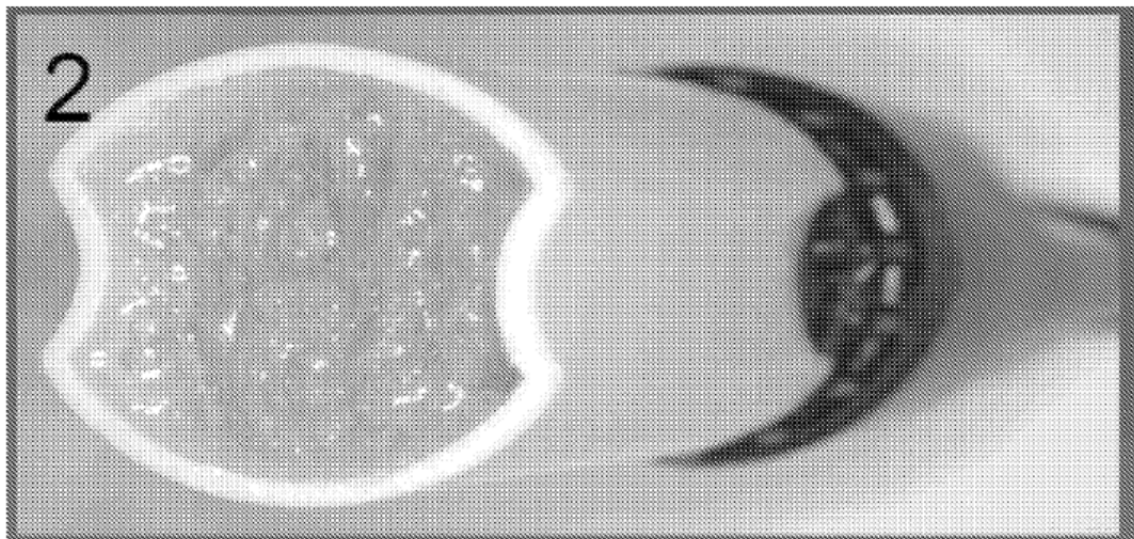
96. All of the disclosures in the Parent Application discussed above make clear, in my opinion, that the device described in the Parent Application requires a bottle assembly, just as it requires an atomizer assembly and battery assembly. Omission of this bottle assembly would not only remove the only disclosed structure for storing liquid—liquid bottle (401) and the fibers within it—but would also result in removal of suction nozzle (403) and air intake hole (503), both of which are critical elements of the airflow path that delivers vapor to the user. *See* Ex.1005 at ¶ [0031] (“The suction nozzle (403) is located on the other end of the cigarette liquid bottle (401). Between the fiber (402) and interior wall of the cigarette liquid bottle (401) is an air intake hole (503).”); *see also id.* at ¶ [0040] (disclosing that vapor “ passes through the air intake hole (503) and suction nozzle (403) to form white mist type aerosol.”). In short, a device that lacked the “bottle assembly” but otherwise conformed to the teachings of the Parent Application would be inoperable.

97. That is not to say that a person of ordinary skill in the art could not imagine or speculate as to alternate designs—some of which might have been obvious in view of the disclosure of the Parent Application— for a device that included some of the features disclosed in the Parent Application but lacked a bottle assembly. Any such design, however, would describe a *different device* from that described in the Parent Application. As I have noted above, moreover, I understand that the possible existence of obvious modifications is not germane to the written description inquiry, and it is plain that no such hypothetical modifications are described or disclosed (either expressly or inherently) in the Parent Application. Accordingly, for all of the reasons I have outlined above, it is my opinion that the Parent Application does not provide written description support for claims, such as those of the 550 Patent, that do not require a bottle assembly.

98. Statements made by the applicant and inventor during prosecution of U.S. 8,689,805 (Ex.1012, the “805 Patent”) support my conclusion that the disclosure of the Parent Application is limited to a device that includes a cigarette bottle assembly. The 805 Patent is directed to an electronic cigarette and has the same named inventor (Hon Lik) as the 550 Patent. The 805 Patent is not in the same family as the 550 Patent; instead its earliest priority claim is to a Chinese application filed in 2009. The 805 Patent describes a bottle-less liquid storage

component with a channel extending through it such that air runs through the liquid storage component. *See, e.g.*, Ex.1012 at 4:20-22, 5:38-43.

99. During prosecution of the 805 Patent, the applicant and inventor compared the disclosure of the bottle-less component in the 805 Patent with the “liquid-supplying bottle” disclosed in a prior art Hon Lik patent application (U.S. Patent Application 2009/0188490, Ex.1016) that the examiner had used to reject the claims of the application that issued as the 805 Patent. The inventor’s declaration stated that the photograph reproduced below “shows the liquid storage bottle described in U.S. 2009/0188490,” and explained that air passes around rather than through the bottle.



Ex.1013 (805 Patent file history) at pp.7-10.

100. Citing the declaration, the applicant also stated that the photograph “shows the liquid storage bottle described in US 2009/0188490,” and

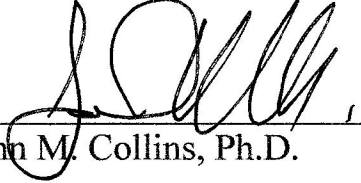
argued that the prior art application did not disclose or suggest the bottle-less component described and claimed in the 805 Patent. Ex. 1013 at pp.7-8. Thus, both the applicant and the inventor made clear that the disclosure of US 2009/0188490 was strictly limited to the particular bottle depicted in the photograph.

101. I have reviewed US 2009/0188490 and, like the Parent Application here, it discloses only a “bottle” for storing liquid. In many respects, however, its disclosure is broader than the Parent Application because it describes alternate embodiments for the “bottle,” *see* Ex.1016 at ¶ [0010], almost never uses the limiting “this invention” language so prevalent in the Parent Application, and does not indicate that the bottle is housed within an “assembly,” as does the Parent Application. Accordingly, if the written description of US 2009/0188490 is strictly limited to the particular preferred “bottle” embodiment disclosed and excludes a broader class of structures for storing liquid, as the applicant and inventor asserted to the examiner, the narrower disclosure of the Parent Application is *necessarily* so limited as well. Thus, in my opinion, the characterization of the “bottle” description in US 2009/0188490 by the inventor and applicant is consistent with and supports my own opinion that the Parent Application’s limited disclosure of a device requiring a “cigarette bottle assembly” does not provide written description support for the bottle-less claims of the 550 Patent.

Declaration

102. I declare that all statements made herein on 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.

Respectfully submitted,



John M. Collins, Ph.D.

Date: 8/31/2016