

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

JUUL LABS, INC.,

Petitioner,

v.

NJOY, LLC,

Patent Owner.

Inter Partes Review No.

IPR2023-00160

Patent 11,497,864 B2

Title: Electronic Vaporizer

Filing Date: June 25, 2019

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**PETITION FOR *INTER PARTES* REVIEW OF
U.S. PATENT NO. 11,497,864 B2**

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TABLE OF EXHIBITS

PETITIONER'S EXHIBIT LIST	Description
1001	U.S. Patent No. 11,497,864 (“’864 Patent”)
1002	Patent Prosecution History of the ’864 Patent
1003	<i>NJOY, LLC v. JUUL Labs, Inc.</i> , C.A. No. 1:23-cv-00917 (D. Del.), Complaint filed on August 22, 2023.
1004	Certified English Translation and Chinese Patent Publication No. CN201238610 (“Xia”)
1005	Certified English Translation and Chinese Patent Publication No. CN101366554 (“Wang”)
1006	Certified English Translation and Chinese Patent No. CN 201085044Y (“Fang”)
1007	Declaration of Robert Sturges and CV
1008	Chinese National IP Association (“CNIPA”) Database Search Results (For Xia);
1009	Global Dossier - United States Patent and Trademark Office Search Results for Xia
1010	European Patent Office Search Results Espacenet (For Xia)
1011	Chinese National IP Association (“CNIPA”) Database Search Results for Fang
1012	Global Dossier - United States Patent and Trademark Office Search Results for Fang
1013	European Patent Office Search Results Espacenet for Fang
1014	<i>Fuma International LLC v. R.J. Reynolds Vapor Company</i> , Case No. 1:19-cv-260, D.I. 122 (M.D.N.C., October 20, 2020) (RJR Brief)
1015	<i>Fuma International LLC v. R.J. Reynolds Vapor Company</i> , Case No. 1:19-cv-260, D.I. 139 (M.D.N.C., May 24, 2021) (MSJ Order)

PETITIONER'S EXHIBIT LIST	Description
1016	August 22, 2006 Tariff Classification for Nicotine Inhaler and Parts From China
1017	<i>Fuma International LLC v. R.J. Reynolds Vapor Company</i> , Case No. 1:19-cv-260, D.I. 76-47 (December 20, 20109) (Declaration of Wang Shanhong)
1018	<i>Fuma International LLC v. R.J. Reynolds Vapor Company</i> , Case No. 1:19-cv-260, D.I. 83 (January 13. 2020) (Fuma CC Brief)
1019	1013-2023_NJOY Email_Re_Alleged Priority Date (See <i>In Re Vaporizer Devices, Cartridges Used Therewith, and Components Thereof</i> , before the International Trade Commission, 337-TA-1372)
1020	<i>Fuma International LLC v. R.J. Reynolds Vapor Company</i> , Case No. 1:19-cv-260, D.I. 95 (March 23, 2020) (Markman Order)
1021	<i>Fuma International LLC v. R.J. Reynolds Vapor Company</i> , Case No. 1:19-cv-260, D.I. 133 (November 25. 2020) (Fuma SJ Brief)
1022	<i>In Re Vaporizer Devices, Cartridges Used Therewith, and Components Thereof</i> , 337-TA-1368, NJOY's Initial Invalidity Contentions and Exhibits
1023	<i>Fuma International LLC v. R.J. Reynolds Vapor Company</i> , Case No. 1:19-cv-260, Conley Deposition Transcript
1024	<i>Fuma International LLC v. R.J. Reynolds Vapor Company</i> , Case No. 1:19-cv-260, Conley Deposition Ex. 2A
1025	<i>Fuma International LLC v. R.J. Reynolds Vapor Company</i> , Case No. 1:19-cv-260, Dkt. 120 (Fuma Brief)

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1026	Affidavit for Certified English Translation of Chinese Patent Publication No. CN201238610 (“Xia”)
1027	Chinese Patent Publication No. CN201238610 (“Xia”)
1028	Affidavit for Certified English Translation and Chinese Patent Publication No. CN101366554 (“Wang”)
1029	Chinese Patent Publication No. CN101366554 (“Wang”)
1030	Affidavit for Certified English Translation and Chinese Patent No. CN 201085044Y (“Fang”)
1031	Chinese Patent No. CN 201085044Y (“Fang”)
1032	337-TA-1372 NJOY’s Initial Domestic Industry Contentions, Ex. 5
1033	337-TA-1372 NJOY’s Infringement Allegations Filed With Complaint, Ex. 8

TABLE OF CHALLENGED CLAIMS

Claim 1	Claim 1 Shorthand¹
1[p] A cartridge configured to couple to a power source of an electronic vaporizer, the cartridge comprising:	1[p]: Cartridge
1[a1] a housing having an interior and a solution holding medium adapted to hold a solution,	1[a1]: Housing and solution holding medium
1[a2] the housing having a first end and a second end that is opposite the first end, the housing having a first aperture proximate the first end and a second aperture proximate the second end,	1[a2]: First aperture proximate first end; second aperture proximate second end
1[a3] the first end of the housing being adapted to electrically couple to the power source,	1[a3] First end electrically couples to power source
1[a4] the first aperture and the second aperture being in communication with one another to permit an airflow through the housing from the first aperture to the second aperture;	1[a4]: First and second aperture in communication with one another
1[b1] a heating element located in the interior of the housing, the heating element extending transversely to a central longitudinal axis of the housing and being at least partially exposed to the airflow,	1[b1]: Transverse heating element partially exposed to the airflow
1[b2]: the heating element being configured to vaporize at least a portion of the solution for oral provision to an individual in the airflow, the heating element being responsive to electrical power received from the power source; and	1[b2]: Heater vaporizes solution for oral provision in the airflow responsive to power source
1[c] an airflow passageway in the housing, at least a portion of the airflow passageway extending centrally and axially with respect to the housing,	1[c]: At least a portion of the airflow passageway extending centrally and axially with respect to the housing

^{1/} Shorthand is for convenience only, is not controlling, and is not the basis for the analysis herein.

1[d] wherein the airflow passageway extends centrally and axially from the first aperture to the second aperture.	1[d]: Airflow passageway extends centrally and axially from first to second aperture
Claim 2	Claim 2 Shorthand
The cartridge of claim 1, further in combination with a power source adapted to be electrically coupled to the first end of the housing, the power source including a battery.	[2]: Battery
Claim 3	Claim 3 Shorthand
The cartridge of claim 1, wherein the airflow passageway has a length extending intermediate of the heating element and the second aperture, the airflow passageway having an interior between the heating element and the second aperture, the interior having no cross-sectional area measured perpendicular to the central longitudinal axis of the housing smaller in cross-sectional area than a cross-sectional area of the second aperture.	[3]: Airflow passageway cross-sectional area between heater and second aperture larger than second aperture
Claim 4	Claim 4 Shorthand
The cartridge of claim 1, wherein the airflow passageway has a length extending intermediate of the heating element and the second aperture, the length of the airflow passageway having a substantially uniform cross-sectional area along a continuous majority of the length, the substantially uniform cross-sectional area being measured perpendicular to the central longitudinal axis of the housing, no portion of the airflow passageway from immediately adjacent the heating element to the second aperture having a cross-sectional area smaller than a cross-sectional area of the second aperture.	[4]: Airflow passageway has substantially uniform cross-sectional area along majority of the length of the airflow passageway between heater and second aperture
Claim 5	Claim 5 Shorthand
5[p] A cartridge configured to couple to a power source of an electronic vaporizer, the cartridge comprising:	5[p]: Cartridge
5[a] a housing having an interior and a solution holding medium adapted to hold a solution, the housing having a first end and a second end that is opposite the first end, the housing having a first aperture proximate the first end and a second aperture proximate the second end, the first end of the housing being adapted to electrically couple to the	5[a]: Housing and solution holding medium; first aperture proximate first end; second aperture proximate

power source, the first aperture and the second aperture being in communication with one another to permit an airflow through the housing from the first aperture to the second aperture;	second end; first end electrically couples to power source; first and second aperture in communication with one another.
5[b] a heating element located in the interior of the housing, the heating element extending transversely to a central longitudinal axis of the housing and being at least partially exposed to the airflow, the heating element being configured to vaporize at least a portion of the solution for oral provision to an individual in the airflow, the heating element being responsive to electrical power received from the power source; and	5[b]: Transverse heating element partially exposed to airflow where heater vaporized solution for oral provision in the airflow responsive to power source.
5[c] an airflow passageway in the housing, at least a portion of the airflow passageway extending centrally and axially with respect to the housing,	5[c]: At least a portion of the airflow passageway extending centrally and axially with respect to the housing
5[d] wherein the airflow passageway extends in a straight path from the first aperture to the second aperture with only the heating element obstructing a portion of the airflow through the airflow passageway along the central longitudinal axis of the housing.	5[d]: Airflow passageway extends in a straight path from first to second aperture with only heating element obstructing a portion of the airflow
Claim 6	Claim 6 Shorthand
The cartridge of claim 5, further in combination with a power source adapted to be electrically coupled to the first end of the housing, the power source including a battery.	[6]: Battery
Claim 7	Claim 7 Shorthand
The cartridge of claim 5, wherein the airflow passageway having a length extending intermediate of the heating element and the second aperture, the airflow passageway having an interior between the heating element and the second aperture, the interior having no cross-sectional area measured perpendicular to the central longitudinal	[7]: Airflow passageway cross-sectional area between heater and second aperture

axis of the housing smaller in cross-sectional area than a cross-sectional area of the second aperture.	larger than second aperture.
Claim 8	Claim 8 Shorthand
The cartridge of claim 5, wherein the airflow passageway having a length extending intermediate of the heating element and the second aperture, the length of the airflow passageway having a substantially uniform cross-sectional area along a continuous majority of the length, the substantially uniform cross-sectional area being measured perpendicular to the central longitudinal axis of the housing, no portion of the airflow passageway from immediately adjacent the heating element to the second aperture having a cross-sectional area smaller than a cross-sectional area of the second aperture	[8]: Airflow passageway has substantially uniform cross-sectional area along majority of the length of the airflow passageway between heater and second aperture.
Claim 9	Claim 9 Shorthand
9[p] A cartridge configured to couple to a power source of an electronic vaporizer, the cartridge comprising:	9[p]: Cartridge.
9[a] a housing having an interior and a solution holding medium adapted to hold a solution, 9[a2] the housing having a first end and a second end that is opposite the first end, the housing having a first aperture proximate the first end and a second aperture proximate the second end, 9[a3] the first end of the housing being adapted to electrically couple to the power source, the first aperture and the second aperture being in communication with one another to permit an airflow through the housing from the first aperture to the second aperture; and	9[a]: Housing and solution holding medium; first aperture proximate first end; second aperture proximate second end; first end electrically couples to power source; first and second aperture in communication with one another .
9[b] a heating element located in the interior of the housing, the heating element extending transversely to a central longitudinal axis of the housing and being at least partially exposed to the airflow, the heating element being configured to vaporize at least a portion of the solution for oral provision to an individual in the airflow, the heating element being responsive to electrical power received from the power source,	9[b]: Transverse heating element partially exposed to airflow where heater vaporized solution for oral provision in the airflow responsive to power source.
9[c] wherein the airflow through the housing follows an airflow path, a first portion of the airflow path proximate	9[c]: Airflow path proximate first and

the first aperture being defined substantially centrally and axially with respect to the central longitudinal axis of the housing, and a second portion of the airflow path proximate to the second aperture being defined substantially centrally and axially with respect to the central longitudinal axis of the housing.	second apertures is substantially central and axial
Claim 10	Claim 10 Shorthand
The cartridge of claim 9, further in combination with a power source adapted to be electrically coupled to the first end of the housing, the power source including a battery.	[10]: Battery.
Claim 11	Claim 11 Shorthand
The cartridge of claim 9, wherein the cartridge is adapted to permit the airflow to pass on both transverse sides of the heating element during use of the electronic vaporizer.	[11]: Airflow passes on both transverse sides of the heating element
Claim 12	Claim 12 Shorthand
The cartridge of claim 9, wherein the heating element includes a wicking material being operative to permit at least a portion of the solution to be held in the solution holding medium to be drawn toward the heating element to be vaporized.	[12]: Wicking material operative to permit solution to be drawn to the heating element
Claim 13	Claim 13 Shorthand
The cartridge of claim 9, wherein the first aperture proximate the first end is smaller than the second aperture proximate the second end.	[13]: First aperture smaller than the second aperture
Claim 14	Claim 14 Shorthand
The cartridge of claim 9, further comprising a solution in the solution holding medium, the solution comprising one of propylene glycol and nicotine.	[14]: Solution containing either nicotine or propylene glycol
Claim 15	Claim 15 Shorthand
The cartridge of claim 9, further comprising an airflow passageway in the housing, at least a portion of the airflow passageway extending centrally and axially with respect to the housing.	[15]: At least a portion of the airflow passageway extending centrally and axially with respect to housing.
Claim 16	Claim 16 Shorthand

The cartridge of claim 15, wherein a majority of the portion of the airflow passageway has a substantially uniform cross-sectional area measured perpendicular to the central longitudinal axis of the housing between the heating element and the second aperture.	[16]: Majority of portion of airflow passageway having substantially uniform cross-sectional area between heating element and second aperture.
Claim 17	Claim 17 Shorthand
The cartridge of claim 9, wherein the heating element includes a coil.	[17]: Heating element is a coil
Claim 18	Claim 18 Shorthand
The cartridge of claim 9, wherein the housing further comprises an airflow chamber having a length extending intermediate of the heating element and the second aperture, the chamber having an interior between the heating element and the second aperture, the interior having no cross-sectional area measured perpendicular to the central longitudinal axis of the housing smaller in cross-sectional area than a cross-sectional area of the second aperture.	[18]: Cross-sectional area of airflow chamber intermediate the heater and the second aperture being no smaller than cross sectional area of second aperture.
Claim 19	Claim 19 Shorthand
The cartridge of claim 9, wherein the housing further comprises an airflow chamber having a length extending intermediate of the heating element and the second aperture, the length of the chamber having a substantially uniform cross-sectional area along a continuous majority of the length, the substantially uniform cross-sectional area being measured perpendicular to the central longitudinal axis of the housing, no portion of the chamber from immediately adjacent the heating element to the second aperture having a cross-sectional area smaller than a cross-sectional area of the second aperture.	[19]: Airflow chamber intermediate heater and second aperture having substantially uniform cross-sectional area along continuous majority of the length; no portion of the airflow chamber having cross-sectional area smaller than second aperture.
Claim 20	Claim 20 Shorthand
The cartridge of claim 9, wherein the heating element includes a material that when powered by the power	[20]: Heating element includes a material adapted to vaporize

source is adapted to vaporize the solution brought into contact with the heating element.	the solution; <i>see also</i> 1[b1]-[b2]
Claim 21	Claim 21 Shorthand
21[p] A cartridge configured to couple to a power source of an electronic vaporizer, the cartridge comprising:	21[p]: Cartridge.
21[a] a housing having an interior and a solution holding medium adapted to hold a solution, the housing having a first end and a second end that is opposite the first end and a central longitudinal axis extending from the first end to the second end, the housing having a first aperture proximate the first end and a second aperture proximate the second end, the first end of the housing being adapted to electrically couple to the power source, the first aperture and the second aperture being in communication with one another to permit an airflow through the housing; and	21[a]: Housing and solution holding medium; first aperture proximate first end; second aperture proximate second end; first end electrically couples to power source; first and second aperture in communication with one another.
21[b] a heating element located in the interior of the housing, the heating element including a coil extending transversely to the central longitudinal axis of the housing and transversely to a direction of the airflow such that the airflow passes on both transverse sides of the heating element during use of the electronic vaporizer, the heating element being configured to vaporize at least the portion of the solution drawn to the heating element for oral provision to an individual in the airflow, the heating element being responsive to electrical power received from the power source; and	21[b]: Transverse coil responsive to electrical power extending along the central longitudinal axis of the housing and transverse to the airflow where airflow passes on both transverse sides of heating coil; heating coil configured to vaporize solution drawn to heating element for oral provision.
21[c] an airflow passageway in the housing, at least a portion of the airflow passageway extending centrally and axially with respect to the housing,	21[c]: Portion of the airflow passageway extending centrally and axially with respect to housing.

21[d] wherein the airflow passageway extends centrally and axially from the first aperture to the second aperture.	21[d]: Airflow passageway extends centrally and axially from first to second aperture.
Claim 22	Claim 22 Shorthand
The cartridge of claim 21, further in combination with a power source adapted to be electrically coupled to the first end of the housing, the power source including a battery.	[22]: Battery.
Claim 23	Claim 23 Shorthand
The cartridge of claim 21, wherein the airflow passageway has a length extending intermediate of the heating element and the second aperture, the airflow passageway having an interior between the heating element and the second aperture, the interior having no cross-sectional area measured perpendicular to the central longitudinal axis of the housing smaller in cross-sectional area than a cross-sectional area of the second aperture.	[23]: Interior of airflow passageway intermediate heater and second aperture having cross-sectional area no smaller than second aperture.
Claim 24	Claim 24 Shorthand
The cartridge of claim 21, wherein the airflow passageway has a length extending intermediate of the heating element and the second aperture, the length of the airflow passageway having a substantially uniform cross-sectional area along a continuous majority of the length, the substantially uniform cross-sectional area being measured perpendicular to the central longitudinal axis of the housing, no portion of the airflow passageway from immediately adjacent the heating element to the second aperture having a cross-sectional area smaller than a cross-sectional area of the second aperture.	[24]: Airflow passageway intermediate heater and second aperture having substantially uniform cross-sectional area along continuous majority of the housing's length; no cross sectional area of the passageway being smaller than second aperture.
Claim 25	Claim 25 Shorthand
25[p] A cartridge configured to couple to a power source of an electronic vaporizer, the cartridge comprising:	25[p]: Cartridge.
25[a] a housing having an interior and a solution holding medium adapted to hold a solution, the housing having a first end and a second end that is opposite the first end and	25[a]: Housing and solution holding medium; first

a central longitudinal axis extending from the first end to the second end, the housing having a first aperture proximate the first end and a second aperture proximate the second end, the first end of the housing being adapted to electrically couple to the power source, the first aperture and the second aperture being in communication with one another to permit an airflow through the housing; and	aperture proximate first end; second aperture proximate second end; first end electrically couples to power source; first and second aperture in communication with one another.
25[b] a heating element located in the interior of the housing, the heating element including a coil extending transversely to the central longitudinal axis of the housing and transversely to a direction of the airflow such that the airflow passes on both transverse sides of the heating element during use of the electronic vaporizer, the heating element being configured to vaporize at least the portion of the solution drawn to the heating element for oral provision to an individual in the airflow, the heating element being responsive to electrical power received from the power source; and	25[b]: Transverse heating element partially exposed to airflow where heater vaporized solution for oral provision in the airflow responsive to power source.
25[c] an airflow passageway in the housing, at least a portion of the airflow passageway extending centrally and axially with respect to the housing,	25[c]: At least a portion of the airflow passageway extending centrally and axially with respect to the housing.
25[d] wherein the airflow passageway extends in a straight path from the first aperture to the second aperture with only the heating element obstructing a portion of the airflow through the airflow passageway along the central longitudinal axis of the housing.	25[d]: Only heating element obstructs airflow passageway between first aperture and second aperture along housing's central and longitudinal axis.

Claim 26	Claim 26 Shorthand
The cartridge of claim 25, further in combination with a power source adapted to be electrically coupled to the first end of the housing, the power source including a battery.	[26]: Battery.
Claim 27	Claim 27 Shorthand
The cartridge of claim 25, wherein the airflow passageway has a length extending intermediate of the heating element and the second aperture, the airflow passageway having an interior between the heating element and the second aperture, the interior having no cross-sectional area measured perpendicular to the central longitudinal axis of the housing smaller in cross-sectional area than a cross-sectional area of the second aperture.	[27]: Airflow passageway cross-sectional area between heater and second aperture larger than second aperture.
Claim 28	Claim 28 Shorthand
The cartridge of claim 25, wherein the airflow passageway has a length extending intermediate of the heating element and the second aperture, the length of the airflow passageway having a substantially uniform cross-sectional area along a continuous majority of the length, the substantially uniform cross-sectional area being measured perpendicular to the central longitudinal axis of the housing, no portion of the airflow passageway from immediately adjacent the heating element to the second aperture having a cross-sectional area smaller than a cross-sectional area of the second aperture.	[28]: Airflow passageway has substantially uniform cross-sectional area along majority of the length of the airflow passageway between heater and second aperture.
Claim 29	Claim 29 Shorthand
29[p] A cartridge configured to couple to a power source of an electronic vaporizer, the cartridge comprising:	29[p]: Cartridge.
29[a] a housing having an interior and a solution holding medium adapted to hold a solution, the housing having a first end and a second end that is opposite the first end and a central longitudinal axis extending from the first end to the second end, the housing having a first aperture proximate the first end and a second aperture proximate the second end, the first end of the housing being adapted to electrically couple to the power source, the first aperture and the second aperture being in communication with one another to permit an airflow through the housing; and	29[a]: Housing and solution holding medium; first aperture proximate first end; second aperture proximate second end; first end electrically couples to power source; first and second aperture

	in communication with one another.
29[b] a heating element located in the interior of the housing, the heating element including a coil extending transversely to the central longitudinal axis of the housing and transversely to a direction of the airflow such that the airflow passes on both transverse sides of the heating element during use of the electronic vaporizer, the heating element being configured to vaporize at least the portion of the solution drawn to the heating element for oral provision to an individual in the airflow, the heating element being responsive to electrical power received from the power source,	29[b]: Transverse coil responsive to electrical power extending along the central longitudinal axis of the housing and transverse to the airflow where airflow passes on both transverse sides of heating coil; heating coil configured to vaporize solution drawn to heating element for oral provision.
29[c] wherein the airflow through the housing follows an airflow path, a first portion of the airflow path proximate the first aperture being defined substantially centrally and axially with respect to the central longitudinal axis of the housing, and a second portion of the airflow path proximate to the second aperture being defined substantially centrally and axially with respect to the central longitudinal axis of the housing.	29[c]: Airflow path being central and axial proximate the first aperture and the second aperture.
Claim 30	Claim 30 Shorthand
The cartridge of claim 29, further in combination with a power source adapted to be electrically coupled to the first end of the housing, the power source including a battery.	[30]: Battery.
Claim 31	Claim 31 Shorthand
The cartridge of claim 29, wherein the heating element includes a wicking material being operative to permit at least a portion of the solution to be held in the solution holding medium to be drawn toward the heating element to be vaporized.	[31]: Wicking material permitting solution to be drawn toward the heating element.
Claim 32	Claim 32 Shorthand

The cartridge of claim 29, wherein the first aperture proximate the first end is smaller than the second aperture proximate the second end.	[32]: First aperture smaller than second aperture.
Claim 33	Claim 33 Shorthand
The cartridge of claim 29, further comprising a solution in the solution holding medium, the solution comprising one of propylene glycol and nicotine.	[33]: Solution contains nicotine or propylene glycol.
Claim 34	Claim 34 Shorthand
The cartridge of claim 29, further comprising an airflow passageway in the housing, at least a portion of the airflow passageway extending centrally and axially with respect to the housing.	[34]: Portion of airflow passageway extending centrally and axially with respect to housing.
Claim 35	Claim 35 Shorthand
The cartridge of claim 34, wherein a majority of the portion of the airflow passageway has a substantially uniform cross-sectional area measured perpendicular to the central longitudinal axis of the housing between the heating element and the second aperture	[35]: Majority of airflow passageway has substantially uniform cross-sectional area between heating element and second aperture.
Claim 36	Claim 36 Shorthand
The cartridge of claim 29, wherein the housing further comprises an airflow chamber having a length extending intermediate of the heating element and the second aperture, the chamber having an interior between the heating element and the second aperture, the interior having no cross-sectional area measured perpendicular to the central longitudinal axis of the housing smaller in cross-sectional area than a cross-sectional area of the second aperture.	[36]: Cross-sectional area of airflow chamber intermediate the heater and the second aperture being no smaller than cross sectional area of second aperture.
Claim 37	Claim 37 Shorthand
The cartridge of claim 29, wherein the housing further comprises an airflow chamber having a length extending intermediate of the heating element and the second aperture, the length of the chamber having a substantially uniform cross-sectional area along a continuous majority of the length, the substantially uniform cross-sectional	[37]: Airflow chamber intermediate heater and second aperture having substantially uniform cross-sectional area

area being measured perpendicular to the central longitudinal axis of the housing, no portion of the chamber from immediately adjacent the heating element to the second aperture having a cross-sectional area smaller than a cross-sectional area of the second aperture.	along continuous majority of the length; no portion of the airflow chamber having cross-sectional area smaller than second aperture.
Claim 38	Claim 38 Shorthand
38[p] A cartridge configured to couple to a power source of an electronic vaporizer, the cartridge comprising:	38[p]: Cartridge.
38[a] a housing having an interior and a solution holding medium adapted to hold a solution, the housing having a first end and a second end that is opposite the first end and a central longitudinal axis extending from the first end to the second end, the housing having a first aperture proximate the first end and a second aperture proximate the second end, the first end of the housing being adapted to electrically couple to the power source, the first aperture and the second aperture being in communication with one another to permit an airflow through the housing; and	38[a]: Housing and solution holding medium; first aperture proximate first end; second aperture proximate second end; first end electrically couples to power source; first and second aperture in communication with one another.
38[b] a heating element located in the interior of the housing, the heating element extending transversely to the central longitudinal axis of the housing and being at least partially exposed to the airflow such that the airflow entering through the first aperture will separate and then pass on both transverse sides of the heating element and then continue along an airflow path co-axial with the central longitudinal axis of the housing toward the second aperture during use of the electronic vaporizer, the heating element being configured to vaporize at least the portion of the solution for oral provision to an individual in the airflow, the heating element being responsive to electrical power received from the power source; and	38[b]: Airflow entering first aperture will separate and then pass on both transverse sides of the heating element and then continue along an airflow path co-axial with the central longitudinal axis of the housing
38[c] an airflow passageway in the housing, at least a portion of the airflow passageway extending centrally and axially with respect to the housing,	38[c]: Portion of airflow passageway extending centrally

	and axially with respect to housing.
38[d] wherein the airflow passageway extends centrally and axially from the first aperture to the second aperture.	38[d]: Airflow passageway central and axial from first to second aperture.
Claim 39	Claim 39 Shorthand
The cartridge of claim 3, further in combination with a power source adapted to be electrically coupled to the first end of the housing, the power source including a battery.	[39]: Battery.
Claim 40	Claim 40 Shorthand
The cartridge of claim 38, wherein the heating element comprises a material that when powered by the power source is adapted to vaporize the solution brought into contact with the heating element.	[40]: Heating element adapted to vaporize solution brought into contact with heater.
Claim 41	Claim 41 Shorthand
The cartridge of claim 38, further comprising a solution in the solution holding medium, the solution comprising one of propylene glycol and nicotine.	[41]: Solution contains nicotine or propylene glycol.
Claim 42	Claim 42 Shorthand
The cartridge of claim 38, wherein a majority of the portion of the airflow passageway has a substantially uniform cross-sectional area measured perpendicular to the central longitudinal axis of the housing between the heating element and the second aperture.	[42]: Majority of airflow passageway has substantially uniform cross-sectional area between heater and second aperture.
Claim 43	Claim 43 Shorthand
The cartridge of claim 38, wherein the housing further comprises an airflow chamber having a length extending intermediate of the heating element and the second aperture, the chamber having an interior between the heating element and the second aperture, the interior having no cross-sectional area measured perpendicular to the central longitudinal axis of the housing smaller in cross-sectional area than a cross-sectional area of the second aperture.	[43]: Cross-sectional area of interior of airflow chamber being no smaller than the second aperture.
Claim 44	Claim 44 Shorthand

The cartridge of claim 38, wherein the housing further comprises an airflow chamber having a length extending intermediate of the heating element and the second aperture, the length of the chamber having a substantially uniform cross-sectional area along a continuous majority of the length, the substantially uniform cross-sectional area being measured perpendicular to the central longitudinal axis of the housing, no portion of the chamber from immediately adjacent the heating element to the second aperture having a cross-sectional area smaller than a cross-sectional area of the second aperture	[44]: Airflow chamber having substantially uniform cross-sectional area along continuous majority of the length; no portion of the airflow chamber having cross-sectional area smaller than second aperture.
Claim 45	Claim 45 Shorthand
45[p] A cartridge configured to couple to a power source of an electronic vaporizer, the cartridge comprising:	45[p]: Cartridge.
45[a] a housing having an interior and a solution holding medium adapted to hold a solution, the housing having a first end and a second end that is opposite the first end and a central longitudinal axis extending from the first end to the second end, the housing having a first aperture proximate the first end and a second aperture proximate the second end, the first end of the housing being adapted to electrically couple to the power source, the first aperture and the second aperture being in communication with one another to permit an airflow through the housing; and	45[a]: Housing and solution holding medium; first aperture proximate first end; second aperture proximate second end; first end electrically couples to power source; first and second aperture in communication with one another.
45[b] a heating element located in the interior of the housing, the heating element extending transversely to the central longitudinal axis of the housing and being at least partially exposed to the airflow such that the airflow entering through the first aperture will separate and then pass on both transverse sides of the heating element and then continue along an airflow path co-axial with the central longitudinal axis of the housing toward the second aperture during use of the electronic vaporizer, the heating element being configured to vaporize at least the portion of the solution for oral provision to an individual in the airflow, the heating element being responsive to electrical power received from the power source; and	45[b]: Transverse heating element at least partially exposed to airflow such that airflow separates and passes on both transverse sides of the heating element and continues co-axially toward the second aperture; heating element responsive to

	electrical power and adapted to vaporize solution.
45[c] an airflow passageway in the housing, at least a portion of the airflow passageway extending centrally and axially with respect to the housing,	45[c]: Portion of the airflow passageway extending centrally and axially with respect to the housing.
45[d] wherein the airflow passageway extends in a straight path from the first aperture to the second aperture with only the heating element obstructing a portion of the airflow through the airflow passageway along the central longitudinal axis of the housing.	45[d]: Airflow passageway extends centrally and axially from first to second aperture.
Claim 46	Claim 46 Shorthand
The cartridge of claim 45, further in combination with a power source adapted to be electrically coupled to the first end of the housing, the power source including a battery.	[46]: Battery.
Claim 47	Claim 47 Shorthand
The cartridge of claim 45, wherein the airflow passageway has a length extending intermediate of the heating element and the second aperture, the airflow passageway having an interior between the heating element and the second aperture, the interior having no cross-sectional area measured perpendicular to the central longitudinal axis of the housing smaller in cross-sectional area than a cross-sectional area of the second aperture.	[47]: Airflow passageway cross-sectional area between heater and second aperture larger than second aperture.

Claim 48	Claim 48 Shorthand
The cartridge of claim 45, wherein the airflow passageway has a length extending intermediate of the heating element and the second aperture, the length of the airflow passageway having a substantially uniform cross-sectional area along a continuous majority of the length, the substantially uniform cross-sectional area being measured perpendicular to the central longitudinal axis of the housing, no portion of the airflow passageway from immediately adjacent the heating element to the second aperture having a cross-sectional area smaller than a cross-sectional area of the second aperture.	[48]: Airflow passageway has substantially uniform cross-sectional area along majority of the length of the airflow passageway between heater and second aperture.

I. INTRODUCTION

Petitioner JUUL Labs, Inc. (“JLI” or “Petitioner”) respectfully requests *inter partes* review of claims 1-48 of U.S. Patent No. 11,497,864 (the “’864 patent”) (Ex. 1001), assigned to patent owner NJOY, LLC (“NJOY” or “Patent Owner”).

The ’864 patent claims an electronic cigarette device that was generally well-known years before the ’864 patent’s alleged priority date.² The ’864 Patent admits that most of the elements of its claims were known in the art:

Conventional electronic cigarette designs generally include a battery, a heating element, and a mouthpiece. The mouthpiece includes a liquid solution that comprises nicotine and the battery provides power to the heating element, which in turn operates to vaporize the solution.

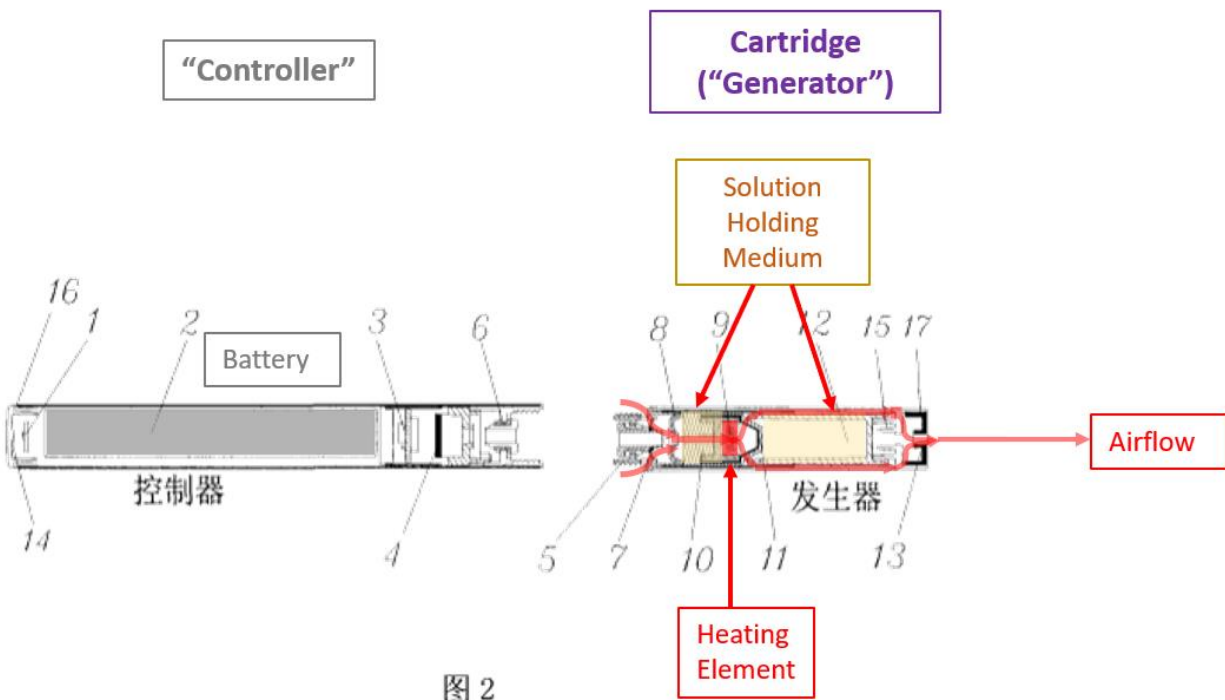
Ex. 1001, 1:20-32.

The ’864 patent purports to disclose three inventive modifications to this conventional design. *E.g.*, Ex. 1001, 1:44-2:38. Two of them—an adapter (described in connection with Figures 7-8) and a power harvesting device (described in connection with Figure 9)—are not the subject of the challenged claims. Instead, the claims are directed to the third purported invention, separating an electronic vaporizer into at least two coupled parts, one that contains the battery/power source

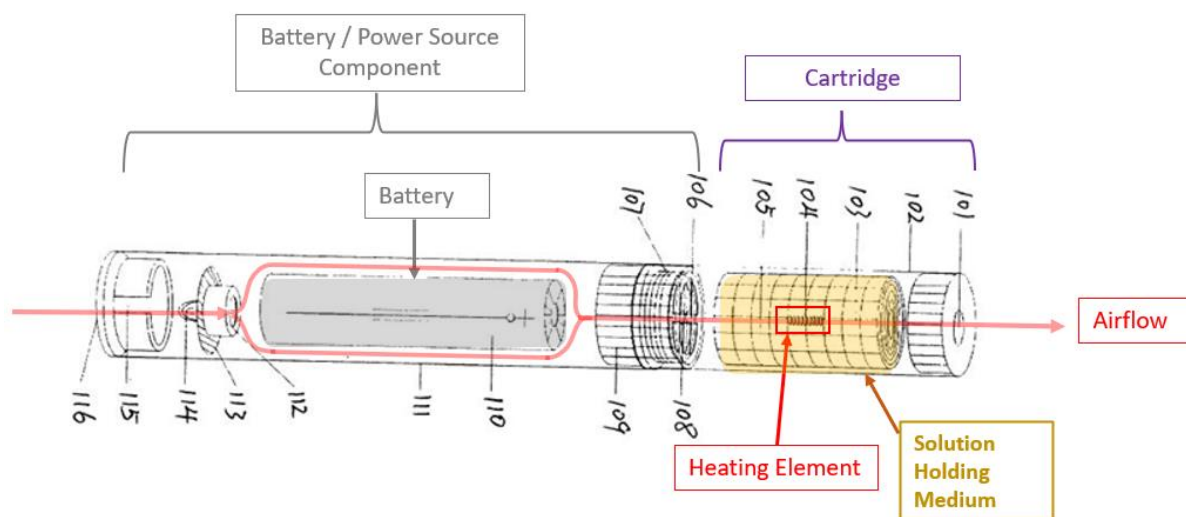
² JLI does not concede that the alleged priority date is correct or supported.

and another—a “cartridge”—that “may include a heating element” and “a solution that is positioned proximate to the heating solution.” Ex. 1001, 1:36-59.

But dividing an electronic cigarette like this was already well known in the art. For example, each of the prior art references Xia (the primary reference of Ground 1) and Wang (the primary reference of Ground 2) discloses an electronic cigarette that features two distinct parts, one that includes a battery/power source and another that is a cartridge that includes, among other things, a heating element and a solution positioned proximate that heating element:



Ex. 1004, Fig. 2 (Xia) (annotated).



Ex. 1005 (Wang), Fig. 1 (annotated). Moreover, Gregory Conley, the first-named inventor and then-president of Patent Owner's predecessor-in-interest, testified that the only possible inventive aspect of his "invention" (as set forth in the similar claim 1 of a parent to the '864 patent, U.S. 9,532,604) was that he moved the heating element in or around the airflow passageway so that vaporization occurs "in the airflow" instead of outside it. Ex. 1023 (Conley 12/4/19 Dep. Tr.), 7:16-59:8; *see also* 24:16-25:4, 33:9-34:8, 38:1-42:15, 47:9-14; Ex. 1024 (Conley Dep. Ex. 2A). But as depicted above and described below, all references described herein (and many more in the art) disclose that concept.

And any arguments that these references do not teach or make obvious the specific elements of the challenged claims should fail as contrary to the teaching of the asserted art and the '864 Patent itself. Indeed, most of the potential arguments

against these references would be contrary to the infringement positions taken by Patent Owner in parallel ITC litigation, which repeat the positions asserted and then adopted by the district court in granting summary judgment when the parent patent to the '864 was asserted in *Fuma International LLC v. R.J. Reynolds Vapor Company* in the District Court for the Middle District of North Carolina.

Accordingly, claims 1-48 are unpatentable under 35 U.S.C. § 103 and the Board should cancel all challenged claims of the '864 patent.

II. MANDATORY NOTICES UNDER 37 C.F.R. § 42.8

As set forth below and pursuant to 37 C.F.R. § 42.8, the following mandatory notices are provided as part of this Petition.

A. Real Parties-in-Interest

JLI is the real party-in-interest. JLI is not controlled by any other entity.

B. Related Matters

Petitioner submits that the '864 patent is the subject of two patent infringement lawsuits brought by Patent Owner against Petitioner: (1) *NJOY, LLC v. JUUL Labs, Inc.*, in the District of Delaware, Case No. 1-23-cv-00917, filed August 22, 2023, and (2) *In Re Vaporizer Devices, Cartridges Used Therewith, and Components Thereof*, before the International Trade Commission, Case No. 337-TA-3961, filed on the same date.

The '864 patent was previously the subject of litigation by NJOY's predecessor-in-interest Fuma International LLC as plaintiff against the current Patent Owner and others in the Eastern District of Virginia, Case No. 2-23-cv-00231, which was dismissed on August 14, 2023. Fuma International also previously asserted the '864 patent against Logic Technology Development LLC in the District of Delaware, Case No. 2-23-cv-04093, filed July 31, 2023 and dismissed August 25, 2023.

C. Lead and Back-Up Counsel

Lead Counsel: William A. Meunier (Reg. No. 41,193) MINTZ, LEVIN, COHN, FERRIS, GLOVSKY AND POPEO, P.C. One Financial Center Boston, MA 02111 Telephone: 617-542-6000 WAMeunier@mintz.com	Back Up Counsel: Michael T. Renaud (Reg. No. 44,299) Adam S. Rizk (Reg. No. 66,867) MINTZ, LEVIN, COHN, FERRIS, GLOVSKY AND POPEO, P.C. One Financial Center Boston, MA 02111 Telephone: 617-542-6000 ARizk@mintz.com MTRenaud@mintz.com Reza Dokhanchy (Reg. No. 62,795) Michael D Van Loy (Reg. No. 52,315) MINTZ, LEVIN, COHN, FERRIS, GLOVSKY AND POPEO, P.C. 3580 Carmel Mountain Road, Suite 300 San Diego, CA 92130 Telephone: 858-314-1500 MDVanLoy@mintz.com RDokhanchy@mintz.com
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Petitioner consents to electronic service at the above email addresses.

D. Service Information

Pursuant to 37 C.F.R. §42.8(b)(4), Petitioner identifies the following service information: Petitioner consents to service by electronic mail at the following addresses: MDVanLoy@mintz.com, RDokhanchy@mintz.com, MTRenaud@mintz.com, ARizk@mintz.com, and WAMeunier@mintz.com.

Petitioner's Power of Attorney is filed concurrently with this petition.

III. PAYMENT OF FEES

Pursuant to 37 C.F.R. §§ 42.103 and 42.15(a), the requisite filing fee of \$41,500 (*inter partes* review request fee of \$19,000 and *inter partes* review post-institution fee of \$22,500) for a Petition for *Inter Partes* Review is submitted herewith. Claim 1 of the '864 Patent is being reviewed as part of this Petition. The undersigned further authorizes payment from Deposit Account No. 50-0311 for any additional fees or refund that may be due in connection with the Petition.

IV. STANDING

Petitioner certifies that the '864 patent is available for *inter partes* review and that Petitioner is not barred or estopped from requesting IPR on the grounds identified herein. The '864 Patent issued on November 15, 2022, and this Petition is filed within one year of service of the Complaint against Petitioner alleging infringement of the '864 Patent and is not barred under 35 U.S.C. § 315(b). *See Ex.*

1003 (*NJOY, LLC v. JUUL Labs, Inc.*, C.A. No. 1:23-cv-00917 (D. Del.) (Complaint filed August 22, 2023)).

V. CHALLENGE AND STATEMENT OF RELIEF REQUESTED

Pursuant to 35 U.S.C. § 311 and 37 C.F.R. § 42.104(b), Petitioner requests institution of *inter partes* review and cancellation of Claims 1-48 under 35 U.S.C. § 103 based on the following prior art and grounds:

Ground	Claims	35 U.S.C.	References
1	1-48	§ 103	Xia in view of Wang and/or Fang
2	1-48	§ 103	Wang in view of Fang

The Petition presents clear evidence of unpatentability for Claims 1-48 and thereby establishes a reasonable likelihood that the Petitioner will prevail in establishing that Claims 1-48 are unpatentable.

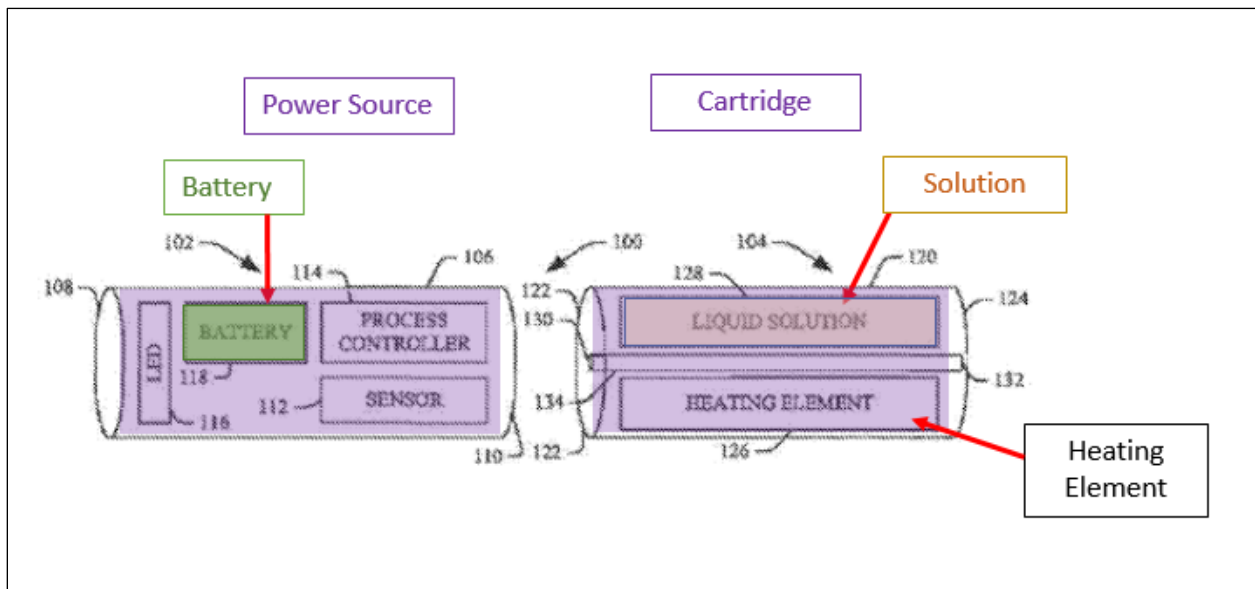
Submitted with the Petition is the Declaration of Robert H. Sturges, Ph.D., PE a qualified technical expert (Ex. 1007).

VI. THE '864 PATENT

A. Summary of the '864 Patent

The '864 patent relates to “[e]lectronic cigarettes (also referred to as e-cigarettes or personal vaporizers).” Ex. 1001, 1:20-21; Ex. 1007, ¶34. These “battery-powered devices...are configured to deliver a vapour that comprises nicotine to an individual,” with “designs generally includ[ing] a battery, a heating element, and a mouthpiece.” Ex. 1001, 1:21-24. The '864 Patent describes

“electronic vaporizers...pertaining to cartridges that comprise heating elements configured to vaporize a solution” comprising a “housing,” a “heating element,” a “solution,” and an “adapter...configured to electrically or electronically couple a power source...with a heating element.” Ex. 1001, 1:39-62. The adapter may also “provide for airflow.” Ex. 1001, 2:10; Ex. 1007, ¶41.

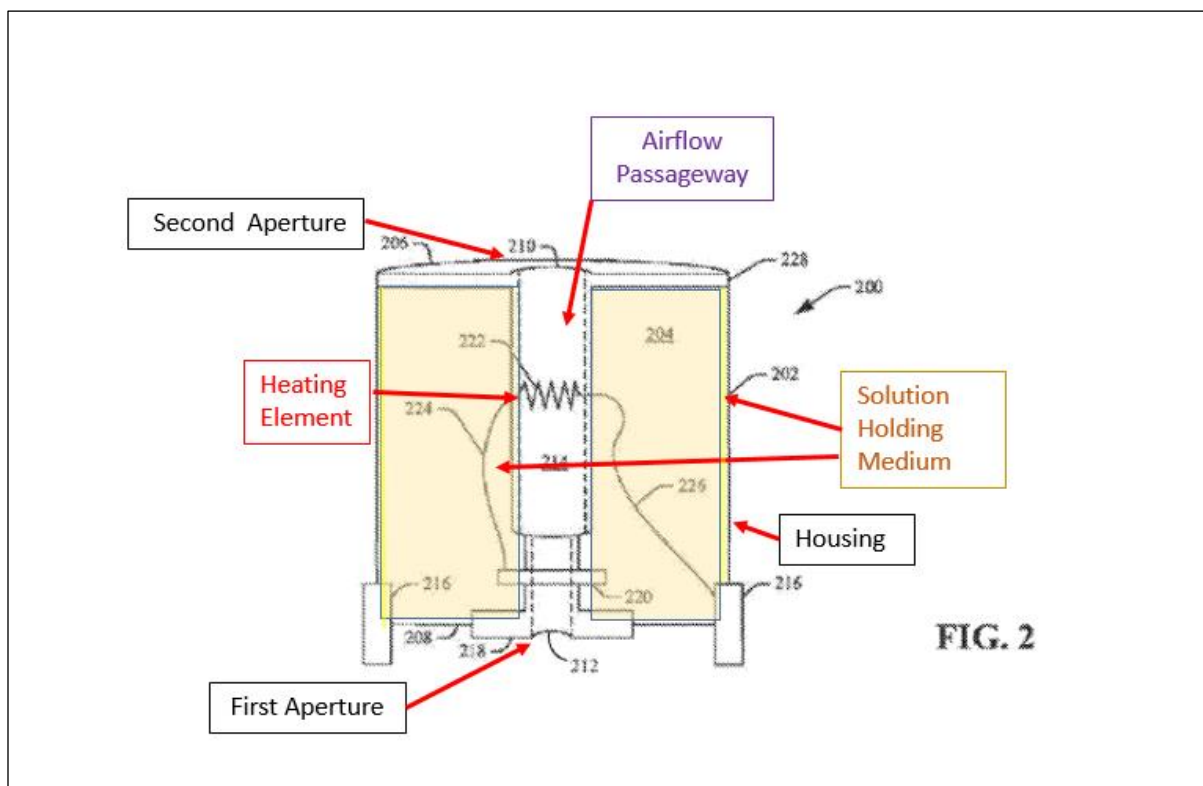


Ex. 1001, Fig. 1 (annotated).

“The power source 102 and the cartridge 104 are configured to be mechanically and electrically coupled to one another” through an electrically conductive threaded portion. Ex. 1001, 2:60-3:1 (“an electrically conductive threaded fastener” and “an electrically conductive threaded receiver...can be coupled to one another...mechanically and electrically coupling the power source 102 with the cartridge 104”); Ex. 1007, ¶42.

The cartridge 104 further “comprises a housing 120 that has an interior,” “a first end 122,” and “a second end 124.” Ex. 1001, 3:43-46 and Fig. 1. Additionally, “[t]he first end 122 of the cartridge 104 comprises a first aperture 130 that is located at approximately the center of the first end 122” and “[t]he second end 124 comprises a second aperture 132 that is located at approximately the center of the second end 124.” Ex. 1001, 4:27-31. “An airflow passageway 134 extends between the first aperture 130 and the second aperture 132 axially proximate to the center of the housing 120” and is configured to provide for airflow from the first to the second aperture. Ex. 1001, 4:32-34; 17:31-33; Ex. 1007, ¶42.

As illustrated in Fig. 2 (annotated below), a solution holding medium 204, which may comprise “an absorbent material, capsule, or reservoir” stores the solution that is ultimately vaporized. *Id.*, 4:4-8. The solution holding medium 204 surrounds the central airflow passageway 214. *Id.*, Fig. 2, 17:42-45. “The heating element 222 can comprise wicking material that draws the liquid solution from the absorbent material 204” (i.e., solution holding medium). *Id.*, 6:43-46; Ex. 1007, ¶44.



Ex. 1001, Fig. 2 (annotated). As further shown above, a solution holding medium—depicted as “an absorbent material 204”—stores the solution that is ultimately vaporized. *Id.*, 4:5-9. The patent further describes that heating element 222 may be “in the airflow passageway”; “on the exterior of the airflow passageway”; or “on the interior and the exterior of the airflow passageway.” *Id.*, 5:52-53; 6:62-7:19.

B. Prosecution History of the '864 Patent

During the prosecution of the '864 Patent, Patentee submitted a swear-behind declaration stating that: “[p]rior to January 13, 2010...[Patentee] reduced to practice in this country the invention as described”. Ex. 1002, 421.

On March 14, 2022, Examiner issued a non-final rejection on the basis that U.S. Pub. No. 2009/0095311 to Han anticipated the proposed claims under AIA § 102. Ex. 1002, 275-283. In response, the Applicant argued that: (1) Han does not disclose a “cartridge,” and (2) Han does not disclose “wherein the airflow passageway extends centrally and axially from the first aperture to the second aperture.” Ex. 1002, 269-274.

Examiner subsequently issued a second non-final rejection on September 8, 2022 based on U.S. Pub. No. 2009/0272379 (“Thorens”). Ex. 1002, 189-196. Examiner stated that Thorens anticipated the proposed claims; Applicant responded that Thorens did not disclose a transverse heating element with respect to the central longitudinal axis of the housing. Following an Examiner Interview, Applicant amended the independent claims to include a “cartridge,” “a transverse heating element,” and an “airflow passageway [that] extends centrally and axially from the first aperture to the second aperture.” Ex. 1002, 188. The Notice of Allowance issued following the amendment on October 5, 2022. Ex. 1002, 24.

VII. PRIOR LITIGATION

A. Level of Ordinary Skill

In previous litigation involving the ’881 patent – the parent patent to the ’864 patent (*Fuma International LLC v. R.J. Reynolds Vapor Company*, Case No. 1:19-cv-260 (M.D.N.C. 2019)) with an identical specification – Patent Owner’s

predecessor-in-interest asserted that a person of ordinary skill in the art (“POSITA”) at the time of the purported invention would have had a mechanical or electrical engineering degree, industrial design degree, or a similar technical degree, or equivalent work experience, and 5 to 10 years of experience in electromechanical devices. Ex. 1007, ¶¶14-17.

B. Prior Constructions

The North Carolina District Court construed certain terms of the parent ’881 patent. See Ex. 1020 (Markman Order).

Term	Construction
solution holding medium ’881 patent, claims 1, 16	A location, container, or mechanism to hold the solution, including but not limited to at least one of an absorbent material, a chamber, a reservoir, a capsule, or any combination thereof.
an electrically conductive portion ’881 patent, claims 1, 8, 16	Ordinary meaning: A portion that is electrically conductive.
wherein the heating element is electrically configured to vaporize at least a portion of the solution to be contained in the solution holding medium ’881 patent, claim 1; claims 8, 16 (similar)	Ordinary meaning: The solution can be, but need not be, in the solution holding medium when vaporized by the heating element.

Term	Construction
an airflow passageway that extends centrally and axially with respect to the housing intermediate of the first aperture on the first end of the housing and the second aperture on the second end of the housing; wherein the airflow passageway is configured to allow an airflow through the cartridge from the first aperture to the second aperture of the housing	The airflow passageway extends in a straight path ³ through the center of the cartridge from a first opening on the first end to a second opening on the opposite end of the cartridge
'881 patent, claim 1; claims 8, 16 (similar)	

C. Summary Judgment of Infringement

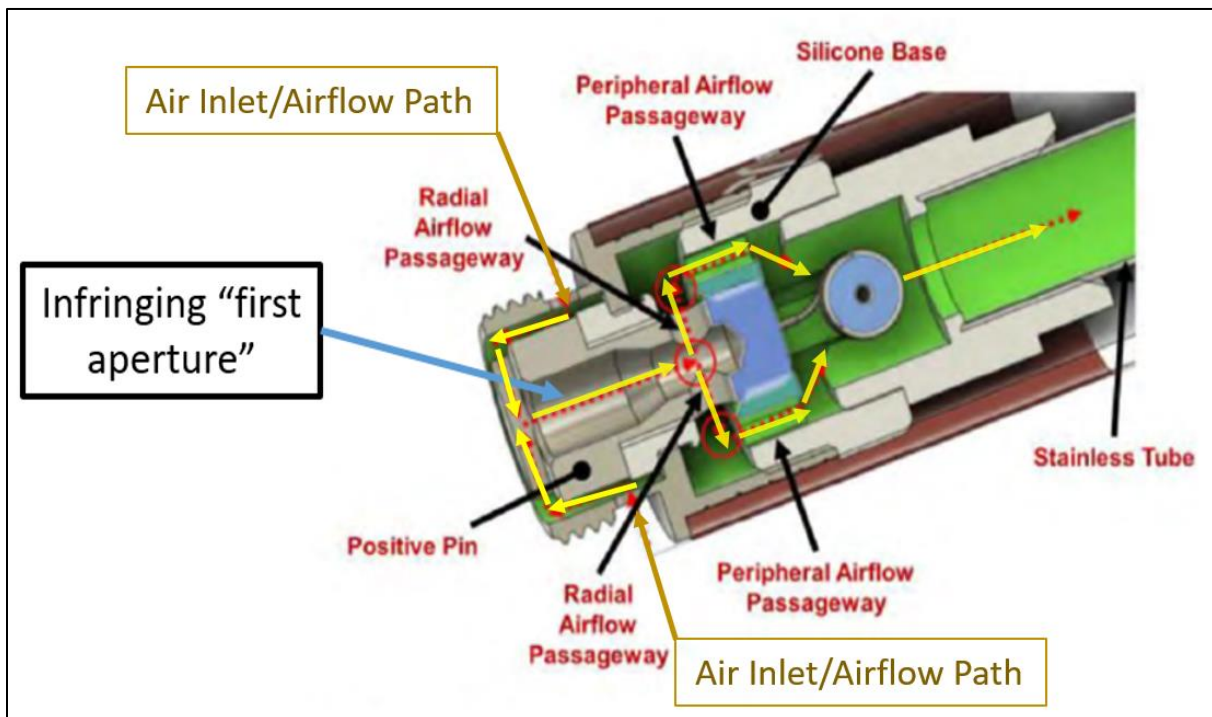
In the prior litigation regarding the parent '881 patent, a North Carolina District Court granted summary judgment that accused RJR products infringed asserted claims of the '881 patent. Ex. 1015 (MSJ Order), 14-18. In those summary judgment proceedings, the patent owner took—and the District Court adopted—positions relevant to this petition, including positions regarding the claimed first aperture and claimed airflow passageway. Ex. 1007, ¶28.

Patent Owner currently asserts the same arguments in parallel ITC litigation that the prior owner did in that case.

Aperture: On summary judgement, the plaintiff/patent owner asserted that the claimed “first aperture on the first end” of the cartridge housing is met by a single

³ The District Court further clarified this term, distinguishing airflow path from the airflow passageway, as described below.

opening **inside** the housing, where air entering the cartridge converges at that opening to pass through to the alleged airflow passageway. See Ex. 1021 (Dkt. 133, Fuma Reply Brief) at 9-12. The following figure depicts the accused apparatus, including its side inlets (which are located on the exterior of the cartridge and allow air to enter the cartridge), the resulting air flow, and the interior central aperture located inside the cartridge housing:



Id., 15 (annotated); Ex. 1007, ¶29.

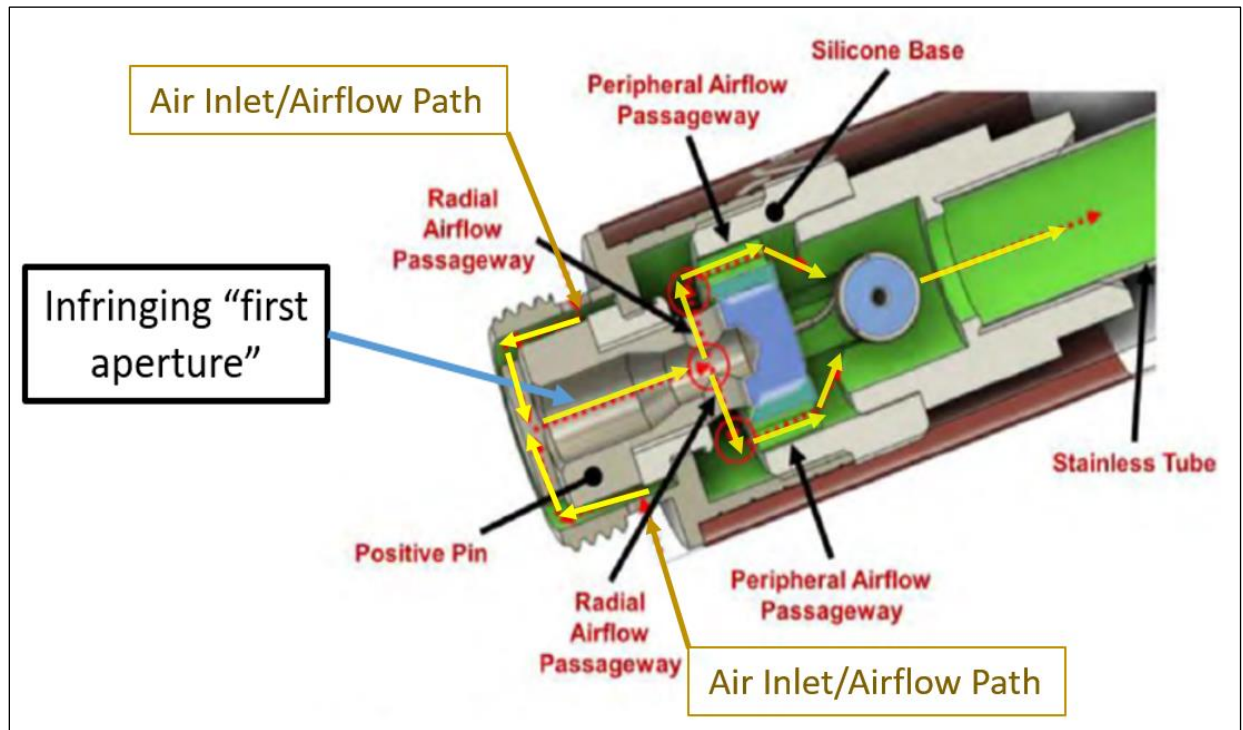
The District Court agreed with plaintiff and explicitly held that the aperture internal to the device, at the beginning of the internal passageway, *i.e.* the hole within the internally-contained “positive pin” depicted above, meets the requirement for a first aperture “on the first end.” Ex. 1014 (Dkt. 122, RJR MSJ), 44; Ex. 1015 (Dkt.

139, MSJ Order), 14-18. The District Court held that the defendant’s argument to the contrary was incorrect because it improperly restricted the scope of the claimed “first aperture” to apertures at the very edge of the cartridge housing, *i.e.*, the side inlets that originally draw in air to the cartridge. The District Court held instead that an aperture **internal** to the device satisfies a first aperture on the first end of the housing. *Id.*; Ex. 1007, ¶30.

In the parallel ITC case, Patent Owner is asserting this same product is covered by the ’864 patent claims and that this internal aperture meets the “proximate” limitation. Ex. 1032 at 3-4.

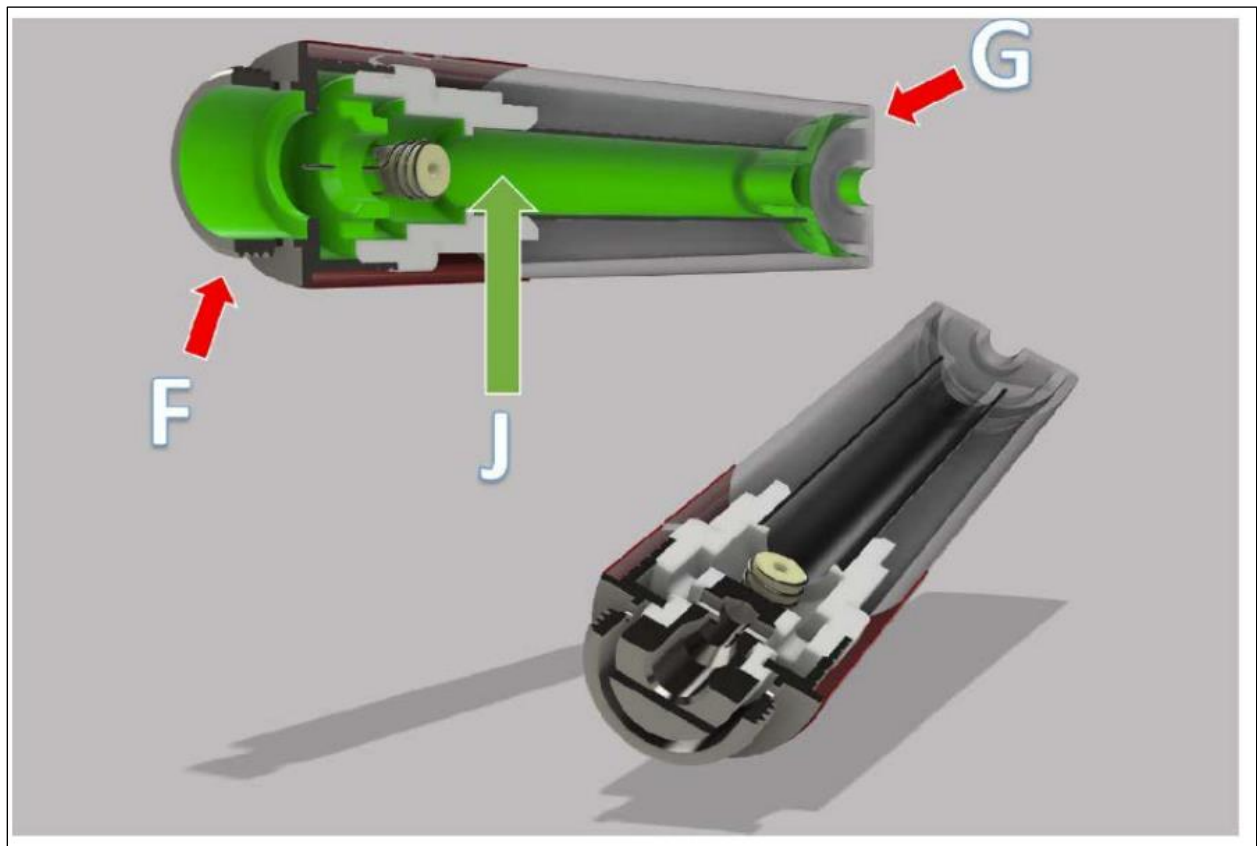
Airflow Passageway: Plaintiff further argued that this accused device included the ’881 patent’s claimed “airflow passageway that extends centrally and axially with respect to the housing” as a matter of law.

The Court agreed, rejecting defendant’s argument that the accused airflow passageway (shown below in green) did not meet this limitation because the passageway obstructed airflow (by among other things the positive pin and silicone base) and directed it away from the center, rather than allowing it to flow along the central axis, making the passageway not centrally and axially located. Ex. 1014 (RJR Brief), 22-25.



Id., 22 (annotated); Ex. 1007, ¶31.

The District Court explained that defendant improperly “conflat[ed] the airflow’s path with the airflow passageway.” Ex. 1015, 14-18. Although “[t]he positive pin and silicone base [in the image above] obstruct airflow and alter the airflow’s path” they do not alter the “interior airflow passageway, which at all times extends straight through the center of the [accused product]’s cartridge to the second end as required by the claim.” *Id.* The figure below from that litigation omits some of those obstructions in the accused passageway and shows that, without those obstructions, the passageway itself (highlighted in green) extends straight through the center of the housing, which the Court held demonstrated infringement despite the obstructions:



Ex. 1025 (Dkt. 120, Fuma SJ Brief) at 17; Ex. 1007, ¶32.

Again, in the parallel ITC case, Patent Owner asserts this same product and passageway meets the '864 patent claims and this limitation. Ex. 1032, 3-4.

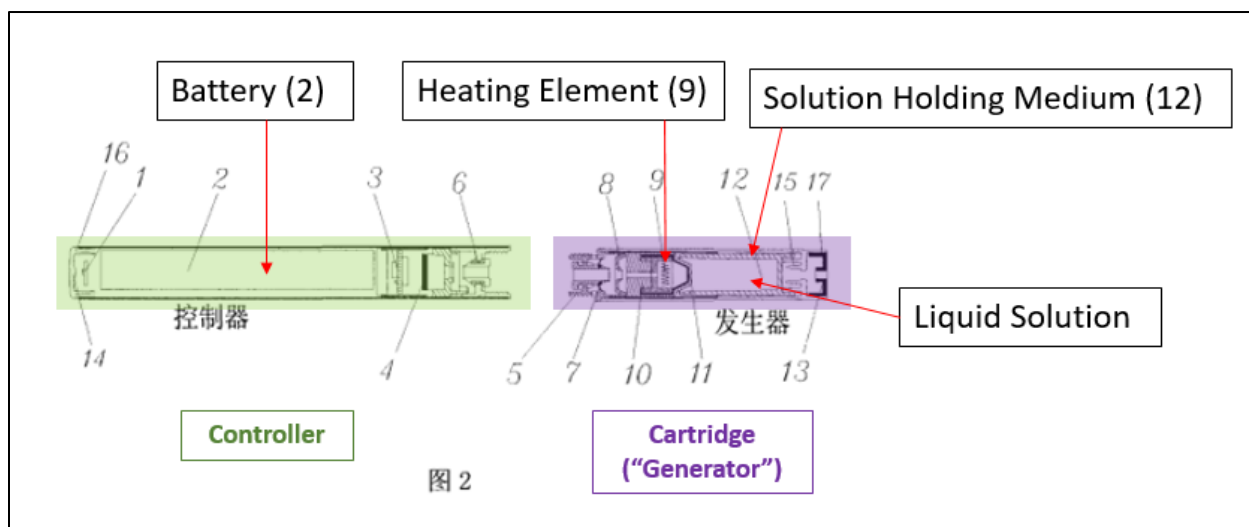
VIII. PRIOR ART

For purpose of this Petition, JLI assumes that the '864 patent's priority date is July 27, 2009, the date of the earliest application to which the patent claims priority.⁴ Ex. 1007, ¶13.

⁴ The '864 patent claims priority to a July 27, 2009, provisional application. In the ITC investigation, Patent Owner alleged a date of conception and reduction to

A. Xia

Chinese Patent No. 201238610 to Xia (“Xia”) was granted and published on May 20, 2009, and qualified as prior art to the ’864 patent under at least pre-AIA §§ 102 (a-b). Ex. 1004.⁵ Xia describes an “atomizing electronic cigarette,” with a cartridge component (right) in Figure 2 below, which attaches to a battery component (left), forming an electronic cigarette. Ex. 1007, ¶48.

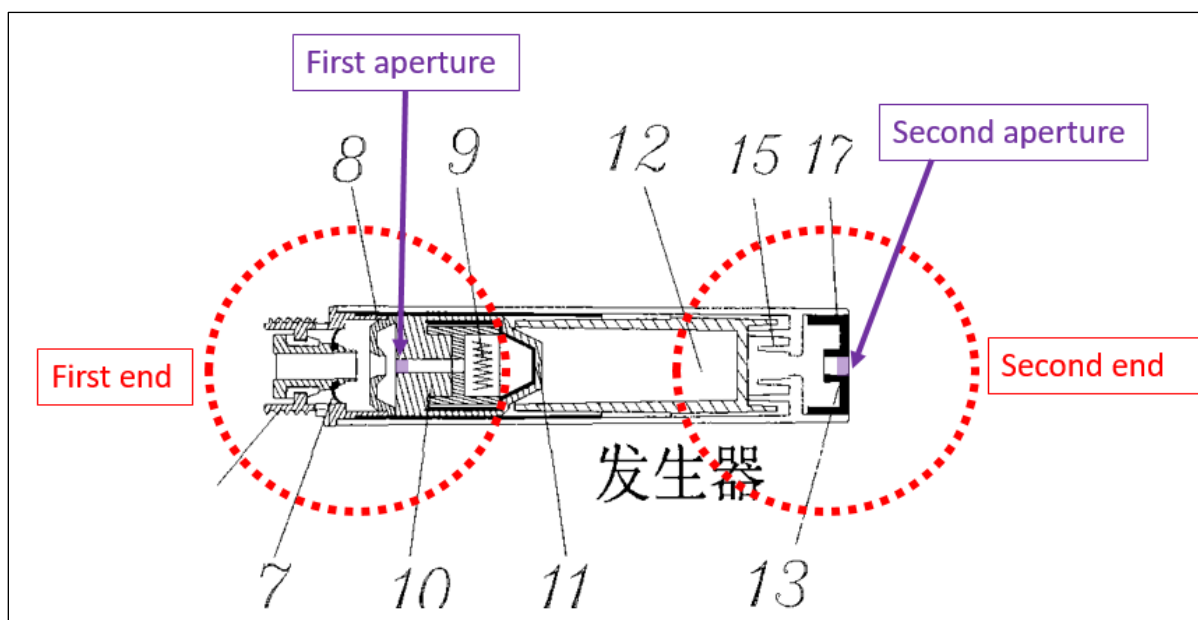


Ex. 1004, Fig. 2 (annotated).

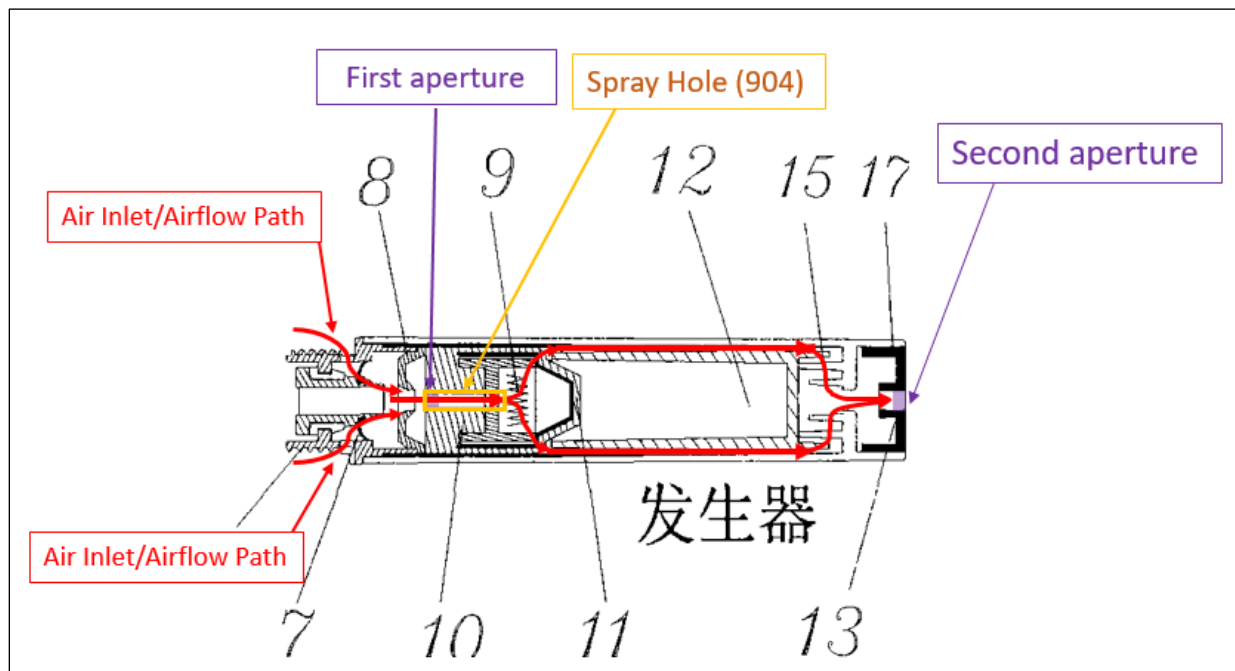
practice of July 28, 2009. Ex. 1019 at 1. JLI does not concede that either alleged priority date is correct.

⁵ In addition to the face of Xia identifying May 20, 2009 as the patent’s grant date, thereby implying its publication, the Chinese National IP Association’s (“CNIPA”) patent application database identifies May 20, 2009 as the date of publication. Ex. 1008, pss-system.cponline.CNIPA.gov.cn (“CNIPA Patent Database”). So too does the U.S.P.T.O.’s Global Dossier website. Ex. 1009; see also <https://globaldossier.uspto.gov/#/result/publication/CN/201238610/98262>; see also European Patent Office Search Results Espacenet, Ex. 1010.

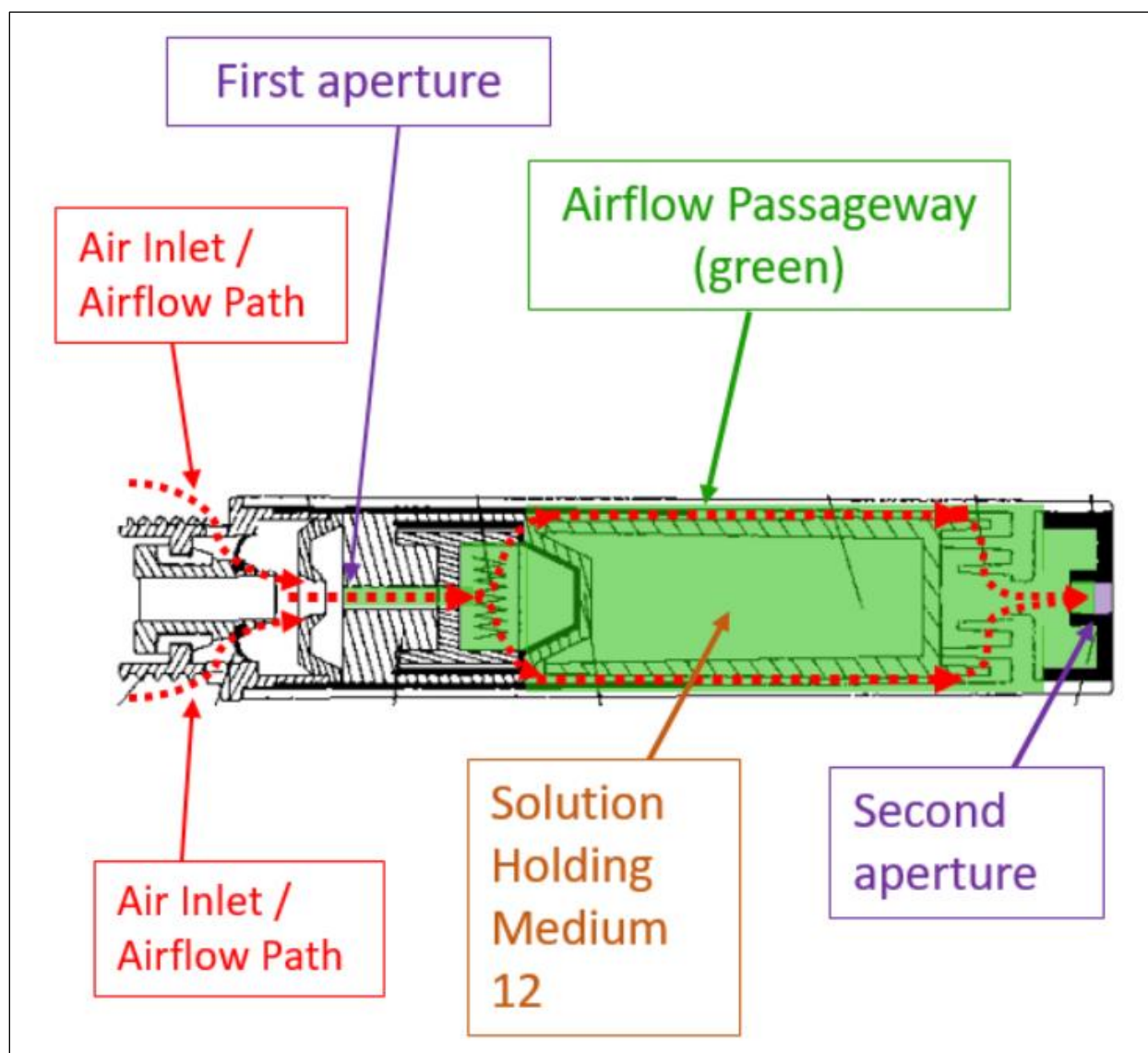
Ex. 1004, Fig. 2 (annotated). As discussed below in more detail, Xia describes that its cartridge (shown in following annotated segment of Xia Figure 2) includes a first aperture on its first end, a second aperture on its second end. As shown below, Xia's first aperture is inside the cartridge, just like the first aperture in the infringing device in the prior North Carolina District Court litigation. Ex. 1007, ¶49.



Ex. 1004, Fig. 2 (partial, annotated). The figure below is annotated to depict the airflow within the Xia device. Air enters the inlets on the exterior of the cartridge, flows through the first aperture at the left end of spray hole 904, into the heating element area, is diverted to the sides by the solution holding medium 12, and flows out the soft suction nozzle 13 to the user. Ex. 1007, ¶50.

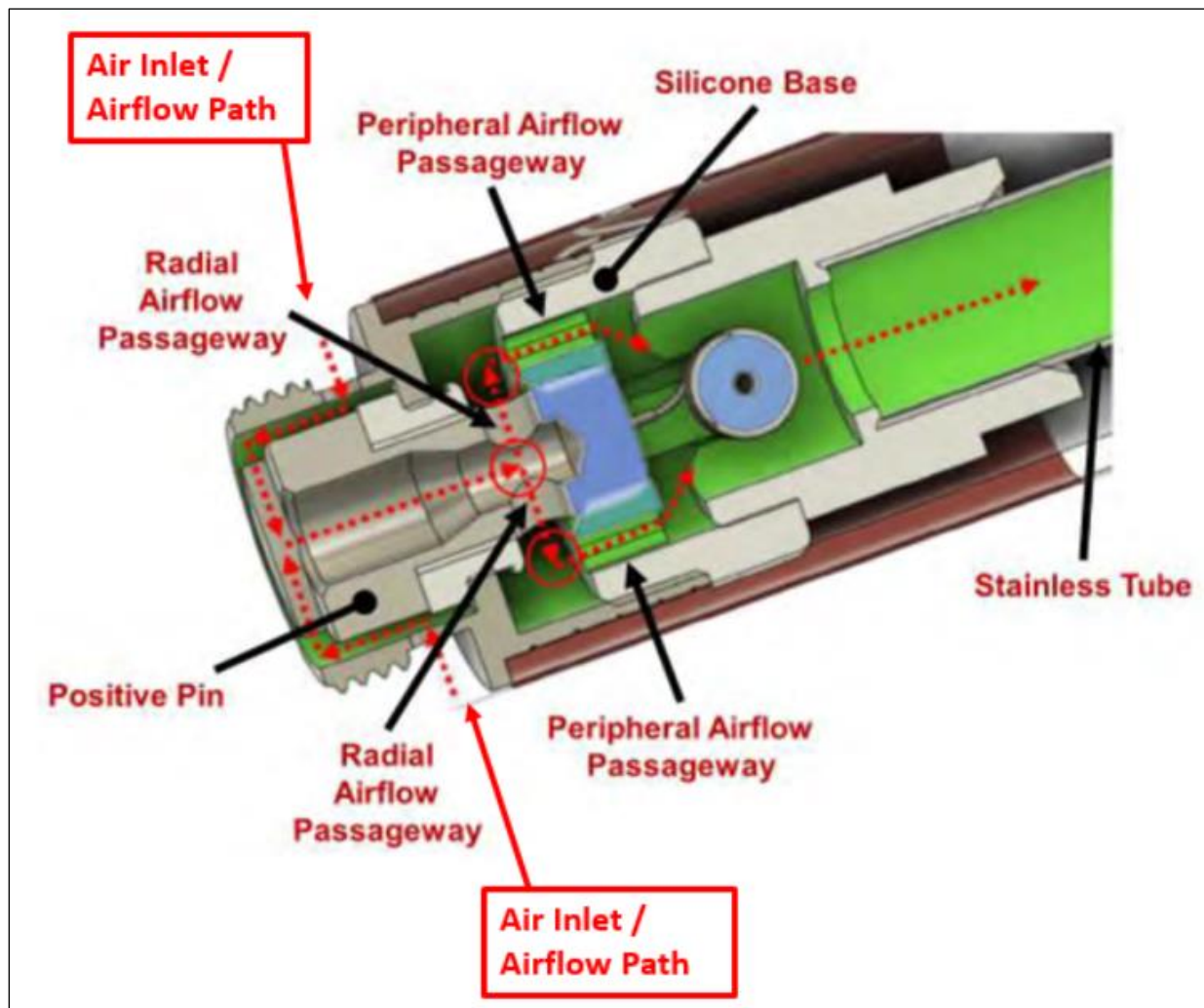


Ex. 1004, Fig. 2 excerpt (annotated). Xia's airflow passageway in Xia is annotated in green below and is a structural component that extends from the first aperture to the second aperture. Consistent with the prior North Carolina district court summary judgment decision, this airflow passageway is central and axial with respect to the housing even though it contains obstacles (such as the solution holding medium) that divert the airflow itself away from the center:



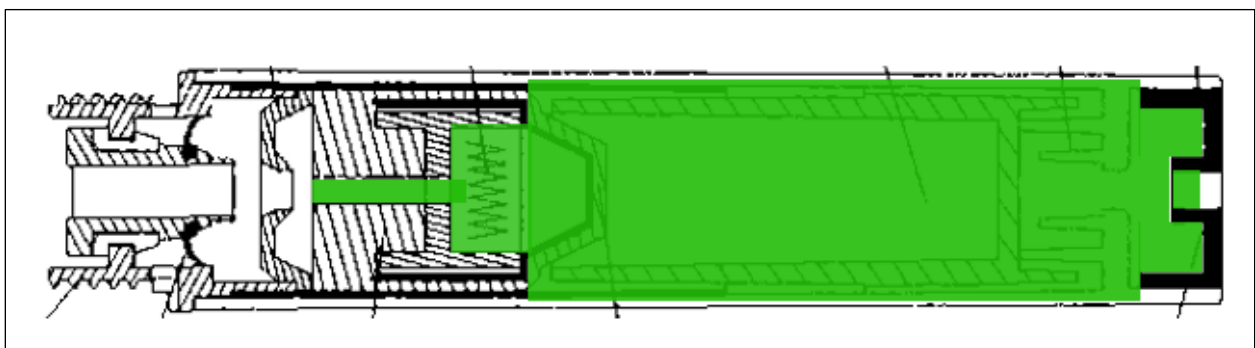
Ex. 1004, Fig. 2 (annotated); Ex. 1007, ¶51.

Thus, Xia's central passageway, which contains objects that divert the airflow away from the center, is substantively the same as that in the infringing RJR device:



See Ex. 1007, ¶52.

As shown above for the product in the district court case, Xia's airflow passageway is depicted below omitting obstructions inside it:



Ex. 1004, Fig. 2.

B. Wang

Chinese Patent Application Publication No. CN 101366554A to Wang (“Wang”) was published on February 18, 2009 and qualifies as prior art under at least pre-AIA §§ 102 (a-b). Ex. 1005, 1; Ex. 1007, ¶54.

As shown below, Wang discloses an e-cigarette comprising battery-holding component (left annotated Figure 2) and an attachable cartridge (right annotated Figure 3):

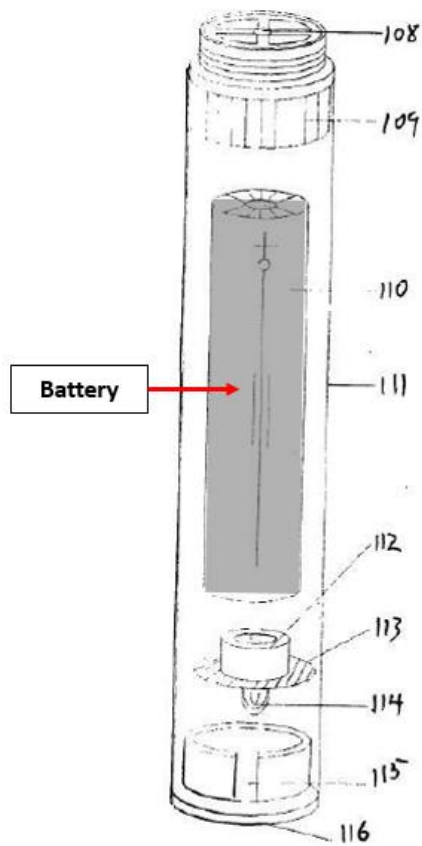


Fig. 2

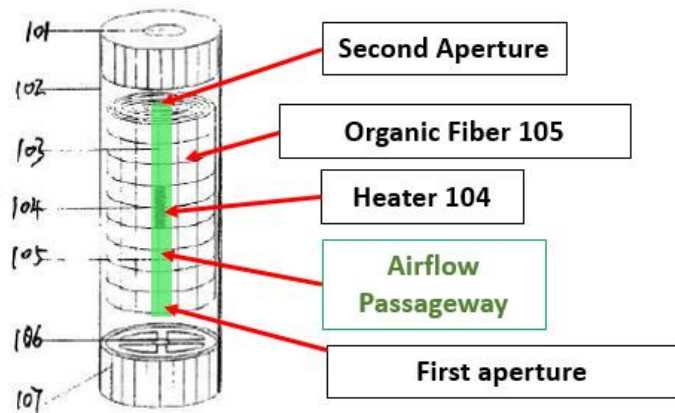
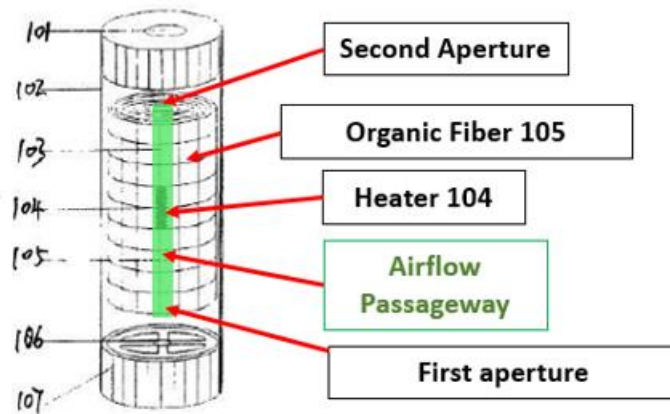


Fig. 3

Ex. 1005, Figs. 2-3 (annotated). As annotated above, the cartridge contains a heater 104 and solution holding medium in the form of an absorbent organic fiber 105, which is positioned around that heater. *Id.*, 6-7, 8.

In the prior North Carolina district court litigation, the inventor Mr. Wang confirmed that his invention's absorbent organic fiber 105 “**surrounds a complete central air passageway**, in which the heater is positioned.” Ex. 1017 (Wang Decl., describing a product he testified embodies the Wang reference invention), 4-5. That

central air passageway is annotated in green and extends from a first aperture and a second aperture.



Wang's central air passageway is also depicted in Wang's Figure 5, which illustrates that the organic fiber 105 comprises fiber or paper that is rolled up so that it defines and contains a central passageway (which in Fig. 3 is where the heater is shown placed). Ex. 1005, Fig. 5. Again, this passageway is annotated below in green to show what would be understood from this and the other figures and the Wang specification:

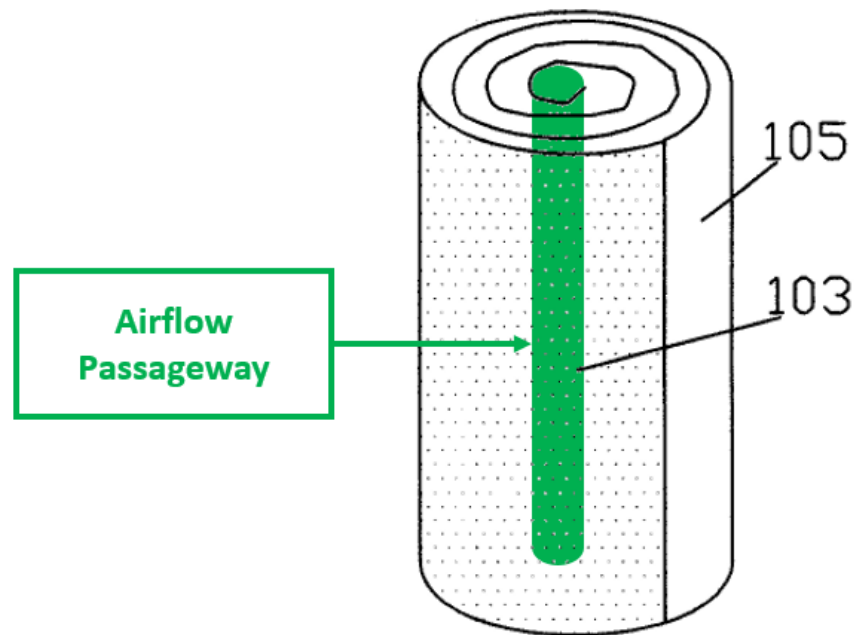


图 5

Ex. 1005, Fig. 5 (annotated), 7-8.

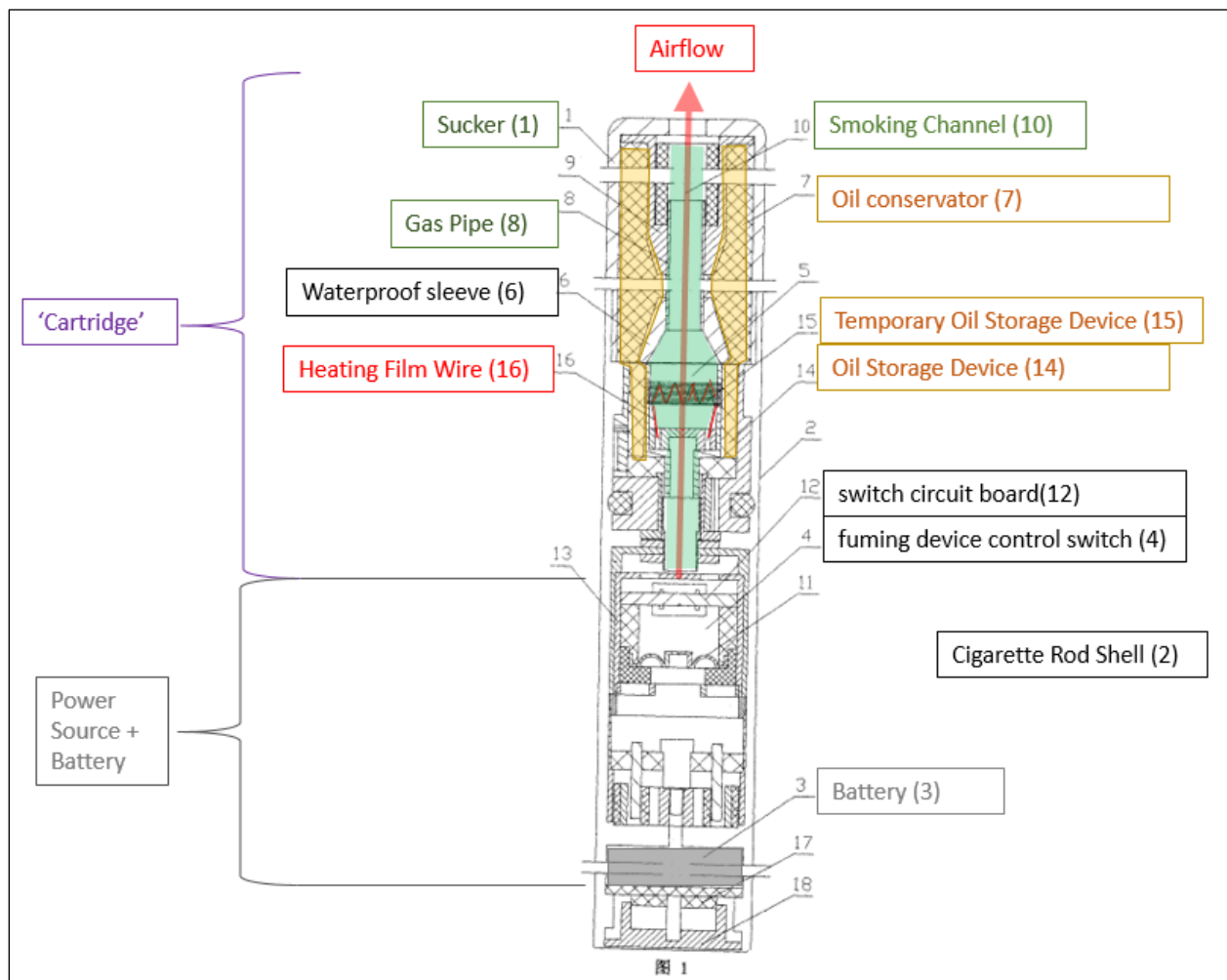
C. Fang

Chinese Patent No. CN 201085044Y to Fang (“Fang”) was published on July 16, 2008⁶ and qualifies as prior art under at least pre-AIA 35 U.S.C. § 102 (a) and (b). Ex. 1006, 1. In the parallel ITC litigation, NJOY has taken the position that Fang

⁶ Ex. 1011 (CNIPA: <https://pss-system.cponline.cnipa.gov.cn/documents/detail?prevPageTit=changgui>); Ex. 1012, (US Global Dossier: <https://globaldossier.uspto.gov/#/result/publication/CN/201085044/117574>); Ex. 1013, (Espacenet: <https://worldwide.espacenet.com/patent/search/family/039632636/publication/CN201085044Y?q=CN%20201085044%20Y>).

was published on July 16, 2008. Ex. 1022, (NJOY Invalidity Contentions), 14; Ex. A-9, 1; Ex. 1007, ¶58.

As shown for example in annotated Figure 1 below, Fang discloses an e-cigarette, including, *inter alia*, a: (1) cigarette rod shell; (2) battery; (3) heating film wire; and (4) a gas pipe, that forms a centrally and axially located airflow passageway ('smoking channel (10)') from the heating element to the mouthpiece, described as a 'sucker (1)'. Ex. 1007, ¶59.



Ex. 1006 (Fang) Fig. 1 (annotated).

Although the device is shown as a single unit, in Figure 1, it has two distinct functional areas: (1) a top portion (as oriented above) that can be described as a “cartridge,” with components for storing and vaporizing nicotine oil and; (2) a power source, with a battery, in mechanical and electrical contact with the cartridge. NJOY has asserted that Fang has or renders obvious “a cartridge” in parallel litigation. Ex. 1022 (NJOY’s Invalidity Contentions) Ex. A, 137 (element 43.A, citing “Fang 044 at Abstract; p.4 ¶¶1, 4; p.6 ¶¶1–4; Figs. 1–3”). NJOY also has asserted that Fang has or renders obvious “a power supply portion comprising a rechargeable battery” and that the cartridge is “configured for separable attachment to the power supply portion.” Ex. 1022 (NJOY’s Invalidity Contentions) Ex. A, 140 (elements 44.B-C, citing “Fang 044 at p.4 ¶4; p.5 ¶3; p.6 ¶¶1, 4–5; p.7 ¶2; Figs. 1–3”); Ex. 1007, ¶60.

IX. MOTIVATION TO COMBINE AND REASONABLE EXPECTATION OF SUCCESS

A person of ordinary skill in the art (“POSITA”) would have been motivated to combine Xia with Wang and/or Fang.

Xia, Wang, and Fang (and the ’864 patent) are each directed to the design and operation of handheld, cylindrical, cigarette-like, electronic cigarettes that use a heating element within the device, powered by a battery, to vaporize liquid held

within the device, for delivery via airflow to a user's mouth via suction from the user, through a mouthpiece at the end of the device. Ex. 1007, ¶61.

Moreover, each of Xia, Wang, and Fang use similar structures and internal components to achieve similar functions. All three were published within the same eleven-month period—with Xia and Wang publishing within three months of each other—and all from Chinese inventors. Ex. 1007, ¶62.

Additionally, a combination of these references would merely result in the substitution of known elements from Wang or Fang for elements in Xia (Ground 1) or of known elements from Fang for elements in Wang (Ground 2). *See, e.g.*, MPEP § 2143; *Agrizap, Inc. v. Woodstream Corp.*, 520 F.3d 1337 (Fed. Cir. 2008). Ex. 1007, ¶63. For example, as discussed with respect to specific limitations, combinations of Xia with Wang and/or Fang merely require known and predictable substitutions of elements to render the Challenged Claims obvious. Because the references are very similar and relate to a predictable subject matter, there would be a high likelihood of success when modifying one reference with the teachings of another. For example, altering the physical arrangement of the known components of the device in Xia, such as a heater or a battery, with similar components such as those in Wang and Fang, would not result in unpredictable results. Ex. 1007, ¶65.

Any arguable distinctions between any individual one of the prior art references discussed in this petition and the '864 patent that Patent Owner may argue

for are basic design choices that any POSITA would consider. Any of the references are anticipatory or at least individually render all claims of the '864 patent invalid via very obvious variations of the disclosures. However, multiple references, including combinations, are discussed here, solely to address arguments that Patent Owner may make, although Petitioner does not agree with them. Ex. 1007, ¶¶64-65.

X. THE '864 PATENT IS INVALID IN VIEW OF THE PRIOR ART⁷

A. Ground 1: Xia alone and in view of Wang and/or Fang and the knowledge of a POSITA Renders Obvious the Challenged Claims

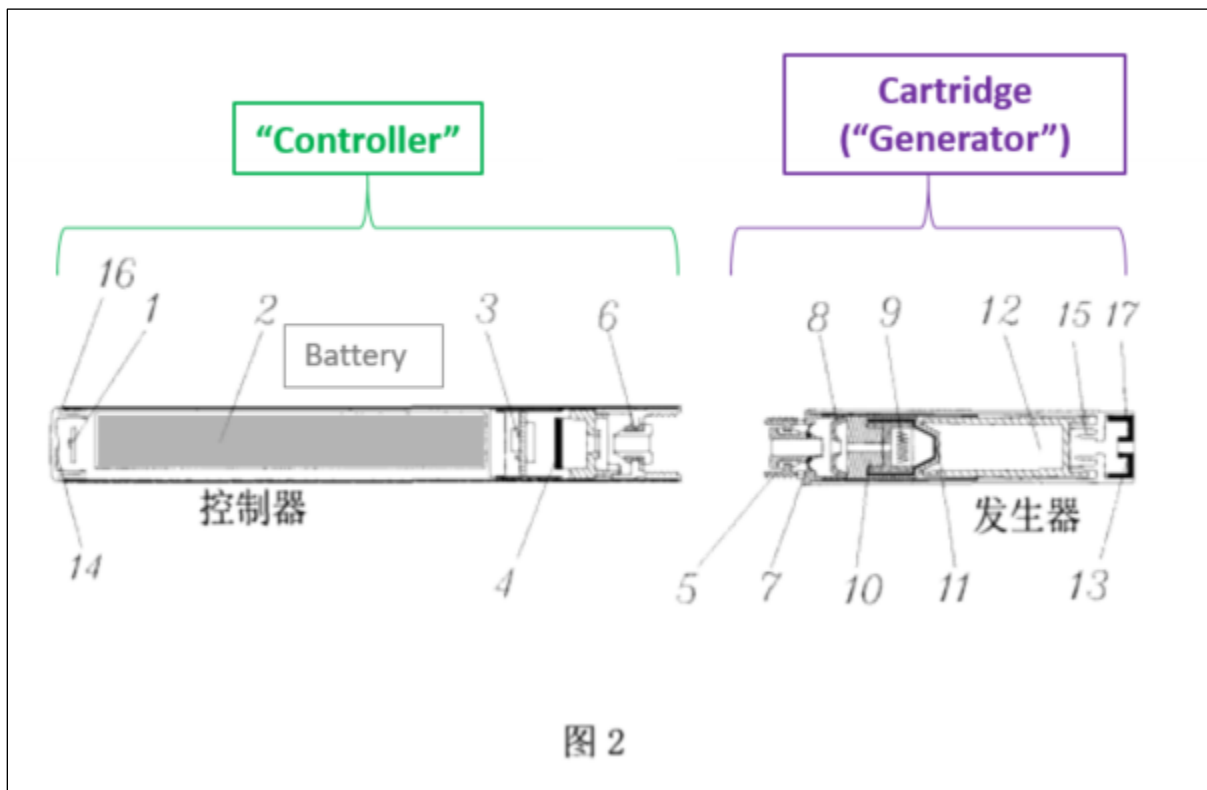
Claims 1-48 of the '864 patent are rendered obvious in view of Xia in combination with either Wang or Fang. Ex. 1007, ¶71.

1. Claim 1:

a. 1[p]: Cartridge

Should the preamble be construed as limiting, Xia discloses a “cartridge configured to couple to a power source of an electronic vaporizer.” For example, Figure 2 depicts two separate portions, the battery and other components (left), and the cartridge, called the “generator” in Xia (right), comprising the elements of this claim, coupled via connectors A5 and B6:

⁷ Petitioner’s understanding and application of claim scope is based in part on the positions taken in the district court ruling described above and by Patent Owner in parallel 337-TA-1368 and 1372 ITC investigations. Petitioner does not necessarily adopt or concede these positions.

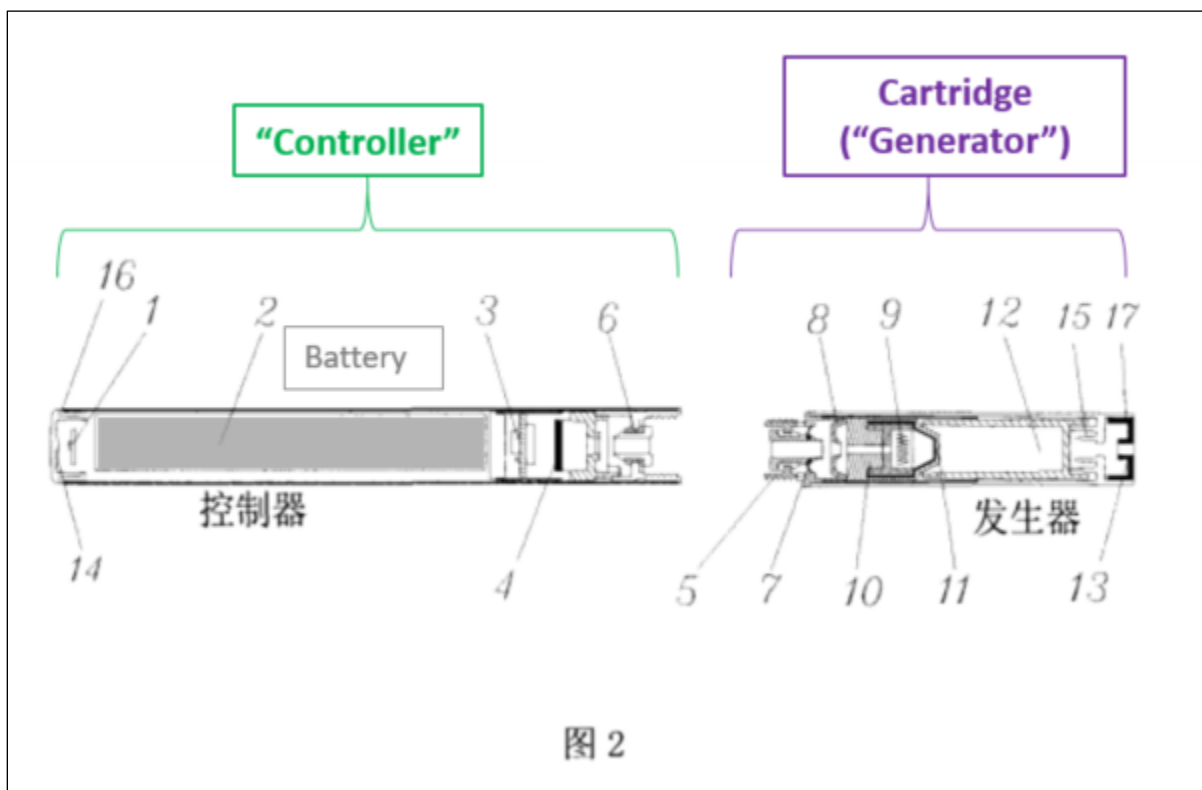


Ex. 1004, Fig. 2 (annotated), 7, 10; Ex. 1007, ¶¶71-72.

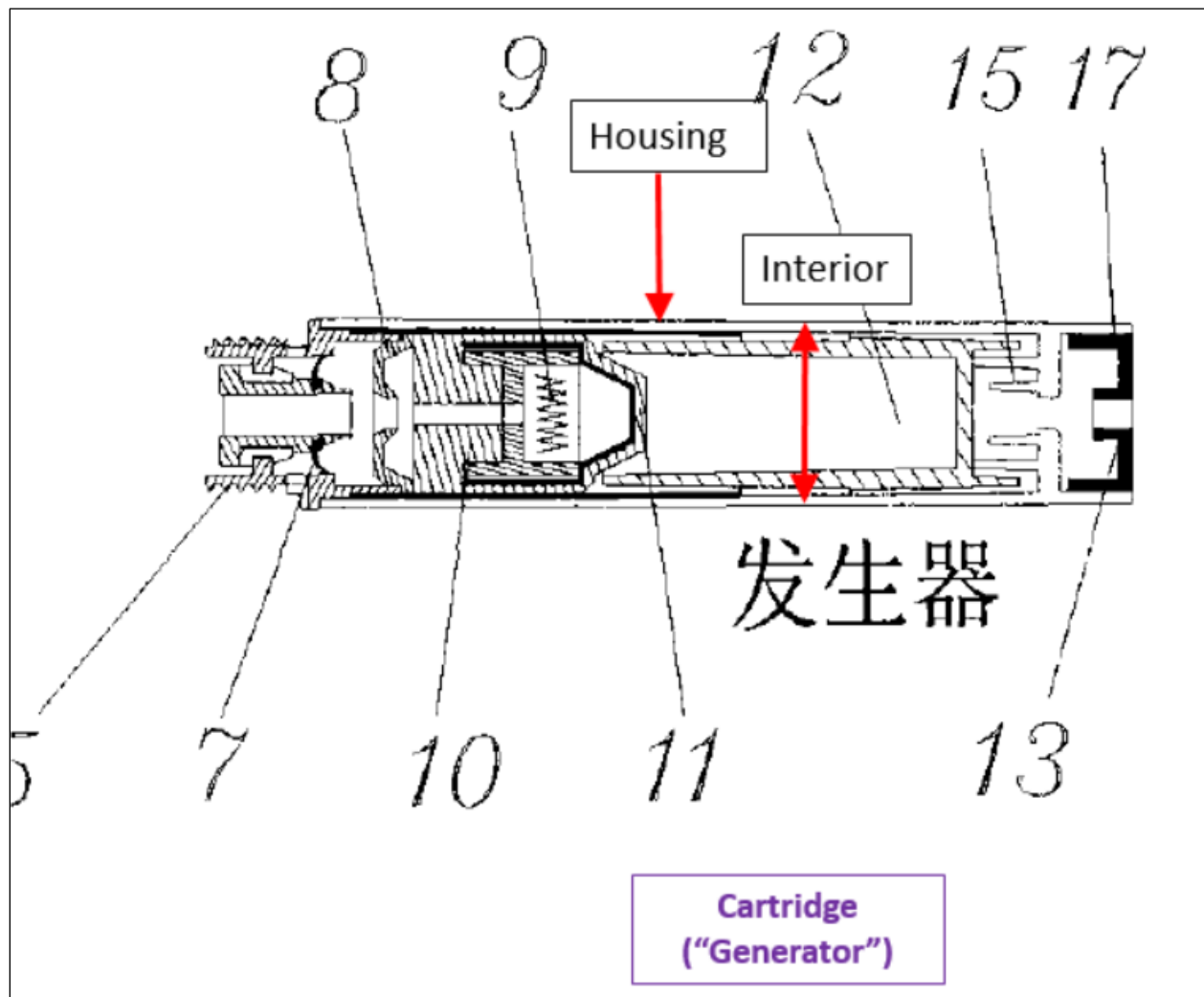
b. 1[a1]: Housing and solution holding medium

i. Xia

Xia alone, Xia in combination with Wang, Xia in combination with Fang, and Xia in combination with Wang and Fang, each alternatively discloses or renders obvious “a housing having an interior.” Xia’s generator has a “stainless steel shell.” *E.g.*, Ex. 1004, Fig. 2; 3(“[S]tainless steel shells are arranged on an outer surface of the controller and an outer surface of the generator[.]”), 7, 8, 11; Ex. 1007, ¶¶75.

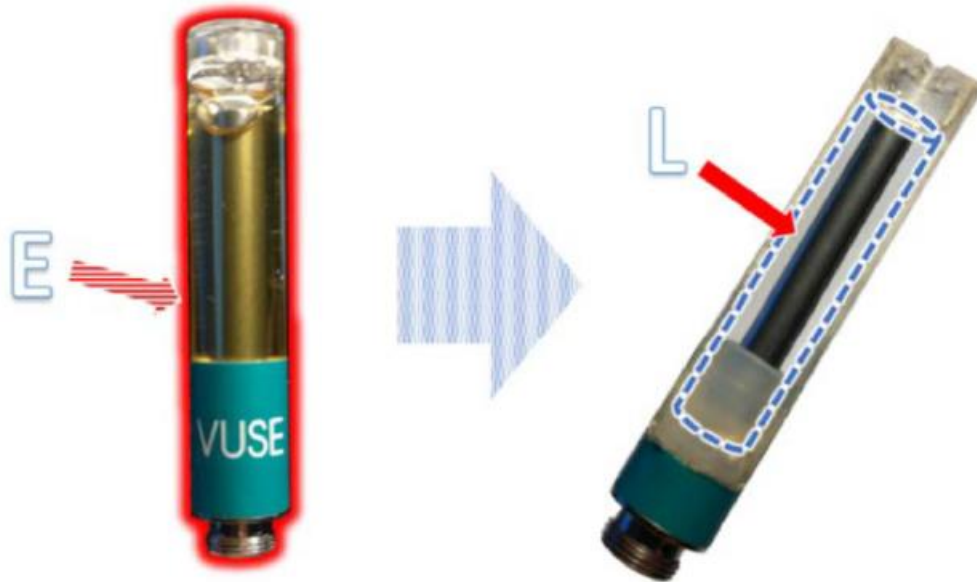


Ex. 1004, Fig. 2 (annotated). This shell has an interior:



Ex. 1004, Fig. 2 (partial) (annotated); Ex. 1007, ¶76.

As established, an RJR device was previously found to infringe the similar '881 patent and Patent Owner is current asserting that that same RJR device satisfies all of the '864 patent claims. In doing so, Patent Owner is asserting that a chamber (identified below as L) within housing E satisfies the claimed solution holding medium:

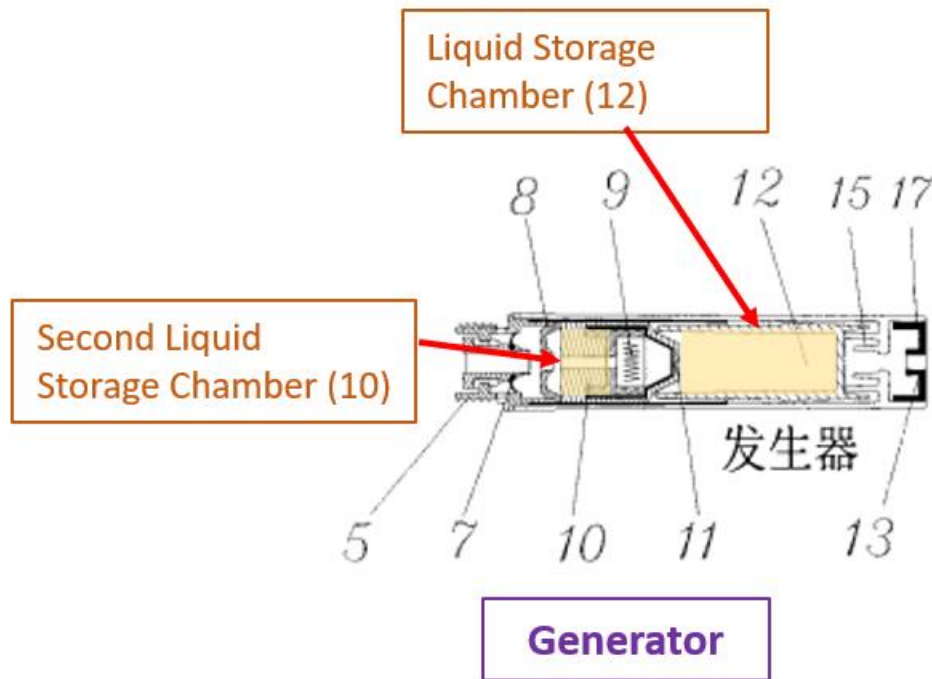


Ex. 1032 at 4-5.

Under Patent Owner’s own analysis and admissions, Xia discloses similar chambers and thus discloses or makes obvious this limitation.

The shell also has a solution holding medium adapted to hold a solution, *e.g.*, a “liquid storage chamber 12,” and “second liquid storage chamber 10,” which are individually or collectively a solution holding medium adapted to hold a solution.

Ex. 1007, ¶78.



Ex. 1004 at Fig. 2 (partial) (annotated), 3, 6-10.

ii. Xia combined with Wang and/or Fang

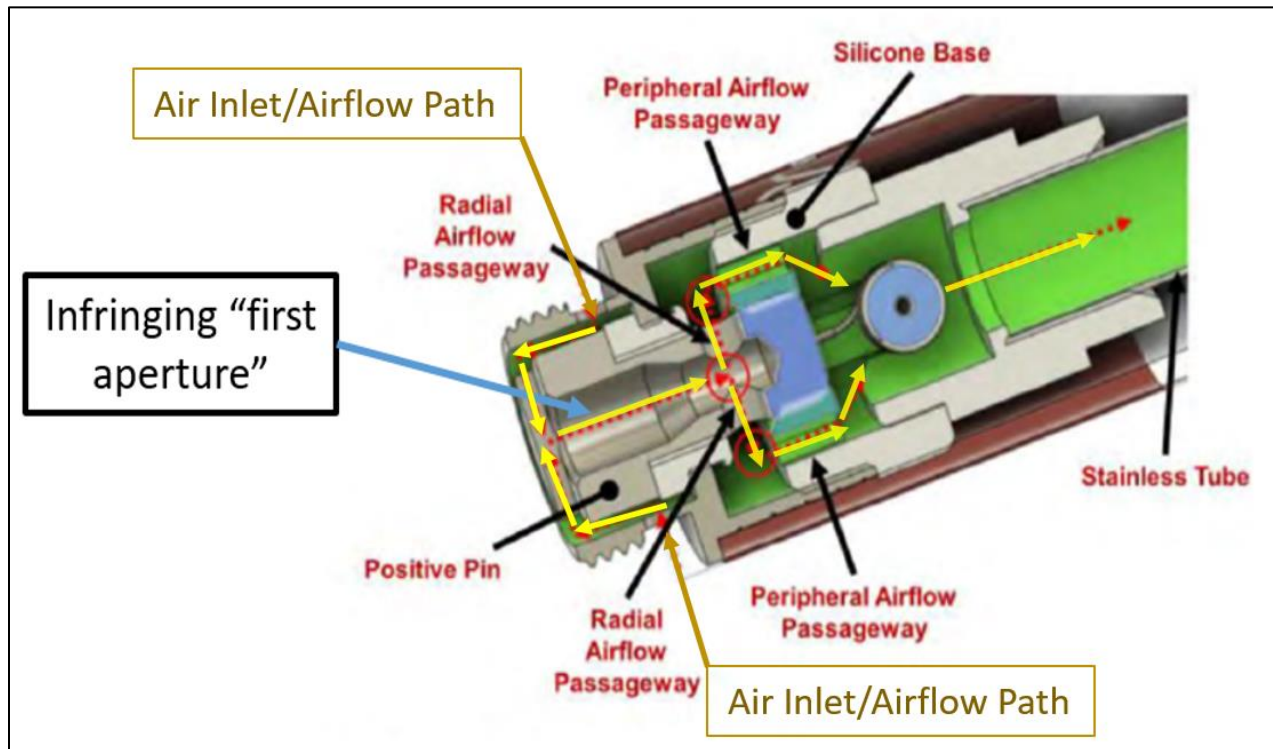
The modifications below in 1[c] regarding the placement of the solution holding medium with respect to the airflow passageway in Xia do not change the fact that there is a solution holding medium adapted to hold a solution inside the housing. Ex. 1007, ¶¶78, 135-158.

c. 1[a2]: First aperture proximate first end; second aperture proximate second end

i. Xia

As discussed above in Section VII.B, the North Carolina District Court granted summary judgment of infringement finding that a device similar to Xia met

this limitation as a matter of law. Ex. 1015 (MSJ Order), 17. The following figure depicts the accused apparatus, with air flowing in through side vents and converging to an internal and central “first aperture”:



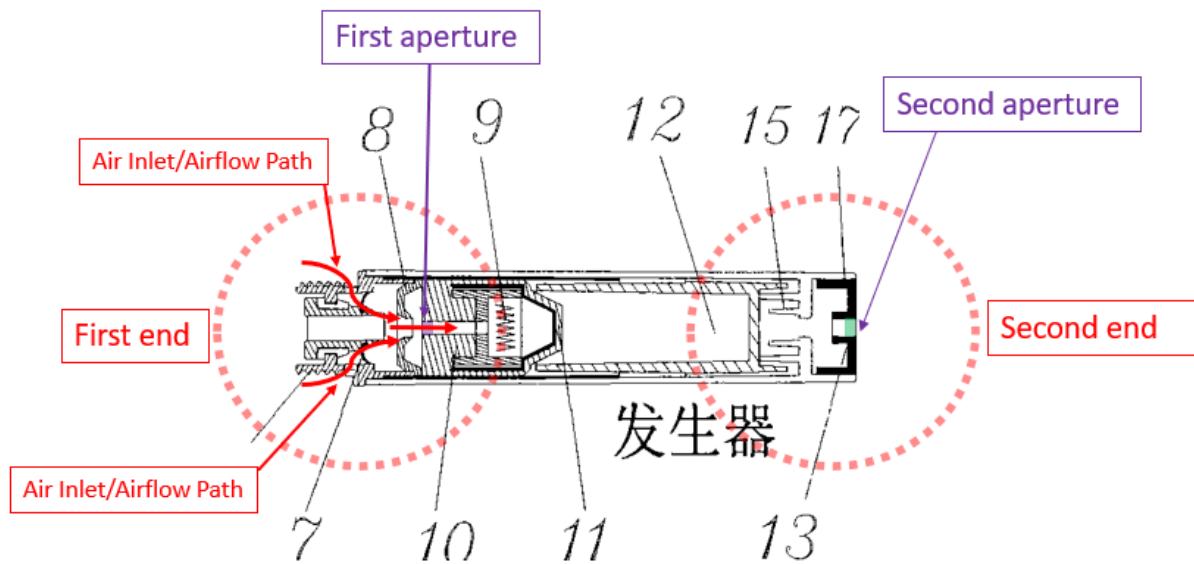
Adopting the plaintiff’s position (which Patent Owner is still asserting in parallel litigation), the District Court explicitly held that the internal aperture, which receives the airflow via side vents on the exterior of the housing, meets the requirement for a first aperture “on the first end.” Ex. 1024 (Dkt. 122, RJR MSJ), 37; Ex. 100#, 17 Ex. 1015 (Dkt. 139, MSJ Order), 14-18. If such an aperture can be “on” a first end, it can be “proximate” a first end as well, as that is, to the extent different, a less stringent requirement. Ex. 1007, ¶¶80-82.

Patent Owner’s infringement contentions against Petitioner in the parallel ITC case also identify a “first end” that is not merely just the very edge of the device:



Ex. 1033 at 5; Ex. 1007, ¶84.

Under Patent Owner’s current contentions in the ITC cases and the prior district court analysis, Xia teaches a similar first aperture proximate the first end to what Patent Owner alleges in parallel litigation, with air flowing in through side vents and converging to an internal and central “first aperture”:



Ex. 1004, Fig. 2 (partial, annotated).

Thus, under the foregoing analysis, the position of a first aperture is not limited to only the very edge or exterior of the device and Xia discloses a first aperture on the first end, with its cartridge's "first end" extending at least to the location of the first aperture 904. Ex. 1007 ¶86. Alternatively, a POSITA would know that moving Xia's external air intake to the battery side to have air enter centrally on the end of the cartridge was a simple and obvious modification. Ex. 1007, ¶90.

ii. Xia with Wang and/or Fang

If the claimed first aperture must be closer to the edge and surface of the first cartridge end, it was obvious to reposition Xia's "first aperture" to meet such an

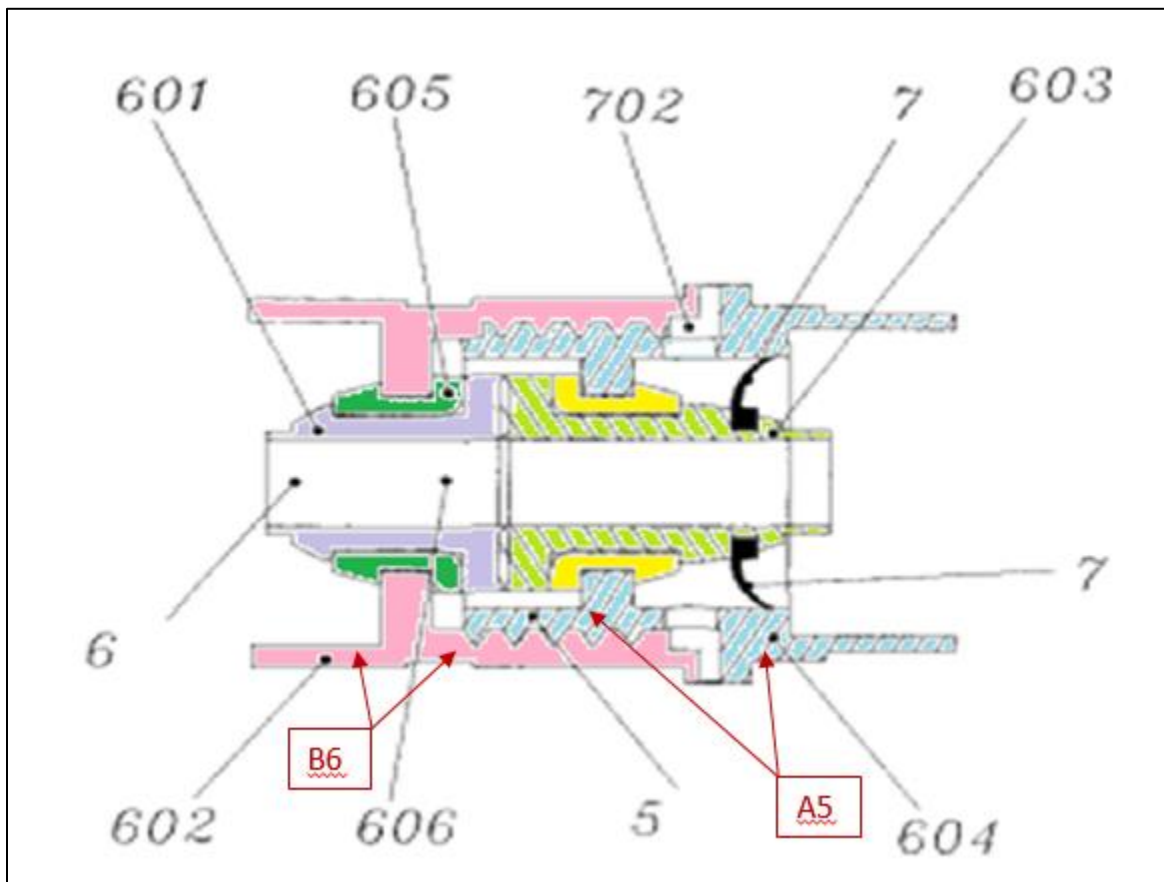
additional requirement. For example, as shown below in element 1[c], it was obvious to modify Xia's cartridge to include the known airflow passageway of Wang. In that combination, Wang discloses this limitation because Wang's first and second apertures are proximate the first and second cartridge ends, respectively, as described below and in Ground 2 elements 1[a2] and 1[c].

And if the apertures are required to be literally on the very edges of the cartridge, that would be an obvious modification under Xia and/or Wang and/or Fang, as it would merely require extension of the passageway to the very edge of the housing, with a central aperture (already present in Wang, and in Fang), which would also allow the solution holding medium to be extended to the edge of the housing as well, increasing liquid storage capacity as explained in Ground 2, 1[c]. See Ex. 1007, ¶¶91-100; 137-160; 307-317.

d. 1[a3]: First end electrically couples to power source

i. Xia

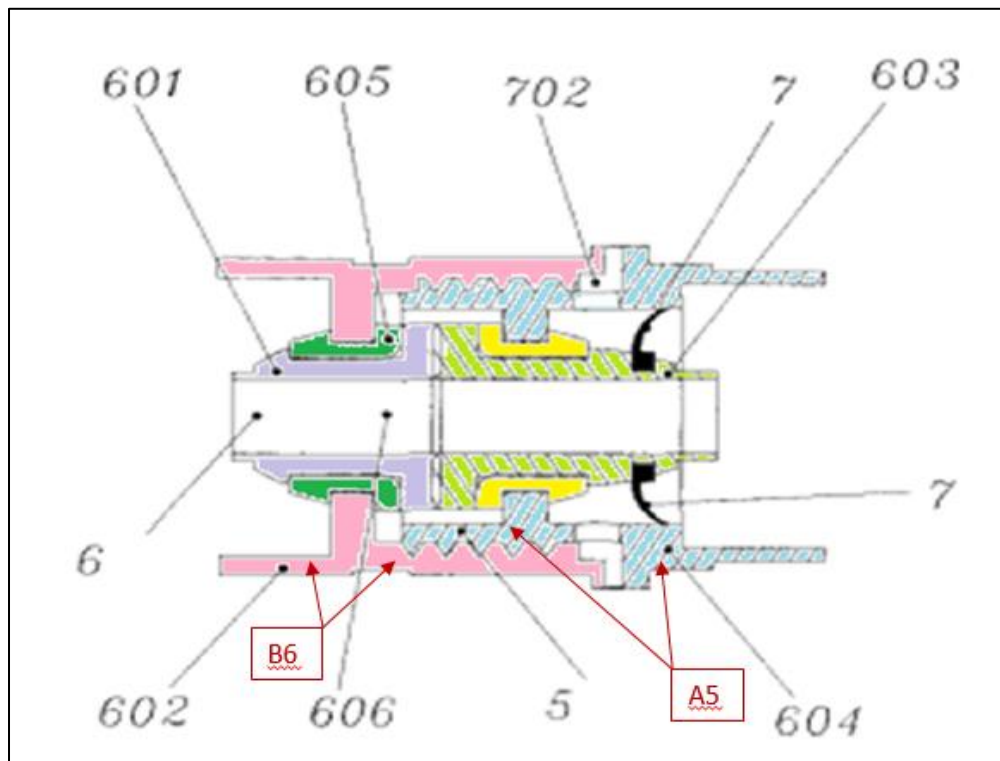
Under Patent Owner's own contentions, Xia discloses this limitation. Xia describes that the cartridge housing includes an electrically conductive portion (conductor A5) that is adapted to mechanically and electrically couple to the conductive portion of the power source (*e.g.*, conductor B6):



Ex. 1004, Fig. 3 (annotated), 7, 9, 10, 12; Ex. 1007 ¶ 104.

Xia explains the mechanical coupling: the “connecting conductor B6 and the connecting conductor A5 are in threaded connection or clamping groove connection through hollow contact copper caps.” Ex. 1004, 3, 7, 10, 12.

Xia also explains the electrical coupling: “the connecting conductor A5 and the connecting conductor B6 form a connecting outer ring through an inner thread 602 and an outer thread 604, respectively” to electrically couple to the battery. Ex. 1004, 12. Specifically, A5 contains electrodes 603 and 604 that conduct electricity and couple to B5 on the controller. Ex. 1004, 12; Ex. 1007, ¶104.



Ex. 1004, Fig. 3.

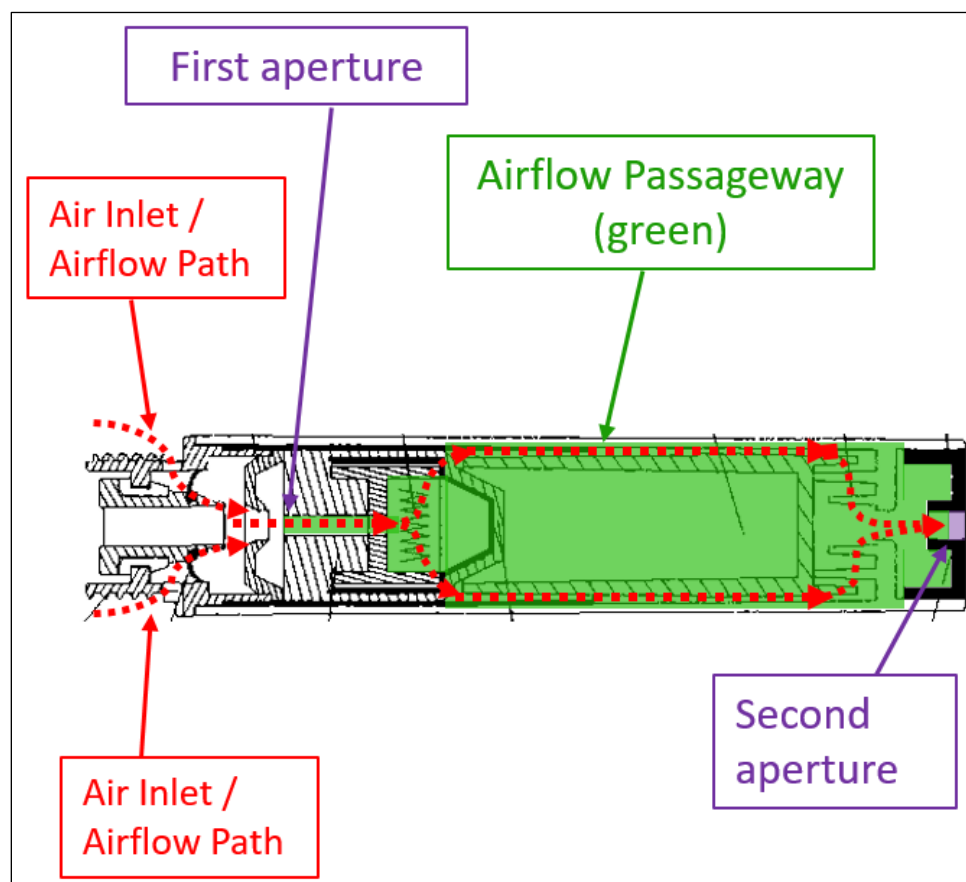
ii. Xia combined with Wang

The foregoing obvious combination of Xia with Wang (with or without Fang) also renders obvious this limitation. When modifying Xia's airflow passageway in light of Wang, a POSITA would know it could use Wang's connections between the cartridge and power source, which also contain, on the cartridge, an electrically conductive portion that is adapted to mechanically and electrically couple to the electrically conductive portion of the power source. *See, e.g.*, Ground 2, elements 1[a1]-1[a3]; Ex. 1005, 8; Ex. 1017 (Wang Decl.), 4-5; Ex. 1007, ¶105, 275-284.

e. 1[a4]: The first aperture and the second aperture in communication with one another

i. Xia

As discussed above in Section VIII.A, Xia discloses or renders obvious that the first aperture and the second aperture are in communication with one another as claimed; it is how the air flows from one end of Xia's cartridge to the other:



Ex. 1004, Fig. 2 (annotated); Ex. 1007, ¶107-110.

ii. Xia combined with Wang and/or Fang

Xia in combination with Wang and/or Fang, as discussed above, because the first aperture and the second aperture are in communication with one another, as air

flows from the first aperture to the second, explained in Section VIII, Ground 2, and 1[c] below. Ex. 1007, ¶111.

f. 1[b1]: Transverse heating element partially exposed to the airflow

This limitation recites a heating element being “located in the interior of the housing...extending transversely to a central longitudinal axis of the housing...at least partially exposed to the airflow.” But the ’864 Patent specification does not use the words “transversely” or “transverse,” nor does it describe what it meant by “extending transversely to a central longitudinal axis of the housing.”⁸ . Ex. 1007, ¶110.

However, the patent does state the following concerning the claimed orientation of the heating element with respect to the passageway: “[w]hile the heating element 222 is shown as residing solely in the airflow passageway 214, it is to be understood that various other configurations of the heating element 222 with respect to the airflow passageway are contemplated and are **intended to fall under the scope of the hereto-appended claims.**” Ex. 1001, 6:64-7:2. The patent further provides examples of heating element orientations that fall within the scope of the claims, including a heating element that is “in the airflow passageway,” “on the

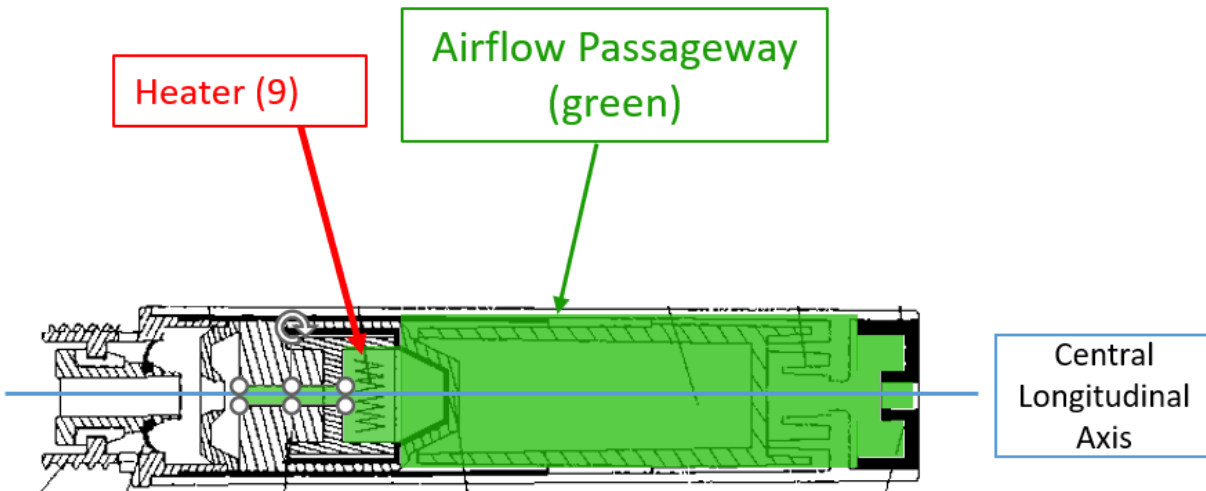
⁸ Because of the limited scope of allowable unpatentability grounds in IPRs, JLI does not raise herein any Section 112 issues such as lack of written description or indefiniteness.

exterior of the airflow passageway,” “on the exterior or interior of the passageway,” “wrap[ped] around the airflow passageway,” and “the airflow passageway 214 itself.” Ex. 1001, 6:64-7:21. The patent summarized that in the claimed configurations of the heating element in relation to the airflow passageway, “it is readily recognized that airflow may pass directly over the heating element, through a chamber that is proximate to the heating element, or other suitable configuration.” Ex. 1001, 7:19-21; Ex. 1007, ¶111.

Applying this description, limitation 1[b1] is disclosed and obvious.

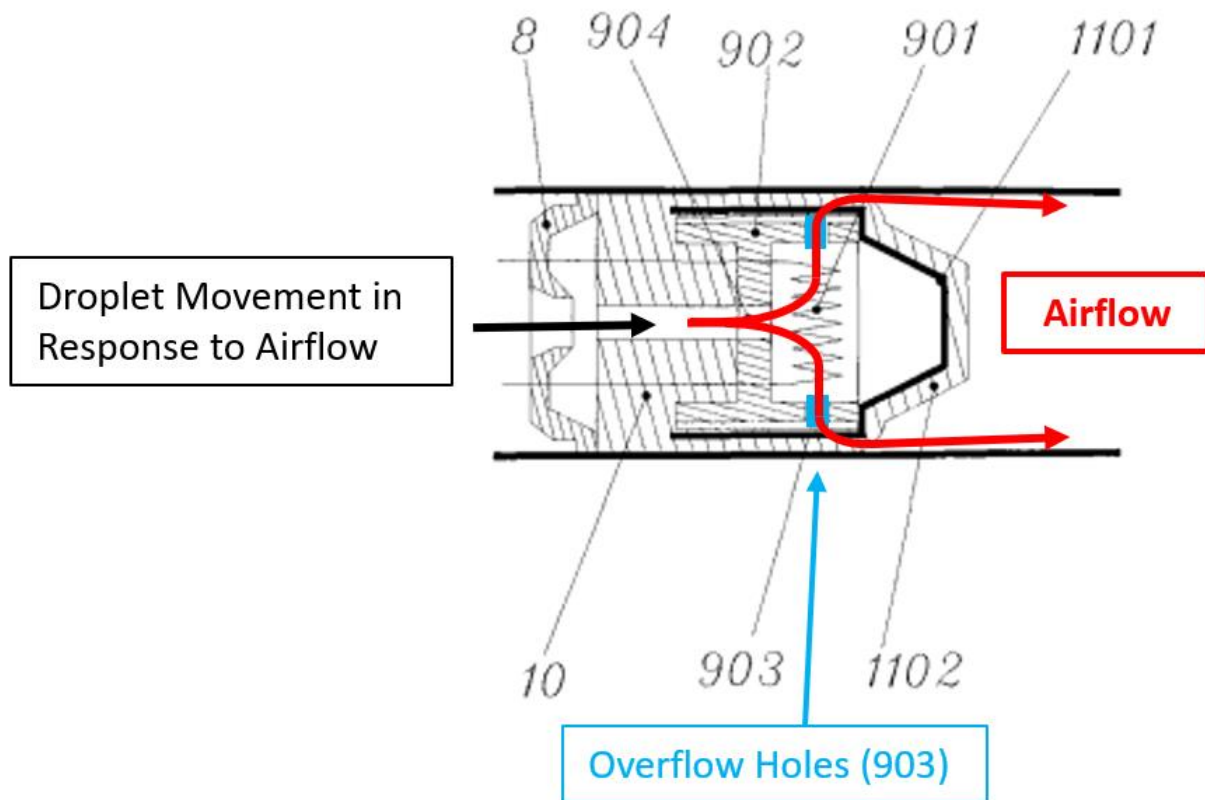
i. Xia

Under Patent Owner’s own application of the term, Xia discloses a heating element (“heater 9”) that is within the airflow passageway and over which airflow passes directly, and thus teaches this element. Xia illustrates heating element 9 within the interior of the housing of the generator in Figures 1 and 2 and within the airflow passageway (identified below in green):



Ex. 1004, 9-10, Fig. 2; . Ex. 1007, ¶113-114.

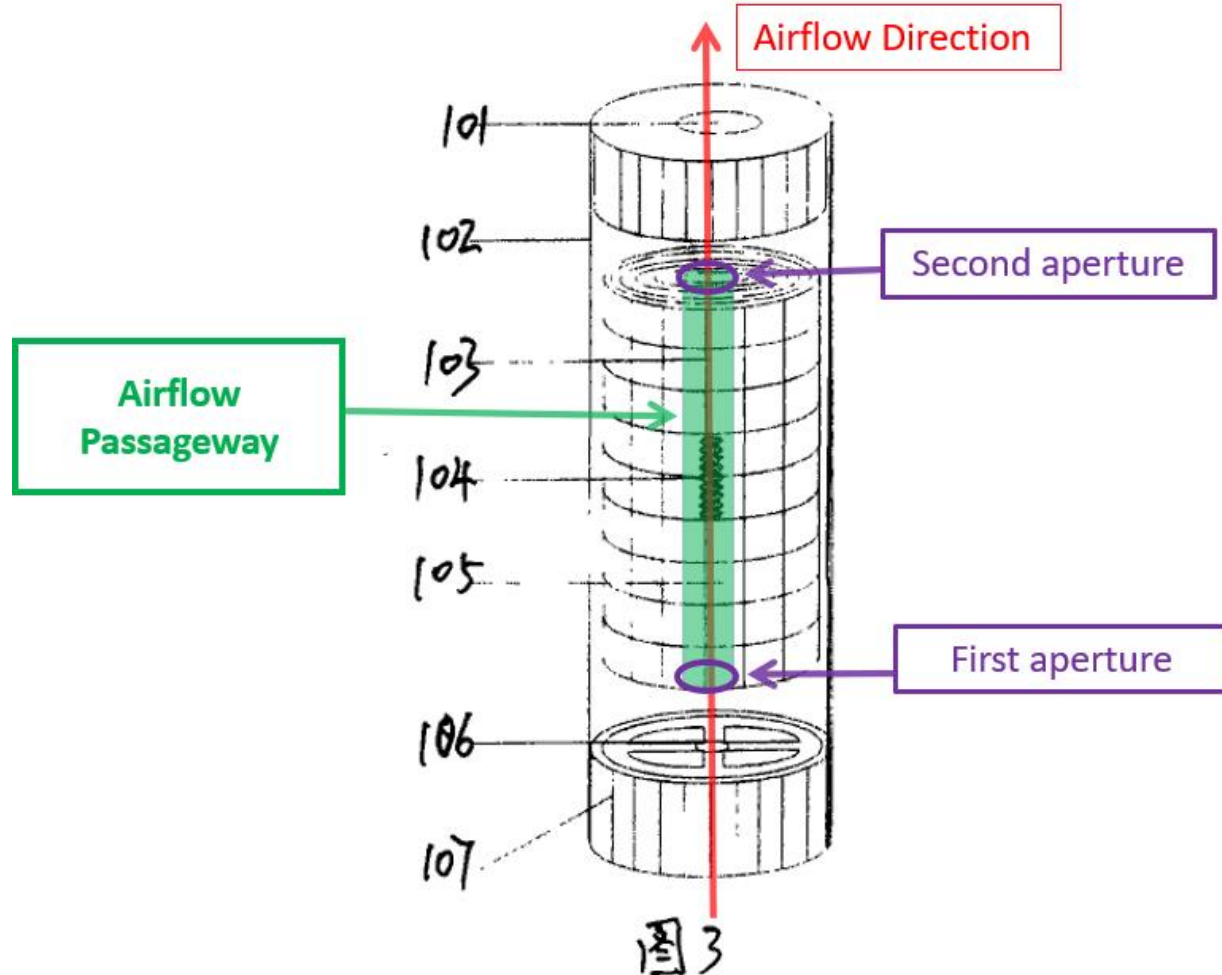
Xia explains that air flows all around the heater, as illustrated in Figure 4:



Ex. 1004 at 10, 13-14, Fig. 4; . Ex. 1007, ¶115.

ii. Xia with Wang and/or Fang

Xia in view of Wang and/or Fang also renders this limitation obvious, as discussed and depicted in 1[c] and Ground 2. For example, as discussed, when substituting Wang's cartridge configuration for Xia's, the resulting heating element 104 is within the airflow passageway and the airflow flows over and around that heater, where the central longitudinal axis is the same as that of the airflow direction:



Ex. 1005, Fig. 3; . Ex. 1007, ¶115-116.

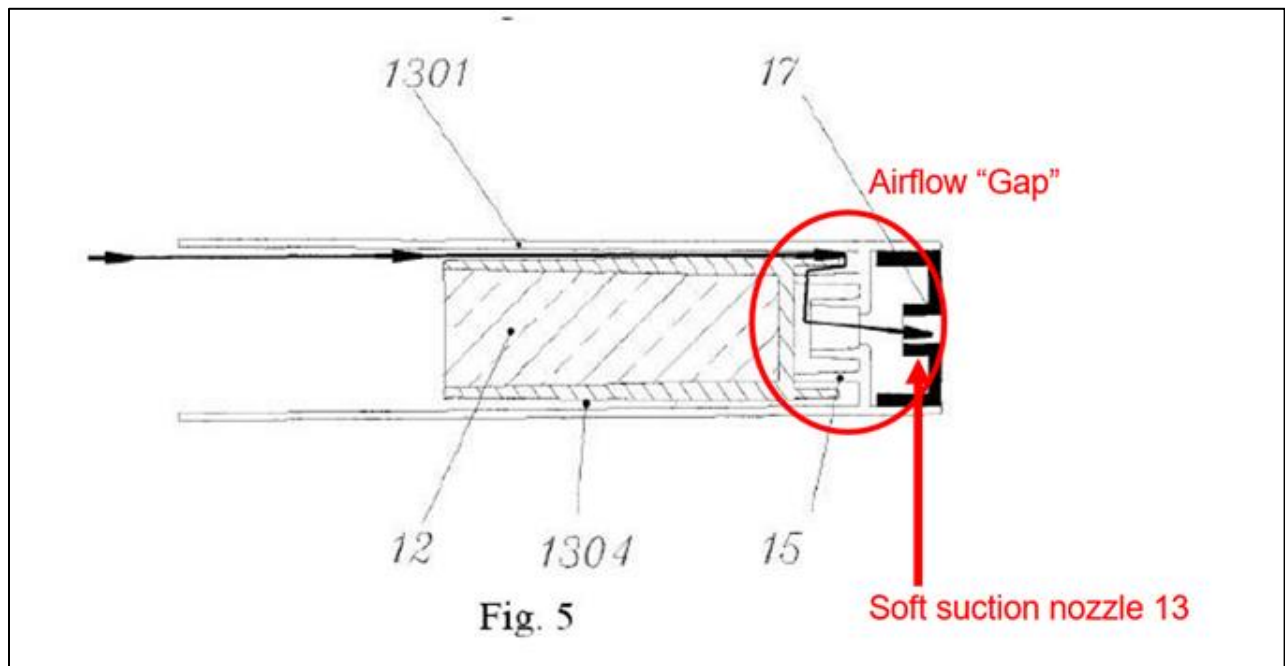
The same is true if Fang’s airway passageway is substituted for Xia’s or Wang’s because their associated heating elements will still be in the combination’s resulting airflow passageway such that airflow may pass directly over it. . Ex. 1007, ¶117.

g. 1[b2]: Heater vaporizes solution for oral provision in the airflow responsive to power source

Elements 1[c] and 1[d] describe why Xia and the proposed modifications thereof disclose that the heating element is electrically configured to vaporize at least a portion of the solution to be contained in the solution holding medium for oral provision to an individual in an airflow from the second aperture. Ex. 1004, 10 (“The smoke generated by smoking is actually water vapor obtained by vaporizing the chemical liquid.”), 5 and 13-14; Ex. 1007, ¶123.

Element 1[a3] explains that the heater’s activity is responsive to electrical power received from the battery through the electrically conductive portions of the cartridge and the power source through connecting conductors A5 and B6. Ex. 1004, 8; Ex. 1007, ¶124.

To the extent this element requires mixing of vapor and airflow separately from, or in addition to, air flowing over the heating element, Xia discloses that limitation. In Xia the vapor mixes with existing air in a “gap” before leaving the mouthpiece 13 via inhalation from the user. Ex. 1004, 9-10, 13, 16; see Fig. 5; Ex. 1007, ¶¶125-128.



Ex. 1004, Fig. 5.

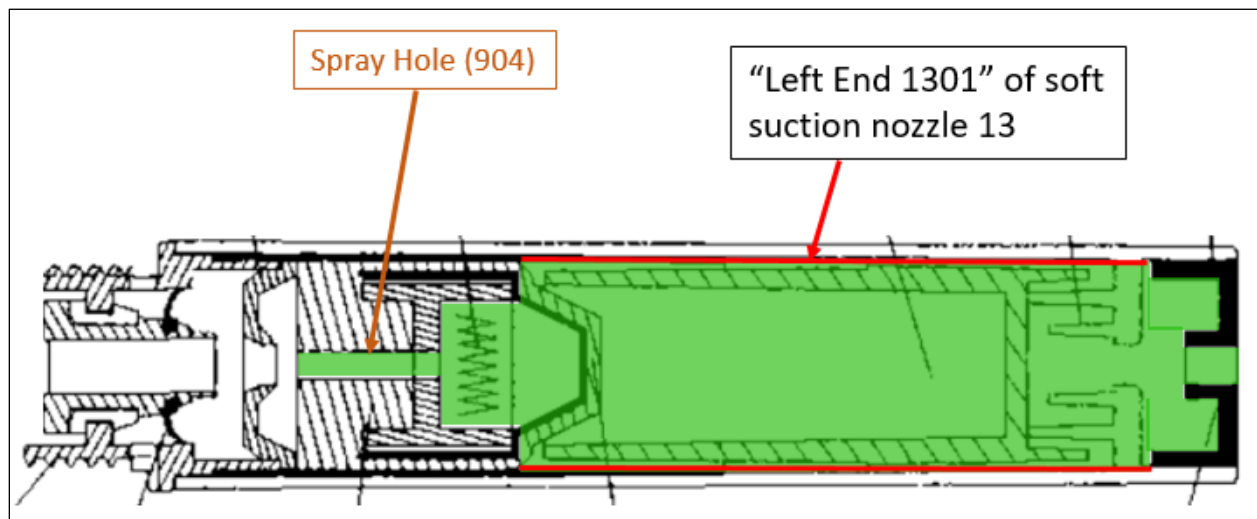
h. 1[c]: Airflow passageway extends centrally and axially with respect to the housing

i. Xia

Xia discloses or makes obvious the claimed airflow passageway. As discussed above in Section VII.C, Patent Owner is currently asserting in the parallel ITC investigation—and a District Court previously found on summary judgment—that a central and axial passageway meets this limitation even if there are objects in that passageway that obstruct the airflow and direct it away from the center, rather than allowing it to flow along the central axis. Ex. 1007, ¶128.

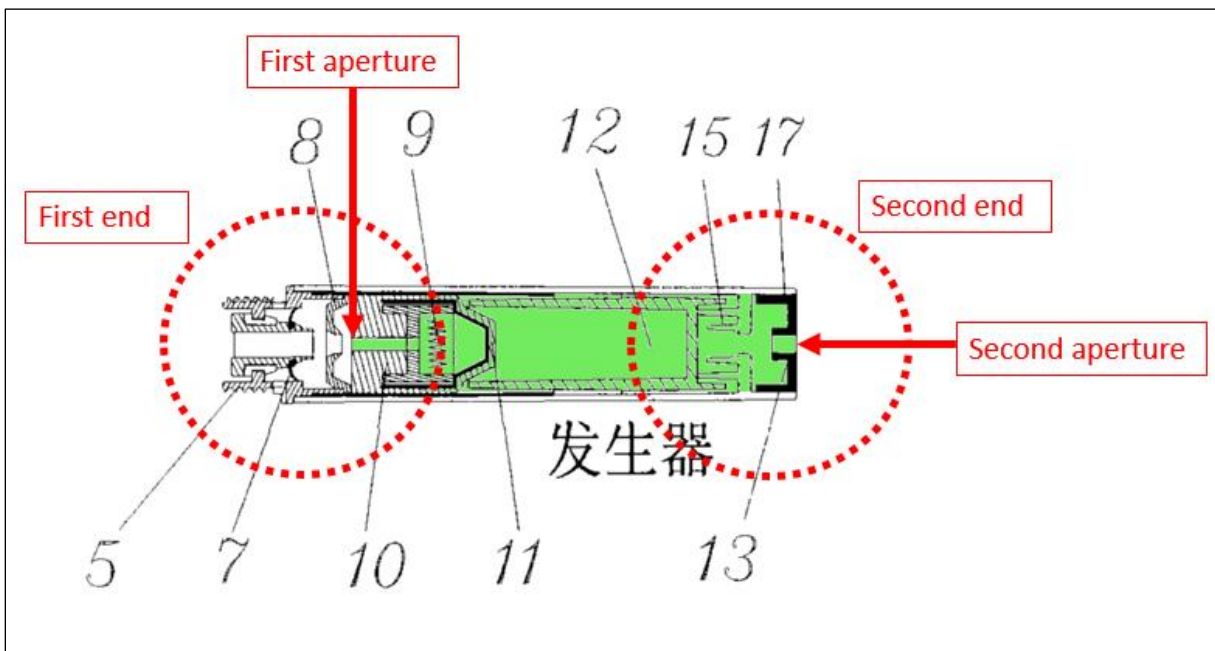
Xia discloses just such an airflow passageway. For example, Xia discloses an airflow passageway through which air flows and that is defined at least in part by

spray hole 904 and a layer of material (such as polypropylene PP material) on the inner surface of the housing. Ex. 1004, (“A left end 1301 of the soft suction nozzle 13 extends to the bottom of the liquid stopping sheet 8, and may be made of environmental-friendly materials such as polypropylene PP, which may effectively prevent internal heat from being transmitted out.”) 11, Figs. 2, 5. This airflow passageway is highlighted in green in the modified figure below:



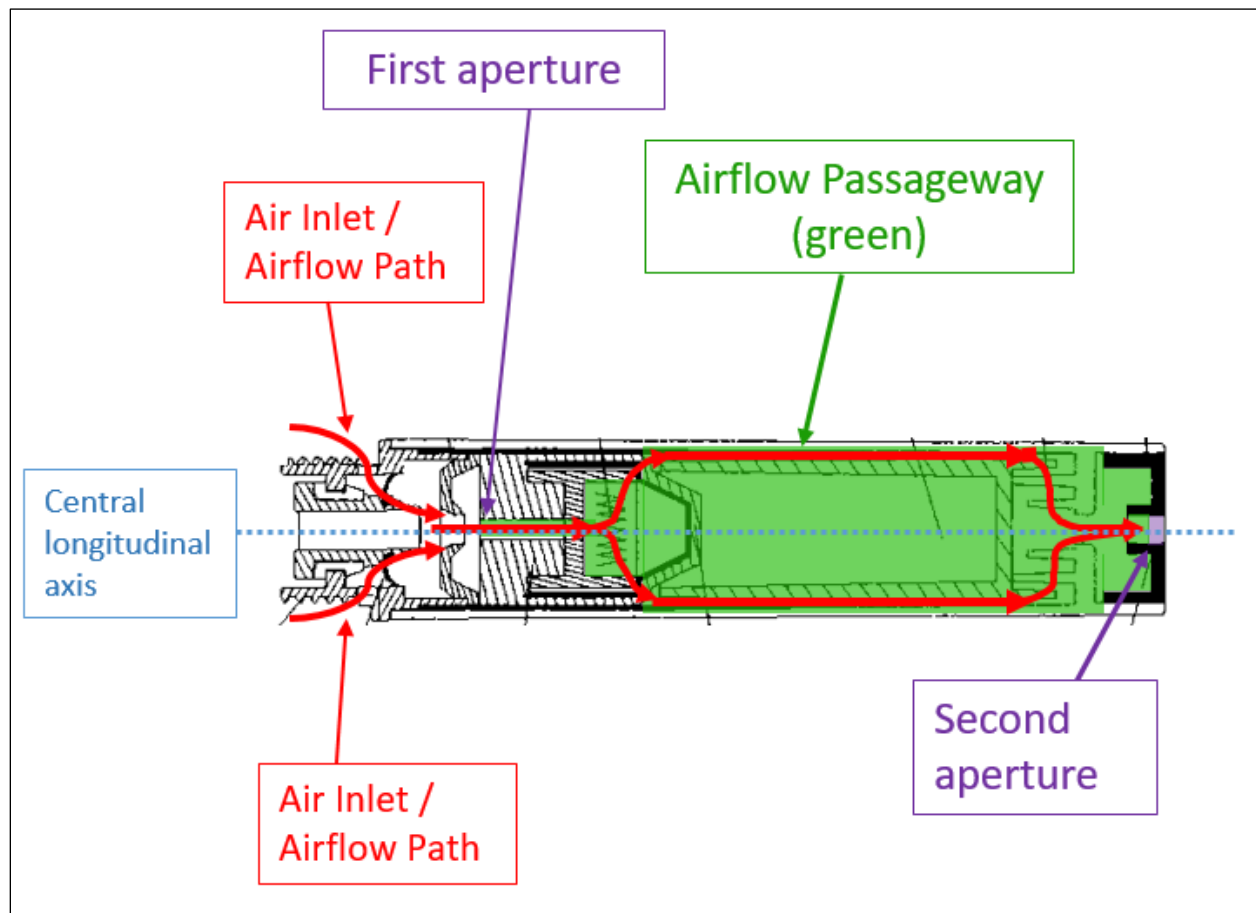
Ex. 1004, Fig. 2 (annotated); Ex. 1007, ¶130.

As shown below, Xia’s airflow passageway extends “centrally and axially with respect to the housing” as claimed.



Ex. 1004, Fig. 2; Ex. 1007, ¶131.

This air passageway is also both interior to the inner surface of the cartridge housing and centrally and axially located with respect to the housing along the length of the cartridge:

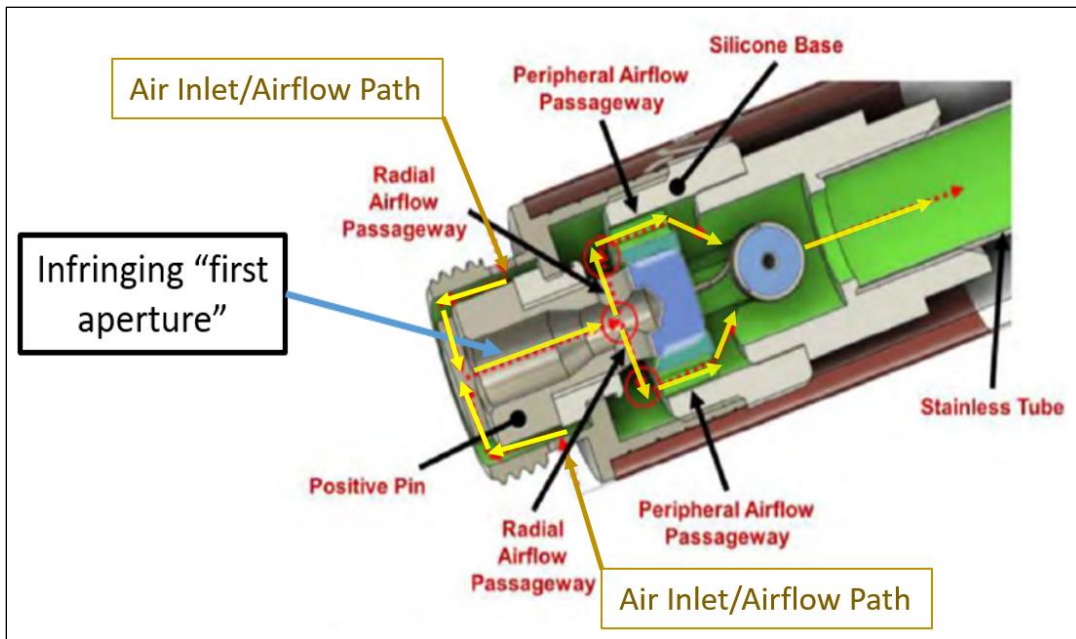


See 1[a4]; see also Ex. 1007, ¶132.

If NJOY argues the Xia's airflow passageway is not centrally and axially located because air within the passageway flows around certain items, such as the liquid storage container 12, rather than in a straight line, that argument is inconsistent with its own assertions in the pending ITC investigation where they accuse the RJR Vuse CIRO device, the prior summary judgement decision as to that device, and the positions taken by prior patent owner Fuma in the RJR litigation. Ex. 1007, ¶133.

As to the prior summary judgment decision, the District Court rejected just such an argument about the actual airflow itself and instead found that a passageway

like Xia's satisfied this limitation as a matter of law. Specifically, the North Carolina District Court rejected defendant's argument that the accused RJR product's airflow passageway (shown below in green) did not meet this limitation because (according to defendant) objects in that passageway obstructed airflow and directed it away from the center, rather than allowing it to flow along the central axis. Ex. 1014 (RJR Brief), 21-25.



Id., 22; Ex. 1007, ¶131. The District Court explained that defendant improperly “conflat[ed] the airflow’s path with the airflow passageway.” Ex. 1015, 14-18. Although “[t]he positive pin and silicone base [in the image above] obstruct airflow and alter the airflow’s path” they do not alter the “interior airflow passageway, which at all times extends straight through the center of the [accused] cartridge to the second end as required by the claim.” Ex. 1015, 14-18; Ex. 1007, ¶136.

As to Patent Owner's current assertions, it is again contending in the pending ITC investigation that this very same RJR's product and passageway meets the '881 patent claims and this limitation. *See* Section VII.C.

Consistent with the District Court's ruling, prior patentee Fuma's arguments, and Patent Owner's current ITC investigation assertions, Xia's airflow passageway is also therefore centrally and axially located, despite the fact that that the air may flow around objects in the passageway.

ii. Xia with Wang

If NJOY contradicts itself and all of the foregoing to argue that Xia itself does not disclose or suggest this limitation, it was obvious over Xia in view of Wang.

In Xia, in at least the part of the device near the heating element, the airflow passageway is inset from the walls of the housing, centrally and axially, with the solution holding medium 10, surrounding it:

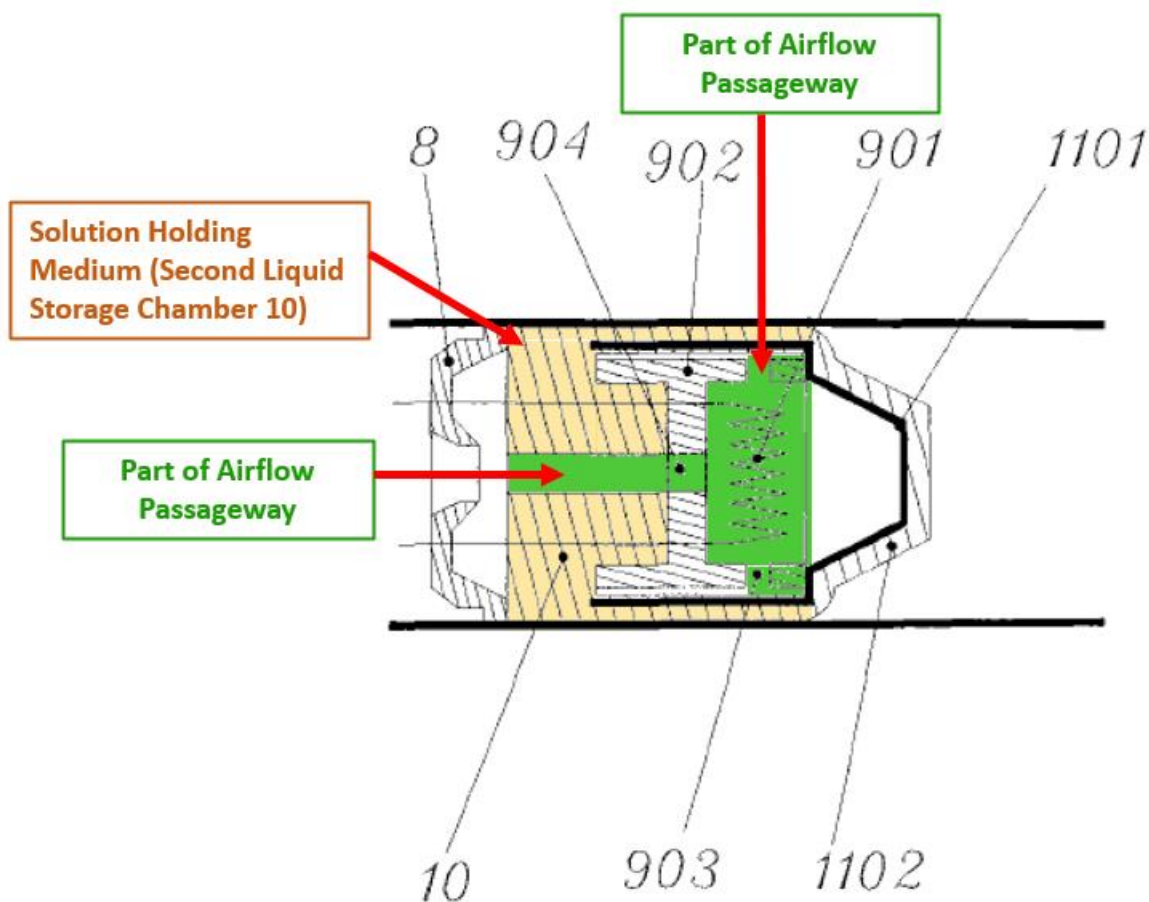
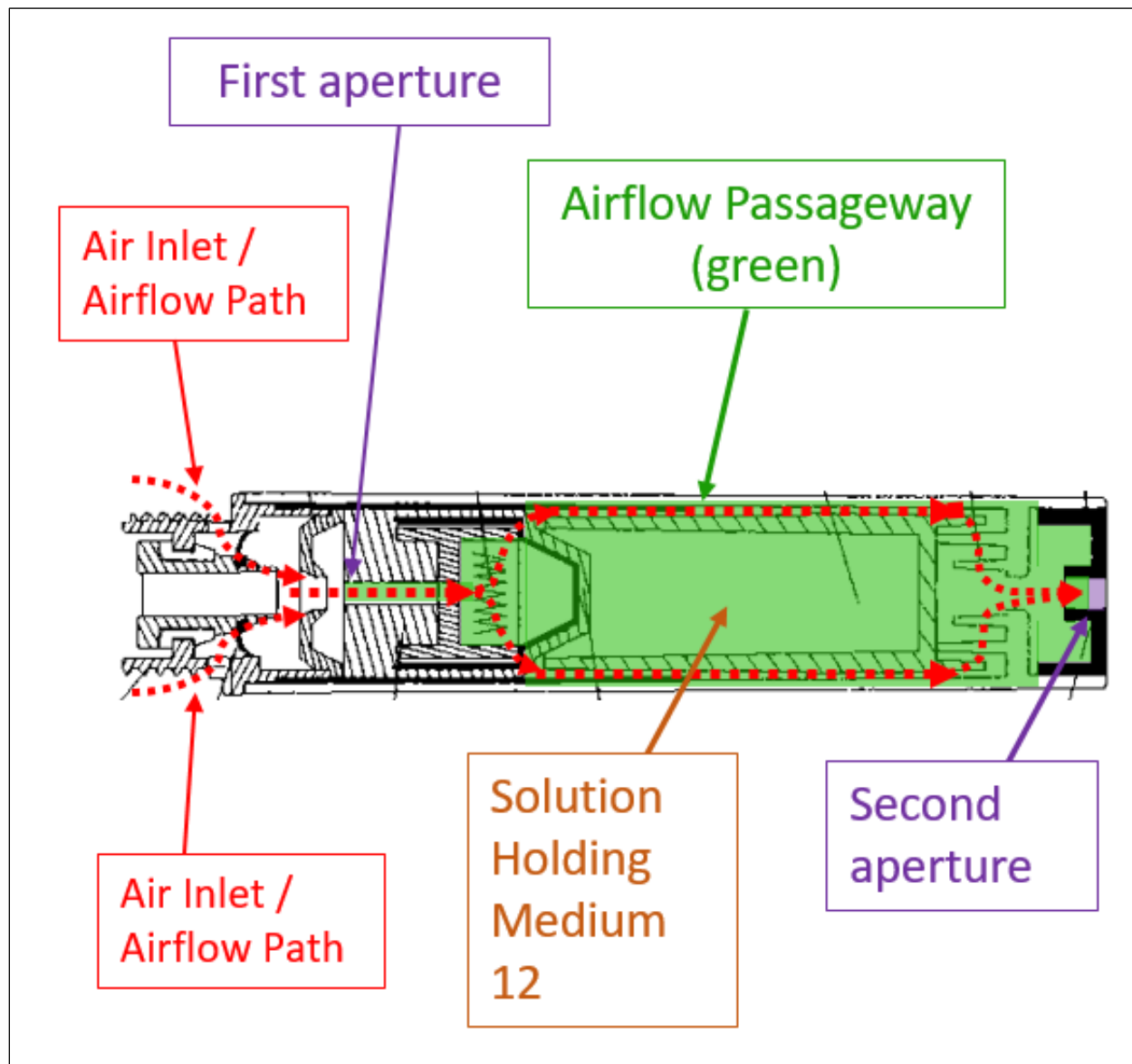


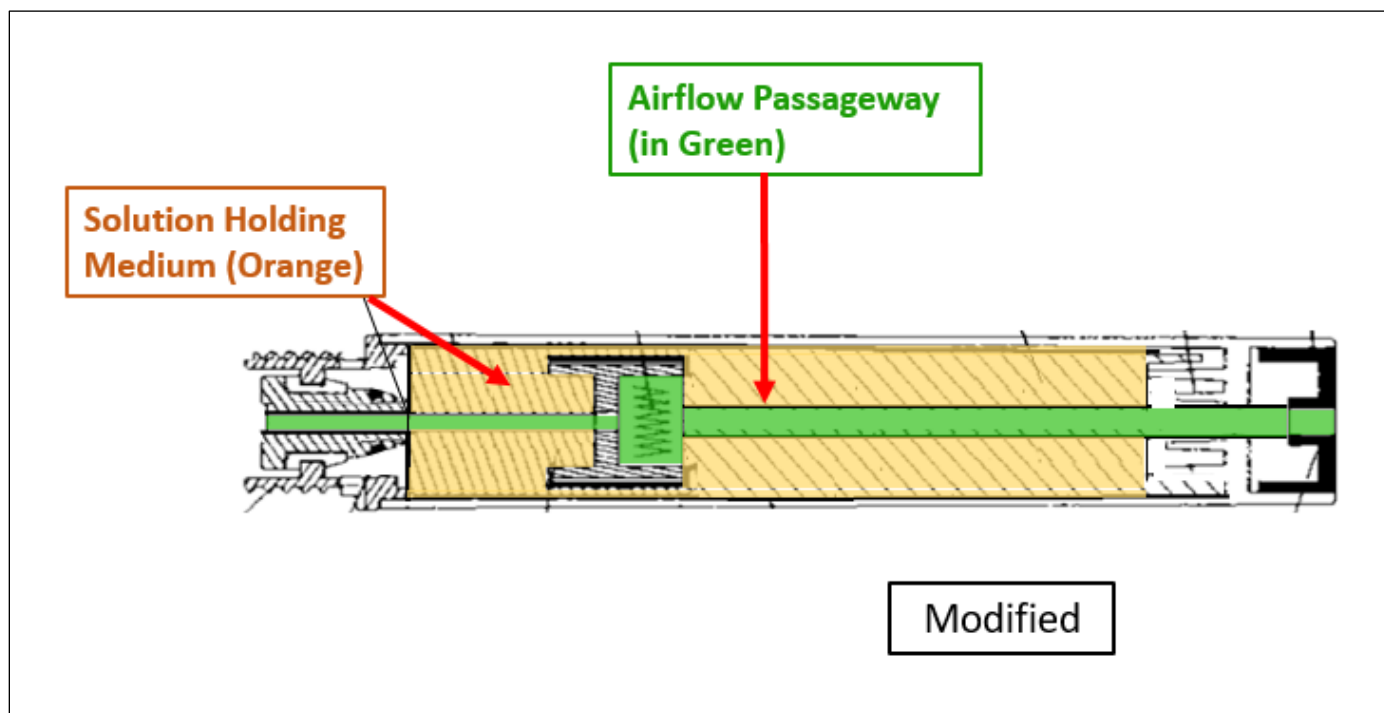
图 4

Ex. 1004, Fig. 4, see 1[a1]; Ex. 1007, ¶136-137. Xia's inventors chose to place the remaining storage holding medium, item 12, in the center of the airflow passageway such that the air flows around it:



Ex. 1004, Fig. 2.

But a POSITA would know that another obvious alternative, with obvious benefits, would have been to extend the architecture in the area of the heating element in Figure 4 leftward and rightward, such that airflow passageway extends through the solution holding medium:



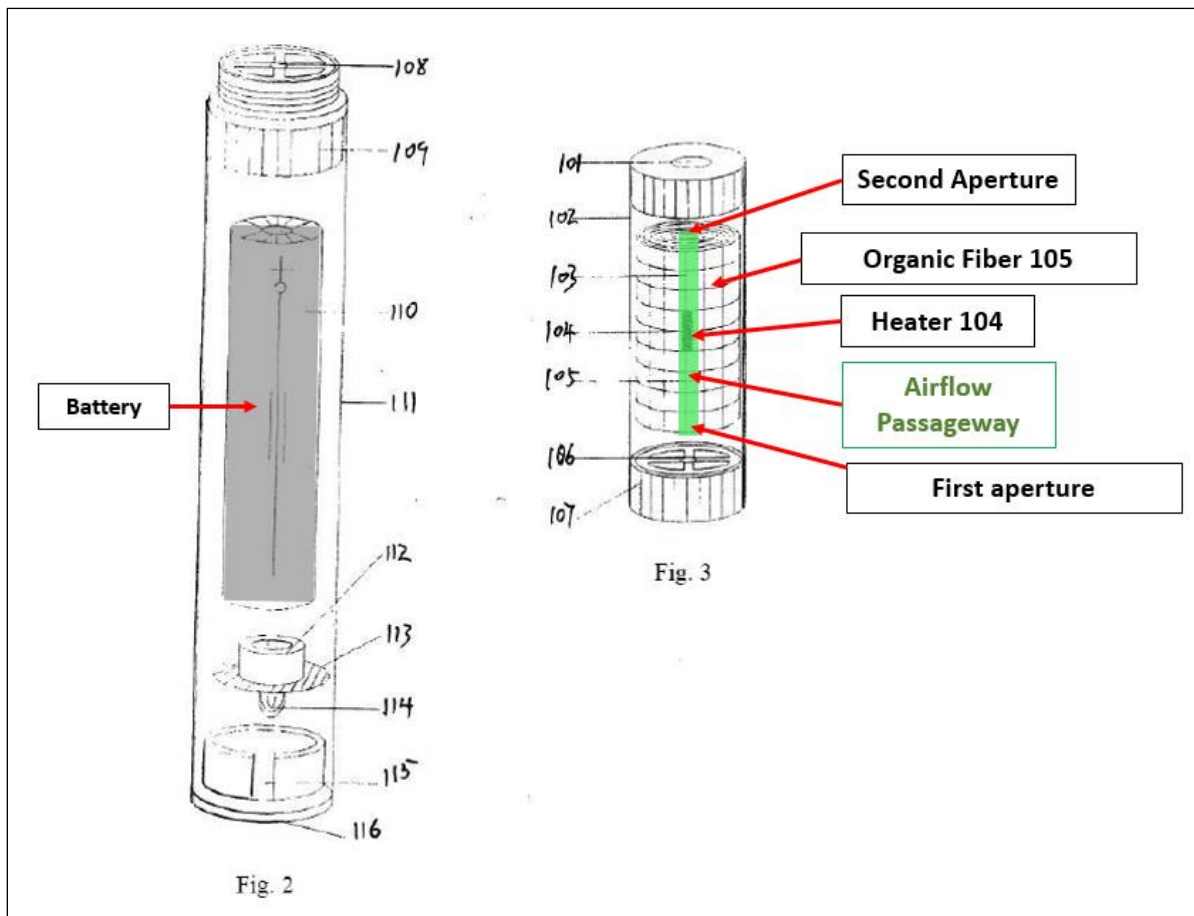
Ex. 1004, Fig. 2 (modified); Ex. 1007, ¶135.

This obvious modification would make the existing architecture in the heating element area consistent and run along the length of the cartridge. All items would function as they currently do in Xia. Ex. 1007, 136-137.

Using such a passageway and solution holding medium design in Xia was obvious because, for example, it was the substitution of a known element for another that yields predictable results and it is the use of a known technique to improve a similar item in the same way to yield predictable results.

That the use of a central passageway extending through a solution holding medium was known is established by, for example, the Wang reference. In the prior North Carolina district court litigation, the inventor Mr. Wang confirmed that his

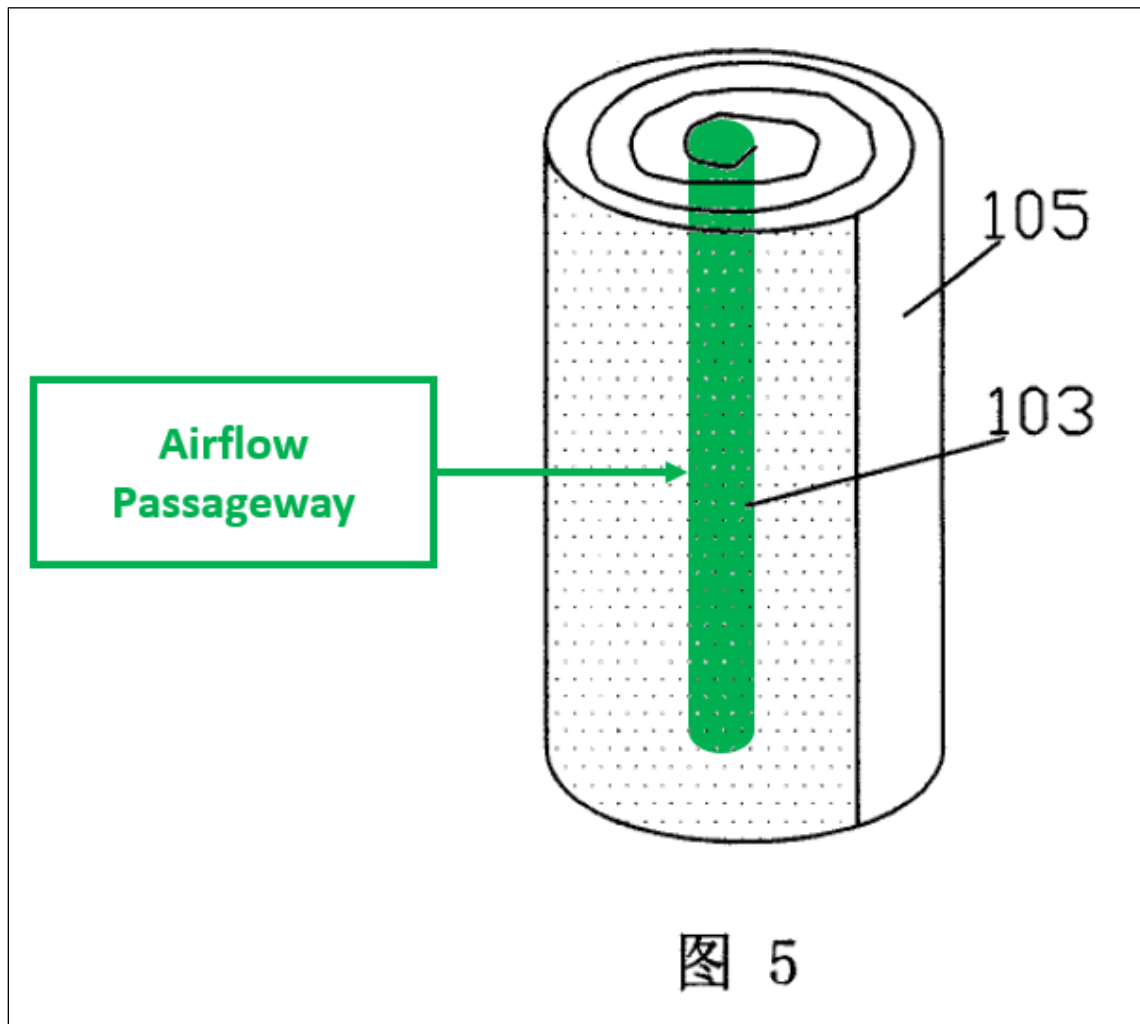
invention's solution holding medium (absorbent organic fiber 105) “surrounds a **complete central air passageway**, in which the heater is positioned.” Ex. 1017 (Wang Decl.), 4-5 (emphasis added). That central air passageway is annotated below in green and extends from a first aperture and a second aperture. Ex. 1007, ¶137.



Ex. 1005, Figs. 2-3 (annotated).

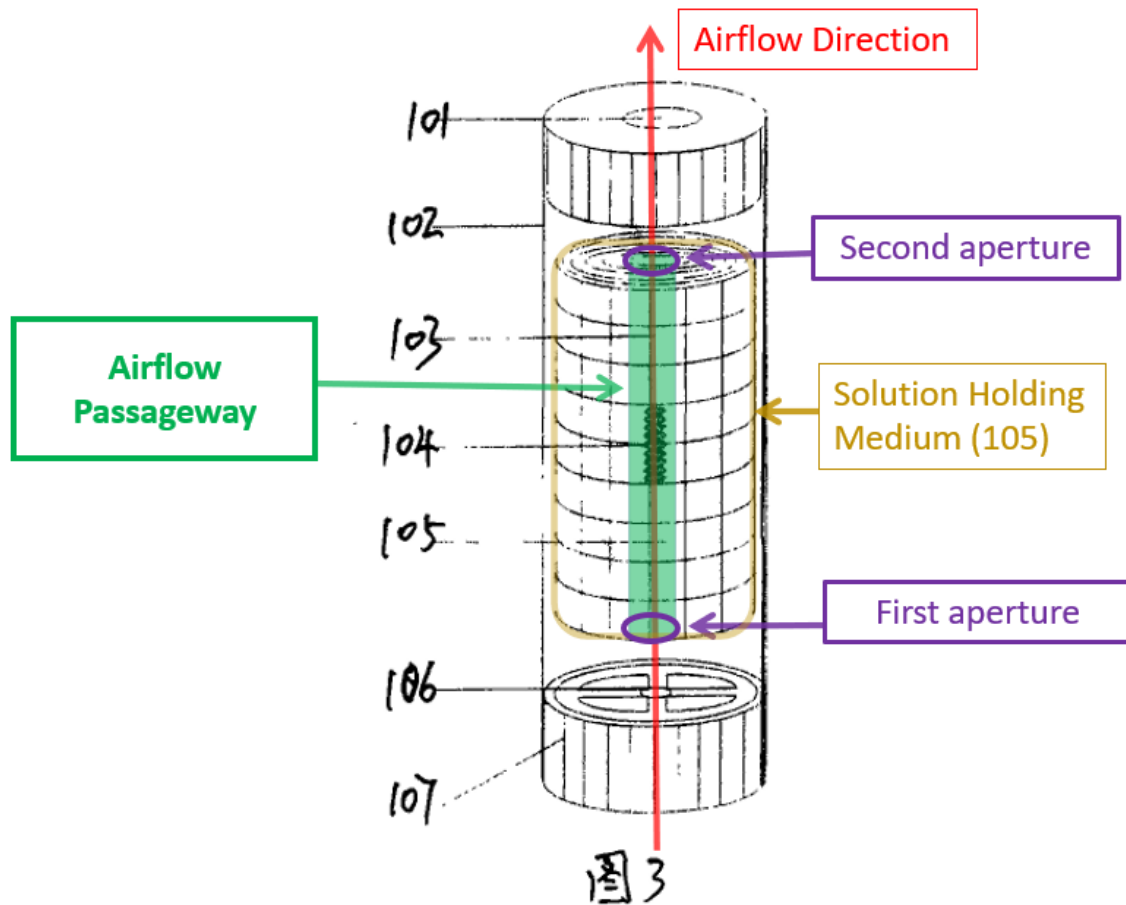
Wang's Figure 5 also depicts Wang's central air passageway as extending through the solution holding medium (absorbent organic fiber 105). As shown below, Figure 5 illustrates that the organic fiber 105 comprises fiber or paper that is

rolled up so that it defines and contains the central passageway (which is annotated here in green). Ex. 1005, Fig. 5; Ex. 1007, ¶138.



Ex. 1005, Fig. 5 (annotated), 7.

When viewed in the context of Wang's Figure 3, this passageway extends centrally and axially with respect to the housing intermediate of the first aperture on the housing's first end and the second aperture on the housing's second end:



Ex. 1005, Fig. 3, 8 (“air inlet 106” and “air outlet 101” are part of the “complete airflow channel”; “the smoke generated by the tobacco extract 103 instantly heated by the heater 104 is partially sucked out from the air outlet 101 of the cigarette holder.”). As seen in Figure 3, the airflow passes directly through the center via the space provided by rolling the organic fiber 105 around the heating element, in order to reach the centrally located heating element 104 and then reach the second aperture. Wang describes air entering the cartridge through “air inlet 106.” Ex.

1005, 8. Air flows into gap in the rolled “organic fiber 105,” flows over the “heater 104,” and exits to the user via “air outlet 101”). Ex. 1005, 7-8; Ex. 1017 (Wang Decl.), 4-5. Ex. 1007 ¶139.

A POSITA would have been motivated to modify Xia’s cartridge to include this obvious passageway arrangement of Wang because, for example, making the change to an airflow passageway located centrally and axially, to the extent it is not already, away from the walls of the housing, with the solution holding medium situated between the passageway and the housing, throughout the length of the housing would provide improved, smoother air flow without pinch points, better temperature control, and vapor content, as well as being simpler and cheaper to design and manufacture. Ex. 1007 ¶140. Moreover, improved air flow, temperature, and vapor content can improve the device’s appeal to users, for example by making the user experience more similar to a traditional cigarette, and by making the vapor more palatable. Ex. 1007 ¶141.

And this obvious substitution and use of Wang’s cartridge layout could be easily achieved using Wang’s elements that connect the cartridge and battery-holding component, and it would result in predictable results with a reasonable expectation of success. Xia already uses this architecture for part of its system because secondary liquid storage chamber 10, part of the solution holding medium, is situated between the housing and heater 9 and the portion of the airflow

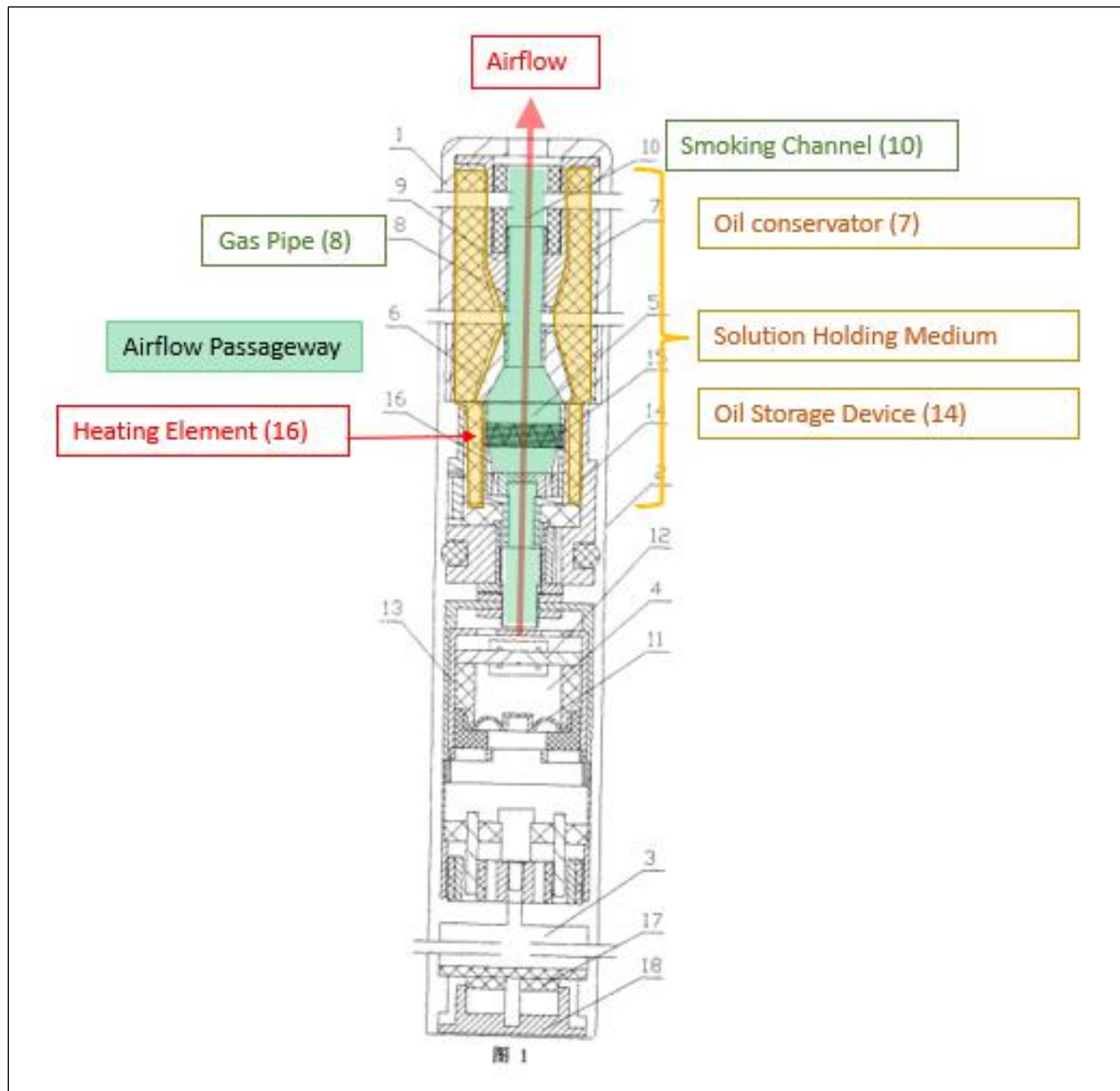
passageway passing over the heater. *See, e.g.*, element 1[a1] above. This modification would simply make that architecture consistent and run along the length of the cartridge. All items would function as they currently do in Xia. Ex. 1007, ¶145-148.

This modification would also simplify the structure of the device, making it (1) have fewer parts, and (2) be more easily manufactured by increasing the use of cylindrical shapes. In doing so, a POSITA would move the portion of the liquid blocking plate 8 that stops the backflow of liquid to the end of the secondary liquid storage chamber. Ex. 1007, ¶149-150; *see* Ex. 1004, 13 (“The liquid-blocking plate 8 may prevent the chemical liquid in the secondary liquid storage chamber 10 from flowing out...”).

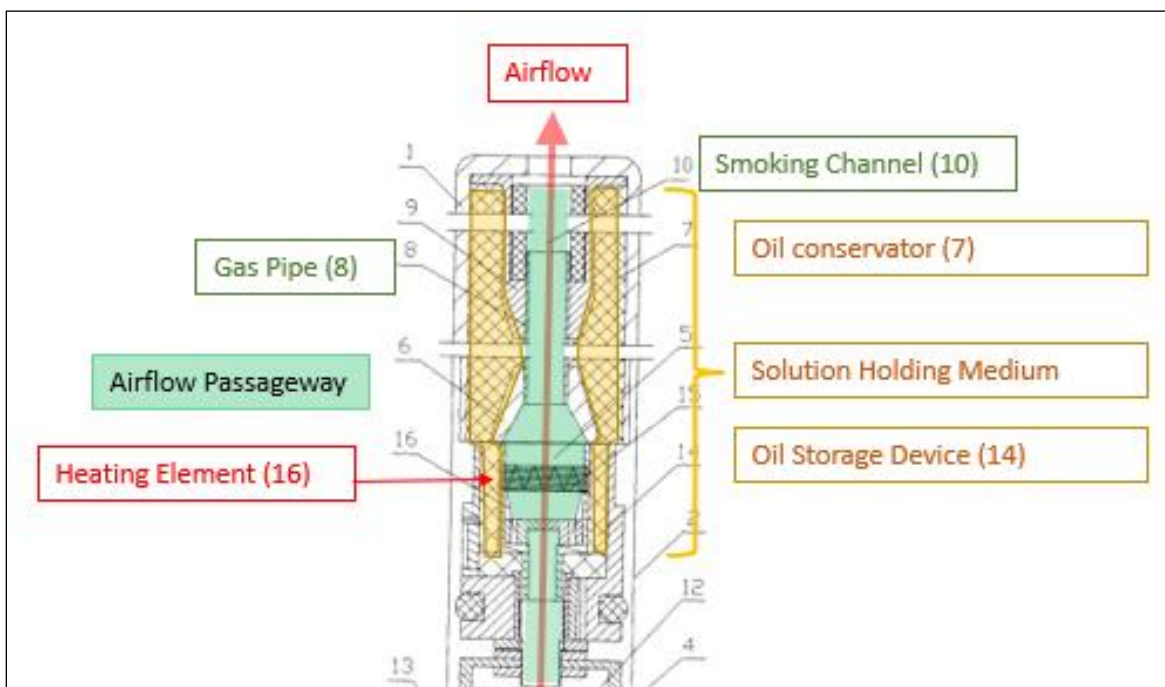
iii. Xia and Wang with Fang

To the extent NJOY further argues that this limitation is not obvious in light of Xia and Wang, it is also obvious in light of Fang. Fang confirms that a central and axial airflow passageway was known. Using Fang’s passageway in place of Xia’s or Wang’s airflow passageway was obvious because, for example, it was the substitution of a known element for another that yields predictable results and it is the use of a known technique to improve a similar item in the same way to yield predictable results. Ex. 1007, ¶152-152.

Fang's claimed central and axial airflow passageway intermediate a first aperture and a second aperture is illustrated below in green:



Ex. 1006, Fig. 1 (annotated); Ex. 1007, ¶154.



Ex. 1006, Fig. 1 (partial, annotated).

Fang discloses a “gas pipe (8),” “smoking channel (10),” and other un-numbered hollow portions in the center of the device, indicated in green highlight in the annotated figures, through which air flows directly down the center of the device, which together form an airflow passageway that runs directly through the center of the device and to the tip, where the user places his or her mouth, at the top of the image, where air mixed with vapor exits the device. Ex. 1006, 4, 6. This is surrounded by the solution holding medium comprising oil conservator 7 and oil storage device 14. Ex. 1007, ¶155-156.

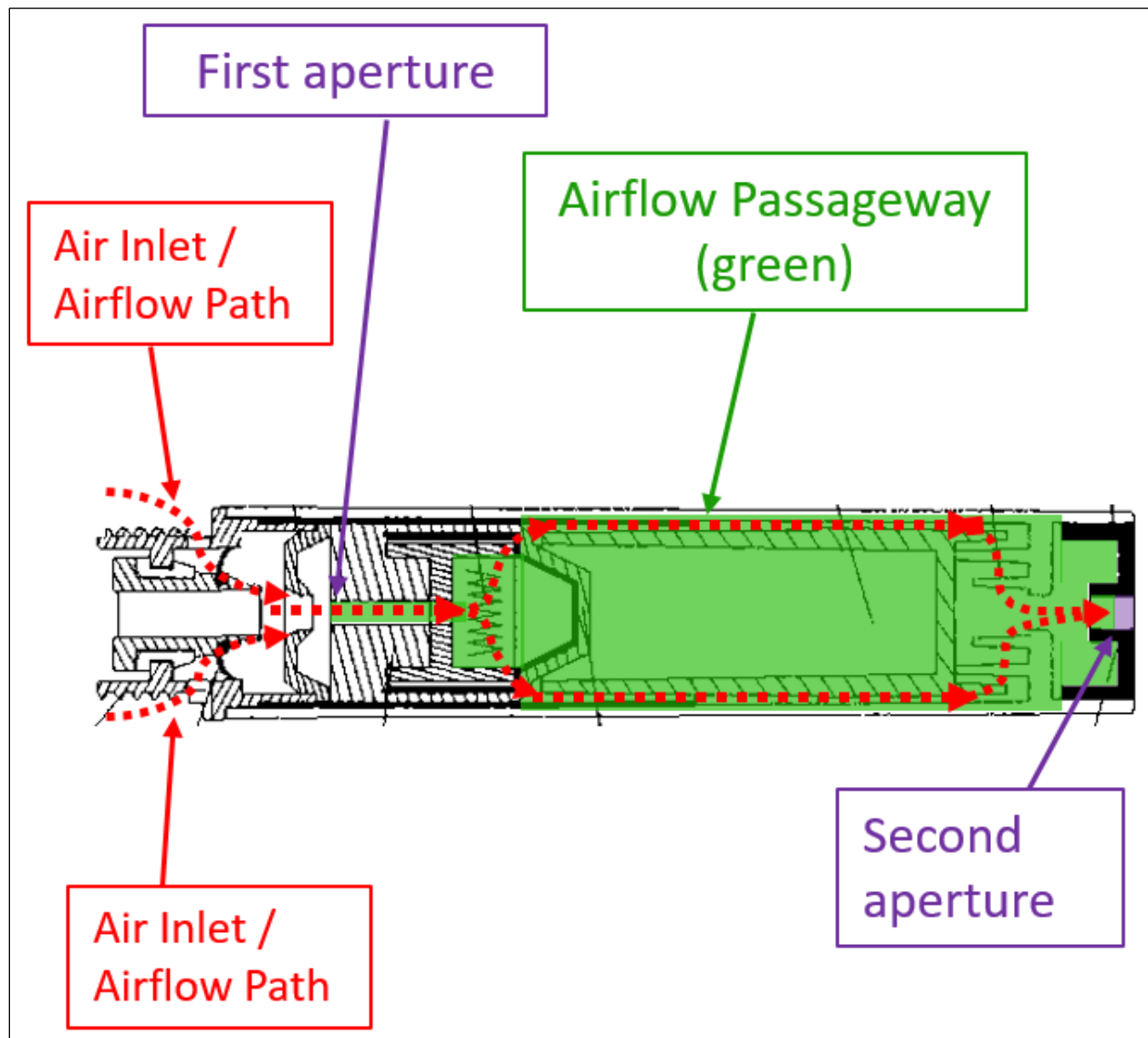
A POSITA would have been motivated to modify Xia’s or Wang’s cartridge to include Fang’s known airflow passageway arrangement for the reasons discussed

above in connection with Wang. Likewise, this obvious substitution and use of Fang's airflow passageway arrangement could be easily achieved using and would result in predictable results for the same reasons discussed above in connection with Wang. Ex. 1007, ¶157-160.

i. 1[d]: Airflow passageway extends centrally and axially from first to second aperture

i. Xia

See 1[c], demonstrating that the airflow passageway is configured to allow an airflow through the cartridge from the first aperture to the second aperture of the housing:



Ex. 1004, Fig. 2 (annotated); Ex. 1007, ¶125-156; 303-315.

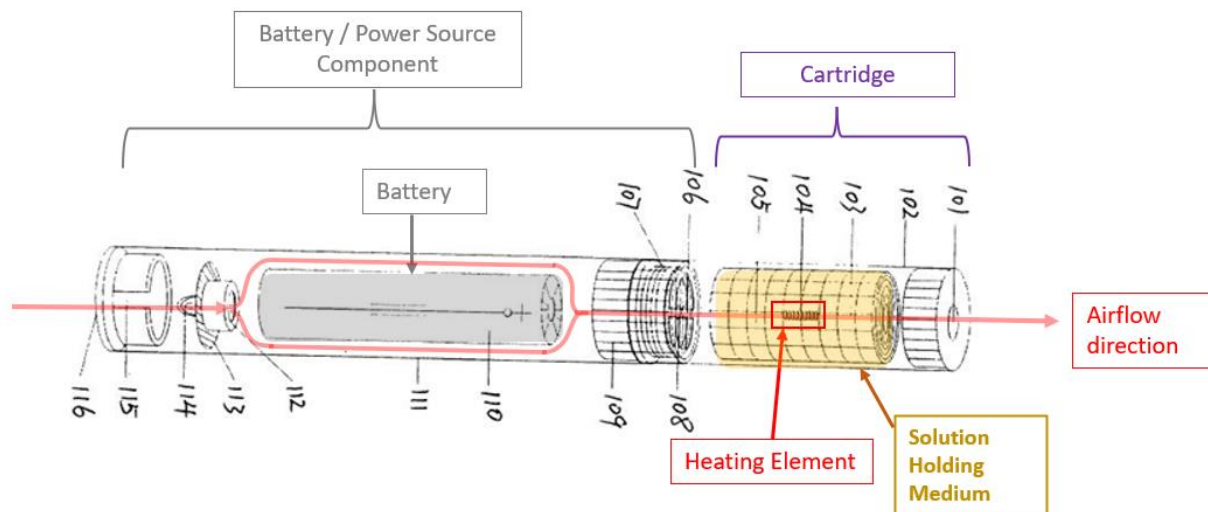
ii. Xia combined with Wang and/or Fang

Xia in combination with Wang and/or Fang, as discussed above, also disclose this limitation, as discussed above in 1[c] and in Ground 2, 1[c]-1[d]; Ex. 1007, ¶128-159; 307-319.

2. Claim 2:

a. Battery

Xia discloses “battery 2...arranged inside the controller.” Ex. 1004, 7;
see Fig. 1:



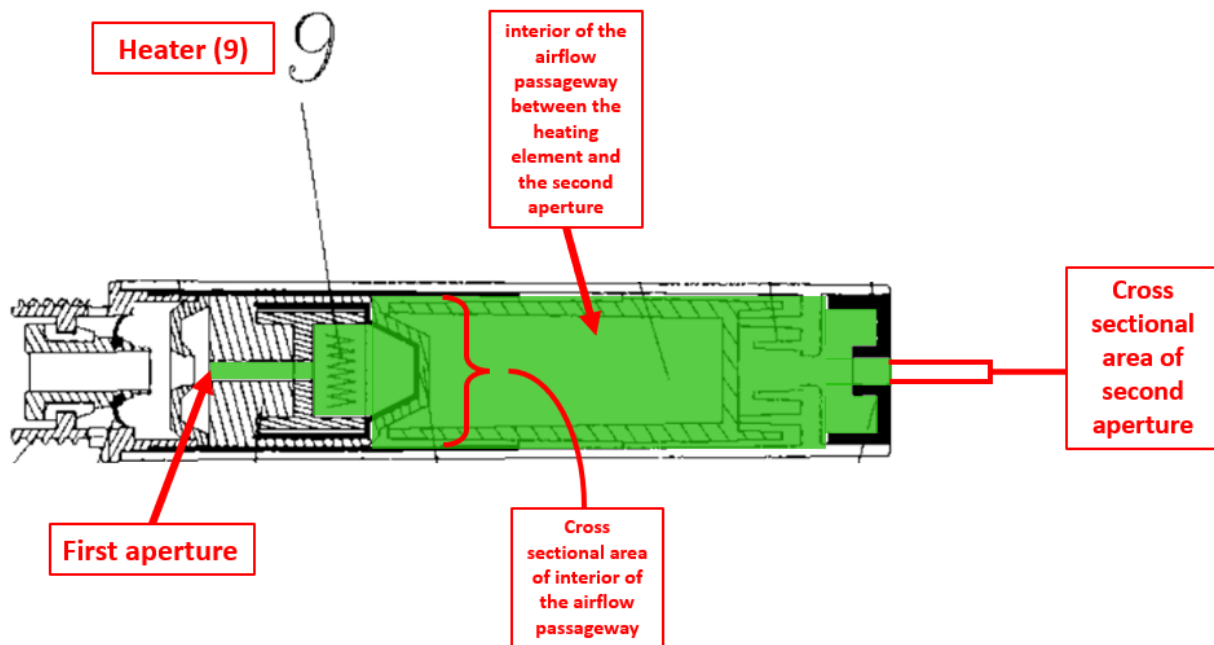
Ex. 1004, Fig. 1. See also 1[p], 1[a3].

3. Claim 3:

a. Airflow passageway having cross sectional area not smaller than second aperture

i. Xia

The interior of Xia’s airflow passageway has a cross sectional area larger than the second aperture perpendicular to the central and longitudinal axis of the device, between the heating element and second aperture. Ex. 1007, ¶164-165.



Ex. 1004, Fig. 2 (partial, annotated).

ii. Xia combined with Wang and/or Fang

The modifications with Wang and/or Fang relate to the location of the first aperture and the location of the airflow passageway, but do not impact the fact that the second aperture in Xia is smaller than the cross section of the passageway. Ex. 1007, ¶166.

4. Claim 4:

a. Airflow passageway having substantially uniform cross-sectional area cross a continuous majority of the length of the housing

See Claim 3 (regarding passageway size versus second aperture); Ex. 1007, ¶167.

As to the substantial uniformity of the cross-sectional area, Xia discloses this as shown in claim 3. The modifications would maintain the uniformity of the airflow passageway, but to move it centrally within the solution medium. A POSITA would recognize the obvious benefits of a simple uniform cross section in the airflow passageway, which also exists in Wang and Fang, because it would create a more consistent airflow, would be simpler to manufacture and repair, and maximizes the storage space for liquid around the passageway. Ex. 1007 ¶ 168-172.

5. Claim 5:

a. 5[p]

See element 1[p].

b. 5[a]

See element 1[a1] – [a4].

c. 5[b]

See element 1[b1]-[b2].

d. 5[c]

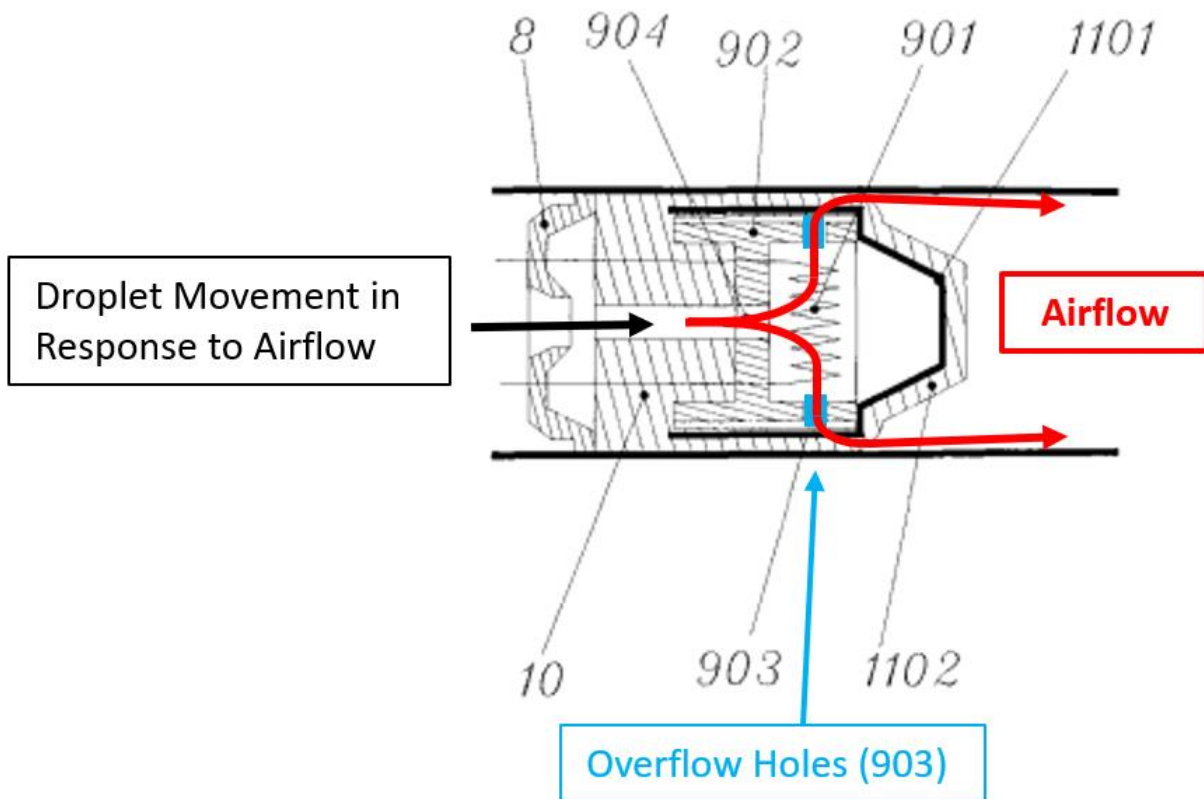
See element 1[c].

e. 5[d]: Airflow passageway extends in a straight path from first to second aperture with only heating element obstructing a portion of the airflow

The passageway of Xia and the combinations proposed above extend in a straight path from the first aperture to the second aperture, as explained above in 1[c] and claim 4. Ex. 1007, ¶177.

i. Xia

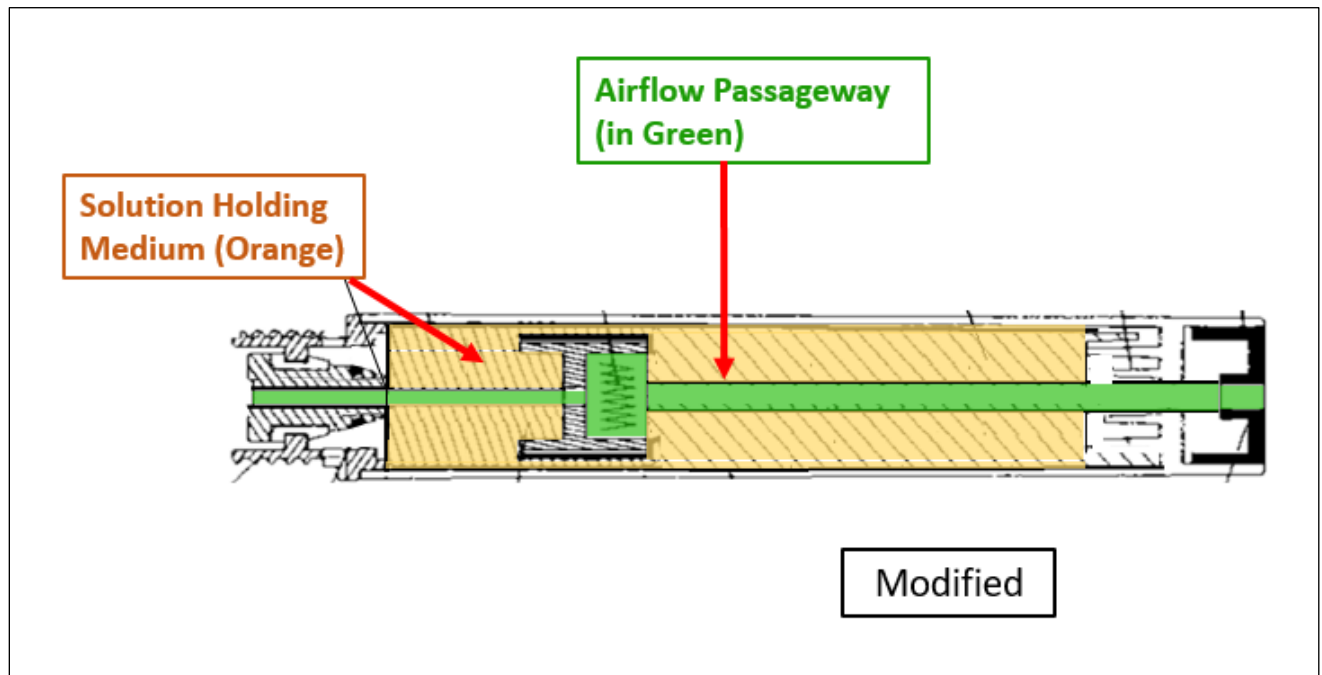
As to the requirement that only the heating element obstructing a portion of the airflow through the airflow passageway along the central longitudinal axis of the housing, Xia discloses such a “portion of the airflow.” As shown in Figure 4 below, in the chamber in which the heating element sits, only the heating element obstructs that portion of the airflow:



Ex. 1004, Fig. 4. See 1[a4]; Ex. 1007, ¶178-179.

ii. Xia combined with Wang and/or Fang

The modification proposed in 1[c] also meets this limitation, as the entirety of the airflow has no obstruction other than the heating element, for example as described above and depicted in the exemplary modified Xia diagram:



Ex. 1004, Fig. 2 (modified); Ex. 1007, ¶180. Further, as in Xia the door of liquid-blocking plate 8 does not obstruct airflow, because in Xia “the airflow passes through . . . the liquid blocking plate” to reach the heating element, *i.e.*, via suction, the vertical blocking door in item 8 is opened. Ex. 1004, 16. The same is true in the modified version. Fang and Wang also individually disclose this limitation as explained in Ground 2, 5[d]; Ex. 1007, ¶177; 332-336.

6. Claim 6:

See claim 2.

7. Claim 7:

See claims 3-4.

8. Claim 8:

See claims 3-4.

9. Claim 9:

a. 9[p]

See element 1[p].

b. 9[a]

See elements 1[a1]-[a4].

c. 9[b]

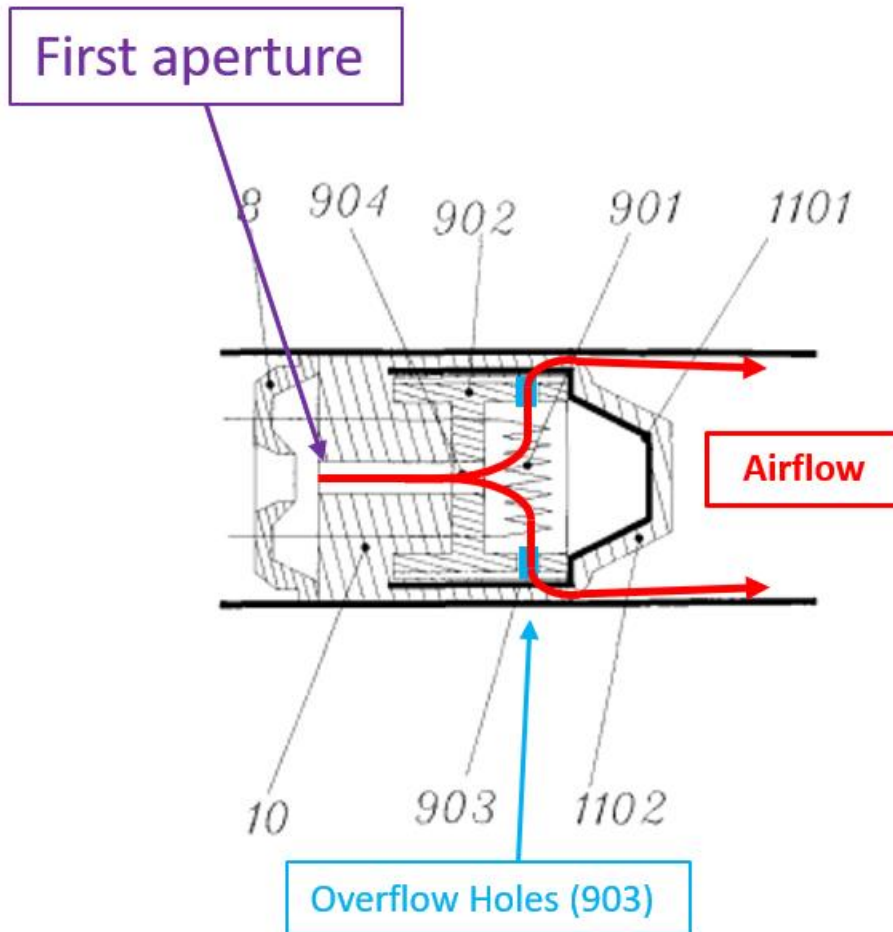
See element 1[b1]-[b2].

d. 9[c]: Airflow path proximate first and second apertures is substantially central and axial

See elements 1[a4], 1[c], and 1[d].

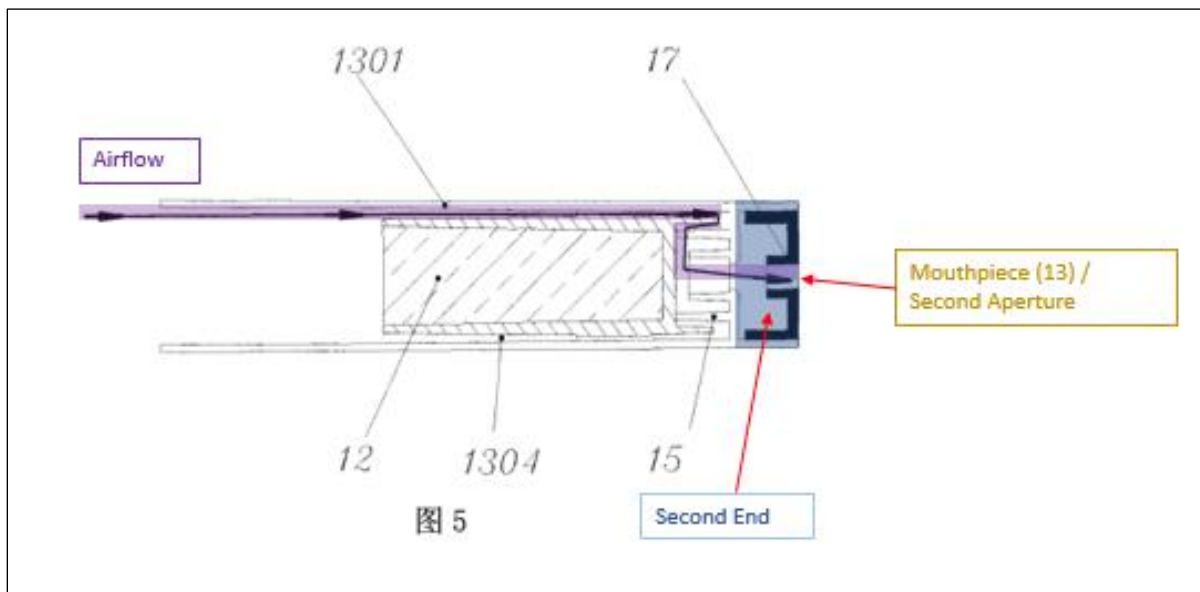
i. Xia

As depicted in Figure 4 air flows in, rightward, through the path 904, which is proximate the first aperture that is at the left edge of path 904:



Ex. 1004, Fig. 4; Ex. 1007, ¶189.

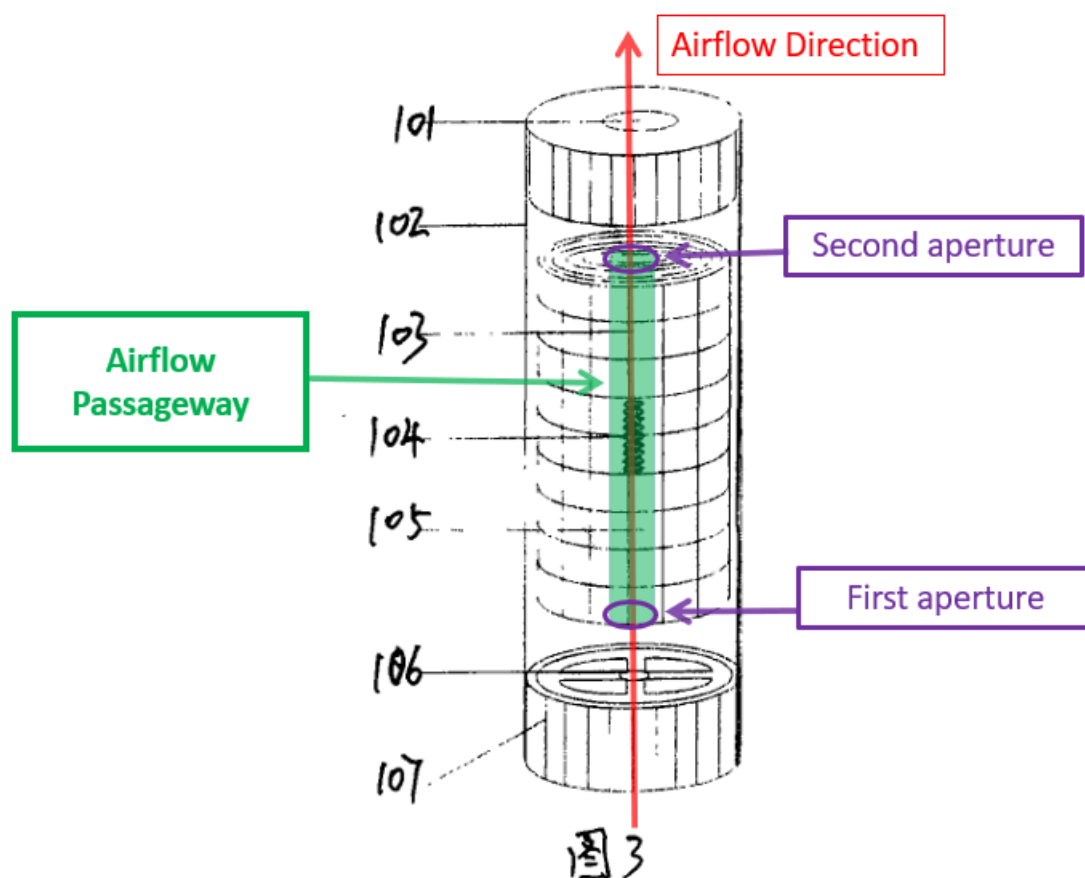
As depicted in Figure 5 proximate the second aperture at the right edge of the device, air flows centrally and axially out the second aperture proximate to the second end:



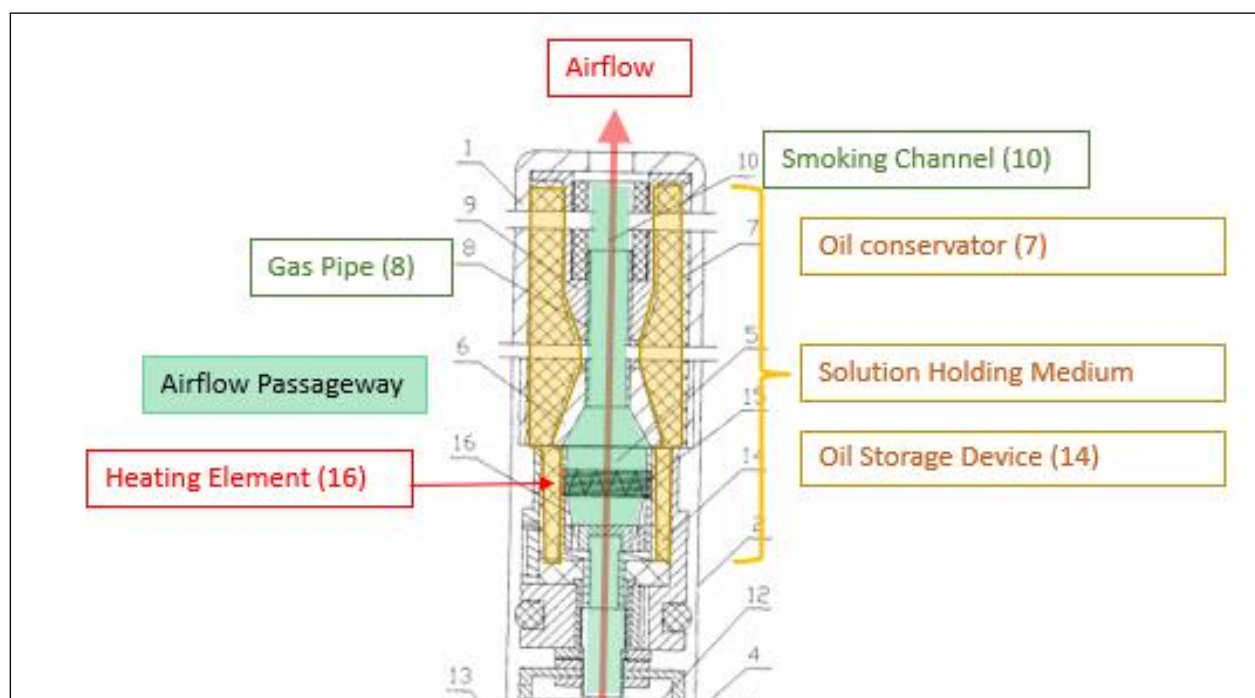
Ex. 1004, Fig. 5; Ex. 1007, ¶190.

ii. Xia combined with Wang and/or Fang

In Wang, the air flows centrally and axially in the first aperture and out the second:



Ex. 1005, Fig. 3 (annotated); Ex. 1007, ¶191-193. In Fang, the same is true:



Ex. 1006, Fig. 1 (partial, annotated); Ex. 1007, ¶194.

10. Claim 10:

See claim 2.

11. Claim 11:

a. Airflow passes on both transverse sides of the heating element

The '864 patent does not explain what it means for airflow to pass on both transverse sides, but applying the closest explanation in the specification, as explained in 1[b1], this element is obvious. Ex. 1007, ¶196. Patent Owner has argued that a device infringes this limitation if air flows over the heating element in the parallel ITC litigation. Ex. 1033 at 19-20; Ex. 1007, ¶197. In Xia air flows to the heating element through the first aperture, at the left edge of spray hole 904, then

flows over the entirety of the heating element 9 before flowing out overflow holes 903. Ex. 1007, ¶198.

12. Claim 12:

a. Wicking material operative to permit solution to be drawn to the heating element

i. Xia

Xia discloses that “the chemical liquid flows from the liquid storage chamber 12 into the secondary liquid storage chamber 10 through the liquid-guiding mechanism 11.” Ex. 1004, 10. “One end of the liquid-guiding mechanism 11 is connected with the secondary liquid storage chamber 10 through the liquid guiding body 1102, and the other end is in contact with the liquid storage chamber 12.” Ex. 1004, 13. Droplets are then drawn into the area of the heater. Ex. 1004, 13. Thus liquid-guiding mechanism 11 is the claimed wicking material. Ex. 1007, ¶200.

Second, the second liquid chamber 10 also acts as the claimed wicking material because it continues to draw the liquid from liquid-guiding mechanism 11 and items 1101-1102 toward the airflow passageway and toward the heating element. Ex. 1007, ¶201.

ii. Xia combined with Wang and/or Fang

If Wang is combined with Xia (with or without Fang) as described above, Wang discloses this limitation because organic fiber 105 is wound around the heating element in conjunction with the tobacco extract 103 and acts as a wicking

element to draw the solution to the heating element from all ends, including those opposite each other. Ex. 1005, 7; Ex. 1007, ¶202.

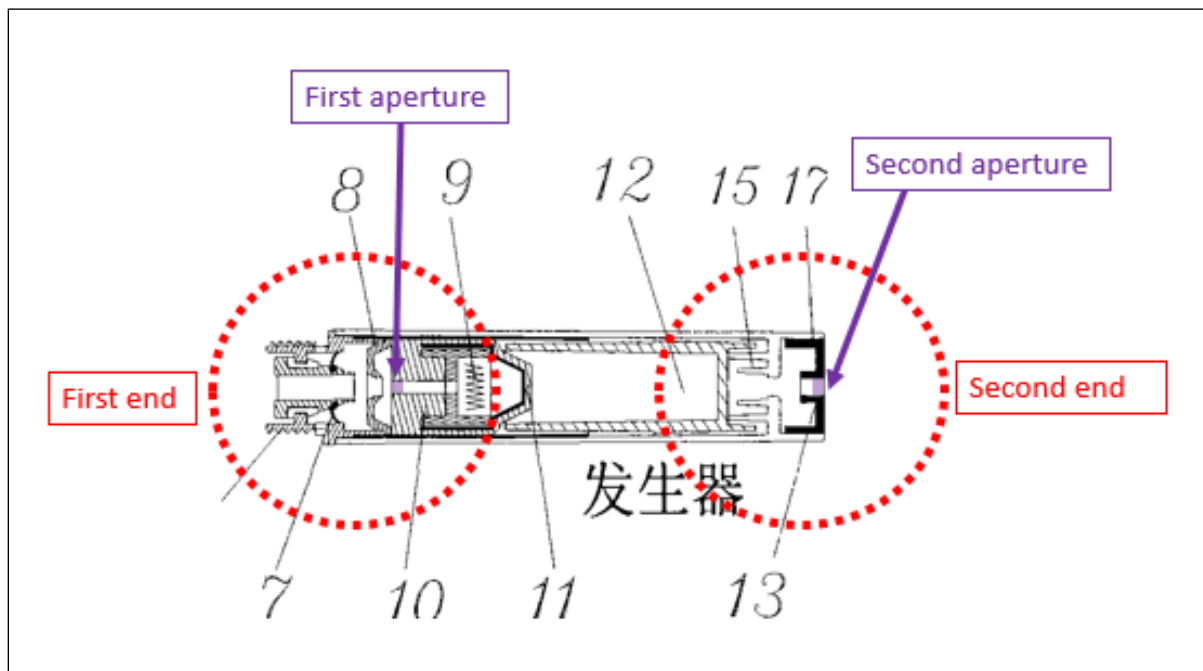
Xia combined with Fang, as discussed above in 1[c], also discloses this limitation. Specifically, Fang discloses a wicking element in the form of its temporary oil storage 15 that draws the solution from the oil storage device, located adjacent both ends of the heating element. Ex. 1006, 6 (“due to the action of the capillary tubes, the temporary oil storage device 15 sucks in nicotine oil stored in the nicotine oil storage device 14, when the electric heating film wire 16 is powered on to heat, nicotine oil on the temporary oil storage device 15 is fumed to produce nicotine oil smoke.”). NJOY has taken the position that Fang has “a wick in contact with the liquid in the liquid reservoir” in parallel litigation. Ex. 1022 (337-TA-1368 NJOY’s Invalidity Contentions) Ex. A, 135 (element 1.I, citing “Fang 044 at p.5 ¶3; p.6 ¶¶4–5; p.7 ¶1; Figs. 1–2.”); Ex. 1007, ¶203.

13. Claim 13:

a. First aperture smaller than second aperture

i. Xia

In Xia, the second aperture is larger in cross sectional area measured perpendicular to a central longitudinal axis of the housing than that of the first aperture as shown in the figure below.



Ex. 1004, Fig. 1; Ex. 1007, ¶205.

Moreover, it would have been obvious to a POSITA to modify the dimensions to make the first (input) aperture smaller than the second (output) aperture to ensure proper airflow exiting the device. Ex. 1007 ¶206. A smaller aperture at the input end with a larger aperture on the output end, creates more drop in pressure, which ensures that air is propelled through device. *Id.*

ii. Xia Combined with Wang and/or Fang

The modifications with Wang and/or Fang, which affect the first aperture location and the passageway location, do not affect relative aperture size. Ex. 1007 ¶207.

14. Claim 14:

a. Solution containing either nicotine or propylene glycol

Xia's heater "instantly heat[s] liquid nicotine liquid." Ex. 1004, 14. It also would have been obvious to a POSITA to modify the solution to include propylene glycol, as Xia's solution likely contained, or could easily be modified to contain it. Propylene glycol is a well-known, safe for human consumption, and common solvent for organic chemicals, such as nicotine. Ex. 1007 ¶208-210.

Wang and Fang both describe the solutions to be vaporized as containing nicotine. See Ex. 1005, 7 ("The tobacco extract 103...is natural tobacco absolute oil, a certain proportion of nicotine is mixed in"); Ex. 1006, 4 ("nicotine oil is fumed"). Ex. 1007, ¶211.

15. Claim 15:

See elements 1[c]-[d].

16. Claim 16:

See claims 3-4.

17. Claim 17:

a. Heating element is a coil

Under Patent Owner's own application of the term, Xia's figures depict heater 9 and/or heating wire 901 as a coil:

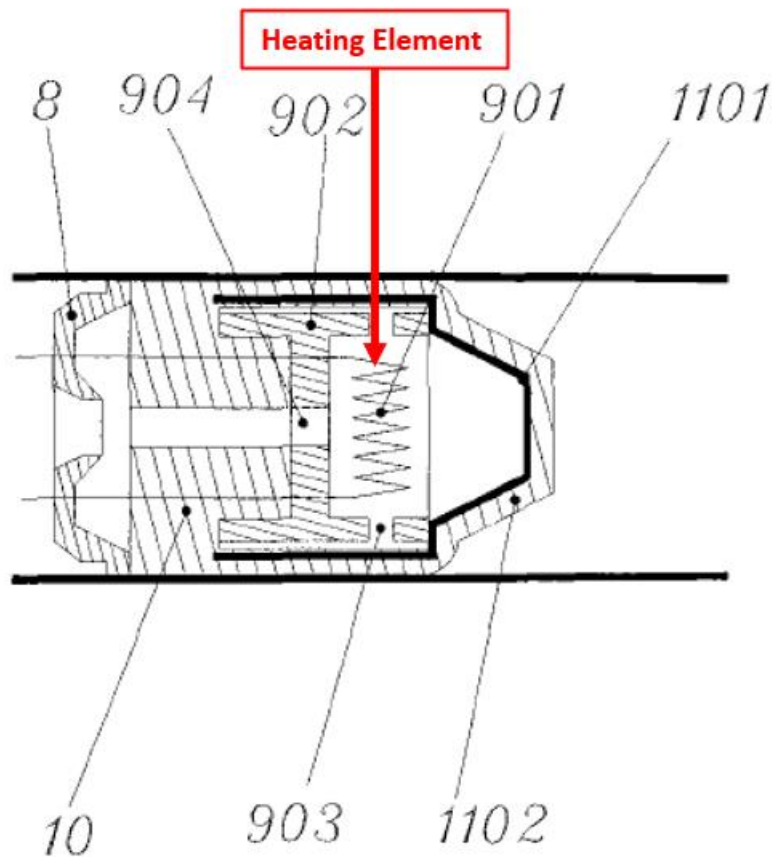
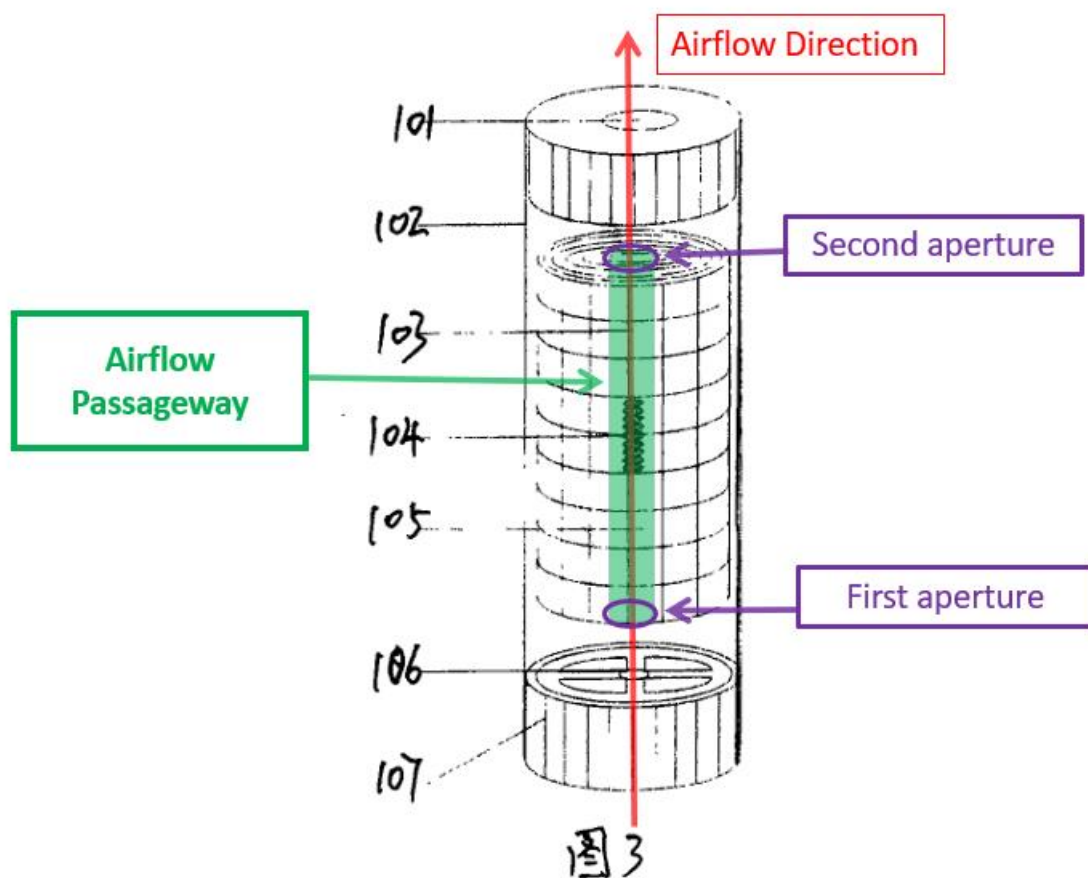


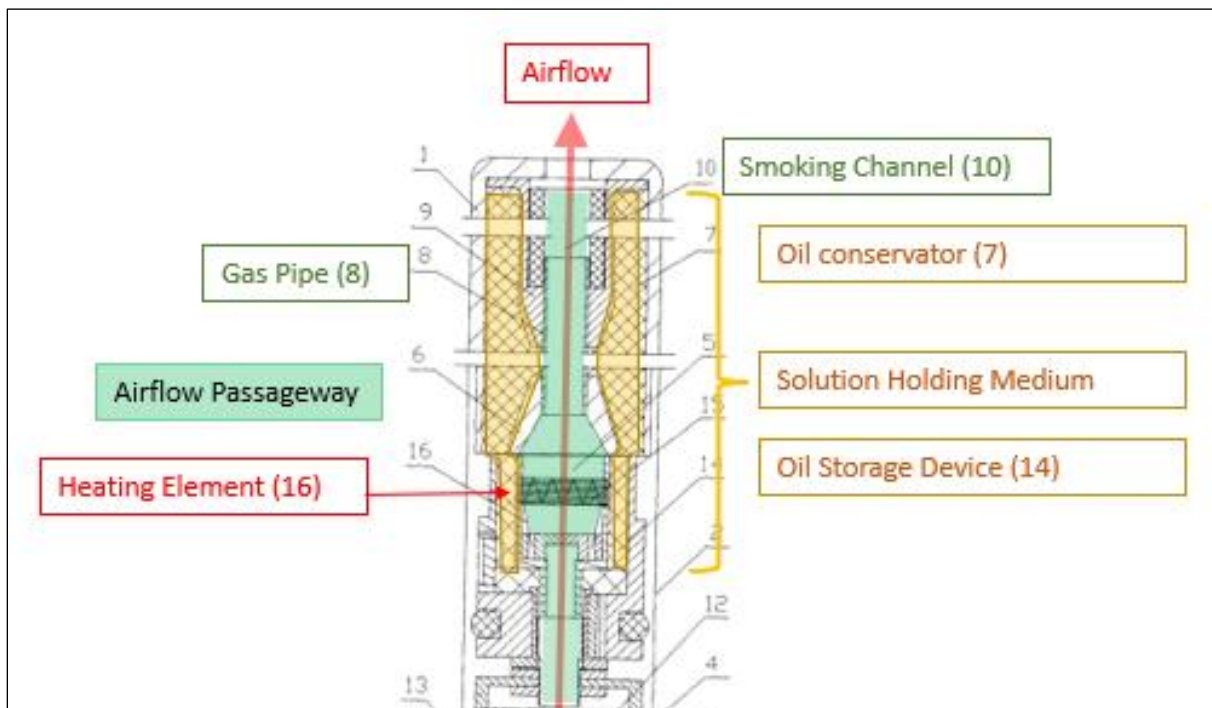
图 4

Ex. 1003, Fig. 4 (annotated); Ex. 1007, ¶210.

Moreover, to the extent Xia's heating element is not determined to be a coil, it would have been obvious to a POSITA to modify Xia's heating element to comprise a coil which is a well-known shape for a heating wire, including in basic items such as a lightbulb. Wang's electric heater in Figure 3 and Fang's heating element in Figure 1 are coils. Ex. 1007, ¶211-213.



Ex. 1005, Fig. 3.



Ex. 1006, Fig. 1.

18. Claim 18:

See claims 3-4.

19. Claim 19:

See claims 3-4.

20. Claim 20:

a. Heating element includes a material adapted to vaporize the solution

See element 1[b1]-[b2].

21. Claim 21:

a. 21[p]

See element 1[p].

b. 21[a]

See elements 1[a1]-[a4].

c. 21[b]

See elements 1[b1]-[b2] and claims 11, 12, and 17.

d. 21[c]

See element 1[c].

e. 21[d]

See element 1[d].

22. Claim 22:

See claim 2.

23. Claim 23:

See claims 3-4.

24. Claim 24:

See claims 3-4.

25. Claim 25:

a. 25[p]

See element 1[p].

b. 25[a]

See elements 1[a1]-1[a4].

c. 25[b]

See elements 1[b1]-[b2] and claims 11, 12, and 17.

d. 25[c]

See element 1[c].

e. 25[d]

See element 5[d].

26. Claim 26:

See claim 2.

27. Claim 27:

See claims 3-4.

28. Claim 28:

See claims 3-4.

29. Claim 29:

a. 29[p]

See 1[p].

b. 29[a]

See 1[a1]-1[a4].

c. 29[b]

See 1[b1]-[b2] and claims 11, 12, and 17.

d. 29[c]

See 1[c]-1[d].

30. Claim 30:

See claim 2.

31. Claim 31:

See claim 12.

32. Claim 32:

See claim 13.

33. Claim 33:

See claim 14.

34. Claim 34:

See 1[c]-[d].

35. Claim 35:

See 1[c]-[d] and claim 4.

36. Claim 36:

See claims 3-4.

37. Claim 37:

See claims 3-4.

38. Claim 38:

a. 38[p]

See 1[p].

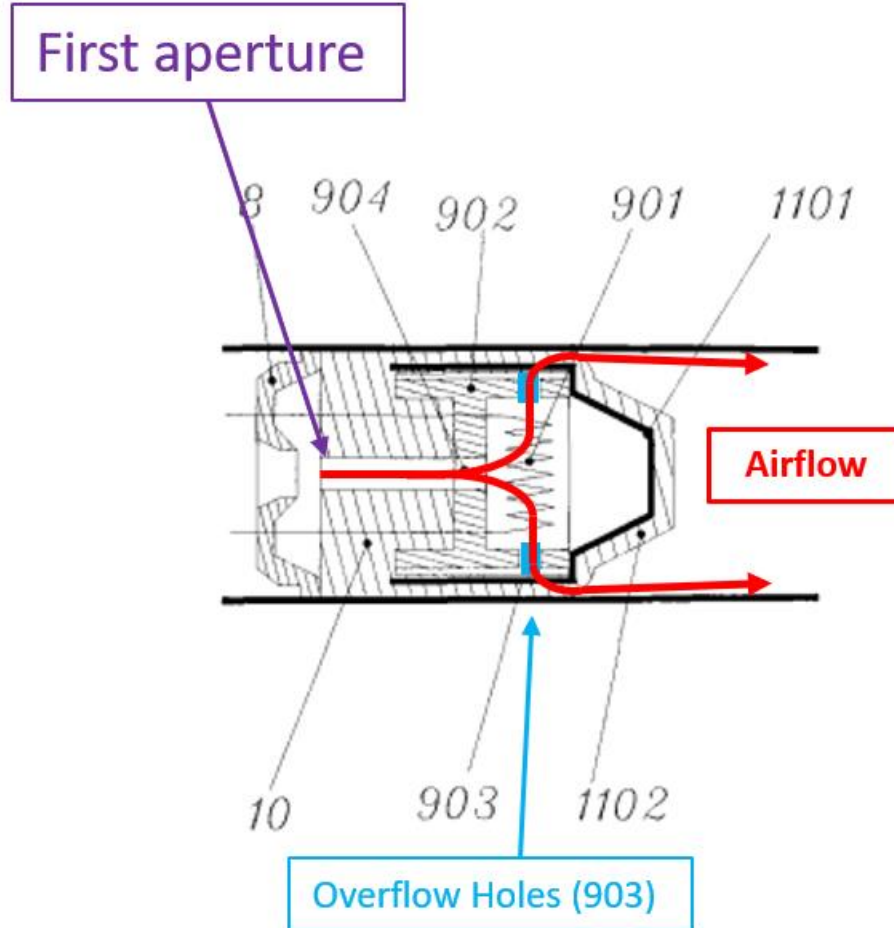
b. 38[a]

See 1[a1]–[a4].

c. 38[b]: Airflow entering first aperture will separate and then pass on both transverse sides of the heating element and then continue along an airflow path co-axial with the central longitudinal axis of the housing

Xia discloses or renders obvious this limitation for substantially the same reasons as set forth in Claims 1[b1]-[b2] and 11. Ex. 1007, ¶249.

Additionally, Xia discloses that “the airflow entering the first aperture will separate and then pass on both transverse sides of the heating element and then continue along an airflow path co-axial with the central longitudinal axis of the housing toward the second aperture.” For example, heater 9 is also “at least partially exposed to the airflow.” Figure 4 depicts a “structural diagram of the liquid-blocking plate 8, the secondary liquid storage chamber 10, the heater 9 and the liquid-guiding mechanism 11... the heater 9 comprises an atomizing working room provided with a heating wire 901.” Ex. 1004, 12. This heating wire 901 is configured to begin operating once the smoker inhales. Ex. 1004, 10 (“under the action of suction by the smoker...the heater 9 starts working”). Further, “[u]nder the action of the airflow, small droplets are sucked into the other side of the heat insulation seat 902 through the spray hole 904 in the heat insulation seat 902.” Ex. 1004, 13; Ex. 1007, ¶250-252.



Ex. 1004, Fig. 4 (annotated). As depicted in Figure 4, the air that flows from the first aperture separates into multiple streams in passing over the heating as it flows out of the multiple corner overflow holes. For example, “[u]nder the action of the heating wire...the liquid is instantly atomized...flows out of the heater...from the overflow holes...through the gap between the soft suction nozzle and the liquid storage chamber...and is finally sucked out through the soft suction nozzle.” Ex. 1004, 13. Accordingly, the heater 9 is at least partially exposed to the airflow, as the airflow passes across both transverse sides of the heating element, requiring that the

airflow separate after traveling from the first aperture to the heating element.⁹ Ex. 1007, ¶252-255.

Once the vaporizer solution exits from the overflow holes 903, the vapor travels along the airflow passageway in a co-axial direction with respect to the central and longitudinal axis of the housing as the vapor travels toward the second aperture, both in Xia and in the modified versions described in 1[c]. Ex. 1007, ¶256.

d. 38[c]

See element 1[c].

e. 38[d]

See element 1[d].

39. Claim 39:

See claim 2.

40. Claim 40:

See elements 1[b1]-[b2] and claim 20.

41. Claim 41:

See claim 14.

42. Claim 42:

See claims 3-4.

⁹ Petitioner's understanding of this requirement is based on Patent Owner's assertions of infringement based on the same theory. Ex. 1033 at 34-35.

43. Claim 43:

See claims 3-4.

44. Claim 44:

See claims 3-4.

45. Claim 45:

a. Claim 45[p]

See element 1[p].

b. 45[a]

See elements 1[a1]–[a4].

c. 45[b]

See element 1[b1]–[b2] and claim 11.

d. 45[c]

See element 1[c].

e. 45[d]

See element 1[d].

46. Claim 46:

See claim 2.

47. Claim 47:

See claims 3-4.

48. Claim 48:

See claims 3-4.

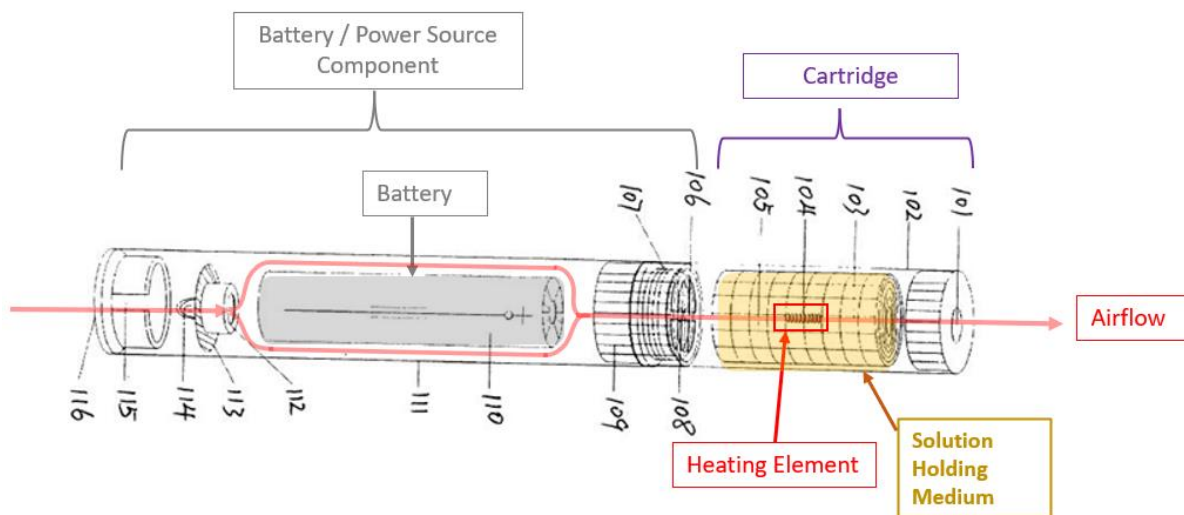
B. Ground 2: Wang alone or in combination with Fang renders obvious Claims 1-48

Claims 1-48 of the '864 Patent are rendered obvious in view of Wang in combination with Fang. Ex. 1007, ¶273.

1. Claim 1

a. 1[p]: Cartridge

Wang's "cigarette holder part" 102 is a cartridge. Ex. 1007, ¶274.



Ex. 1005, Fig. 1 (annotated).

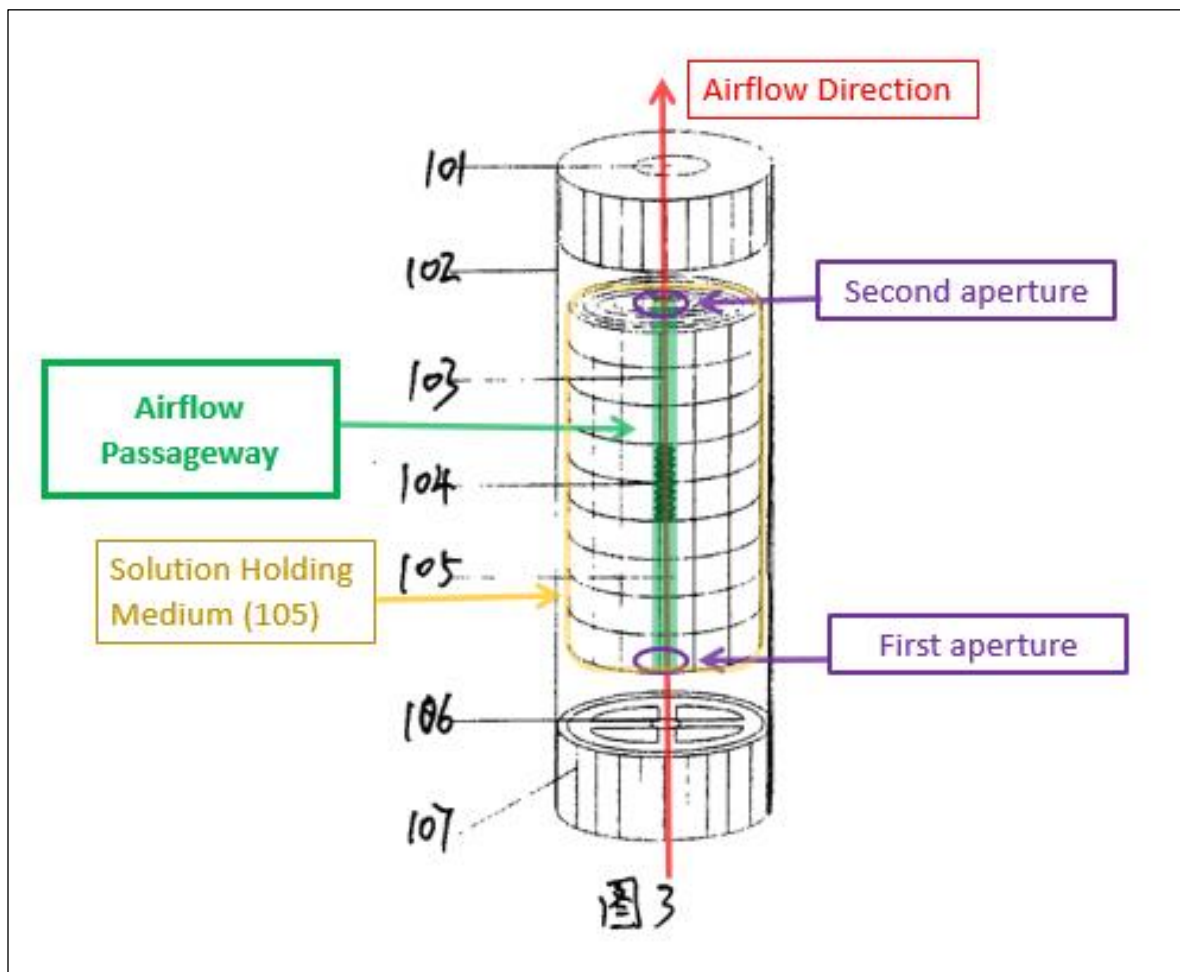
b. 1[a1]: Housing and solution holding medium

i. Wang

As shown in Figure 3, Wang's cartridge ("the cigarette holder"), has a housing ("cigarette holder shell 102," that "is a hollow cylinder"), which has an interior, in

which the heating element 104 and solution holding medium 105 are, for example.

Ex. 1005, Fig. 3. Ex. 1007, ¶275.



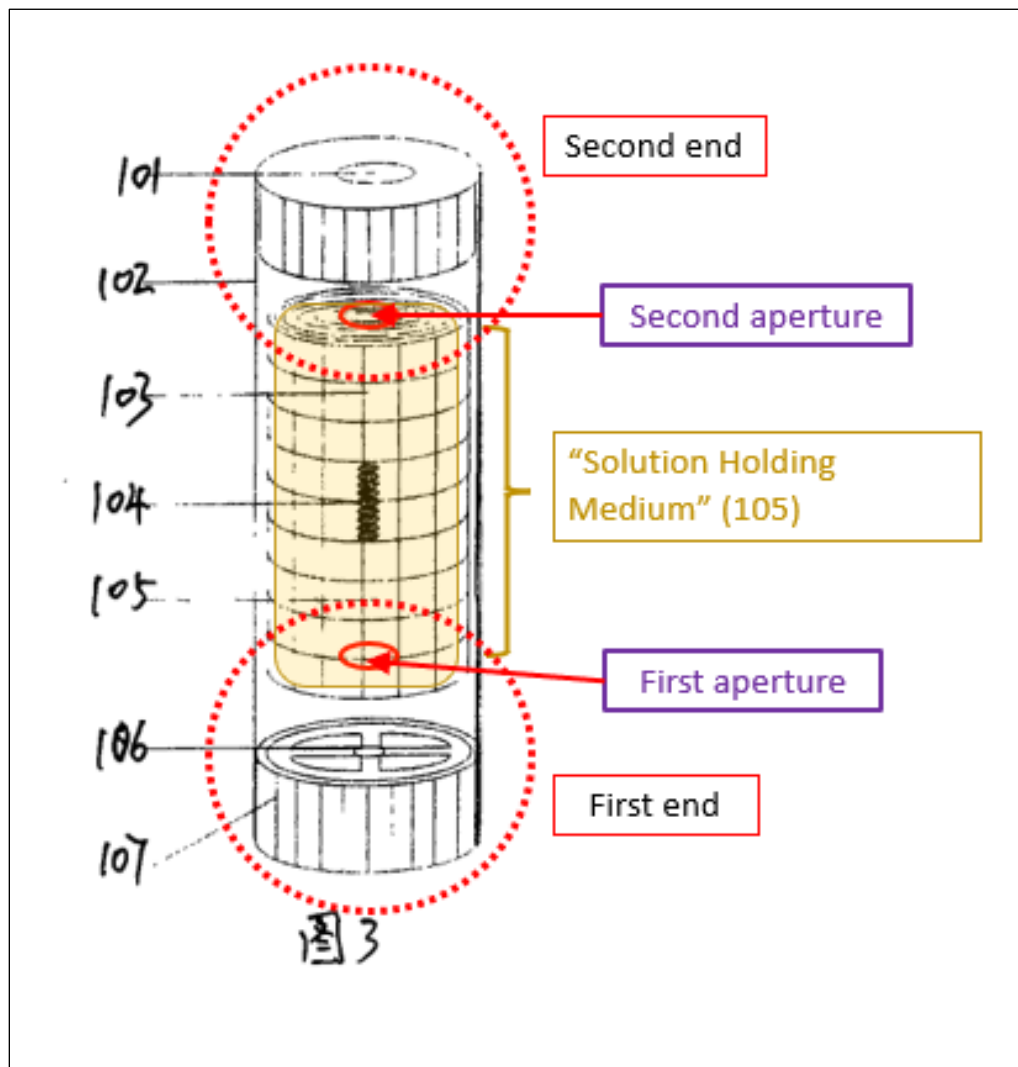
Further, “organic fiber [105] holds “tobacco absolute oil” and is thus “a solution holding medium adapted to hold a solution.” Ex. 1007, ¶272-274.

ii. Wang combined with Fang

Fang also contains a solution holding medium as described in Ground 1, 1[c].
Ex. 1007, ¶279.

c. 1[a2]: First aperture proximate first end; second aperture proximate second end

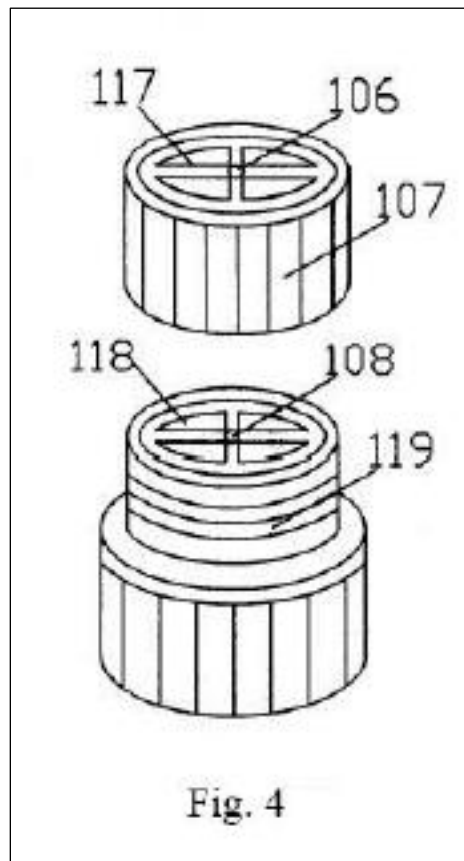
Wang alone, and Wang in combination with Fang, each alternatively discloses or renders obvious this limitation. As shown in Figure 3, the cartridge has “a first end and a second end that is opposite the first end” as well as “a first aperture proximate the first end and a second aperture proximate the second end” of the housing:



Ex. 1005, Fig. 3. As shown above, the two ends are opposite one another. The apertures are proximate the ends of the housing as for the same reasons as explained in Ground 1. 1[a2] regarding Xia. Ex. 1007, ¶280.

d. 1[a3]: First end electrically couples to power source

Wang explains that item 107 in the cartridge 102 provides electrical coupling to the power source via, *e.g.*, electrode 117. Ex. 1005, 8; Ex. 1017 (Wang Decl.), 4-5; Ex. 1007, ¶281-283.



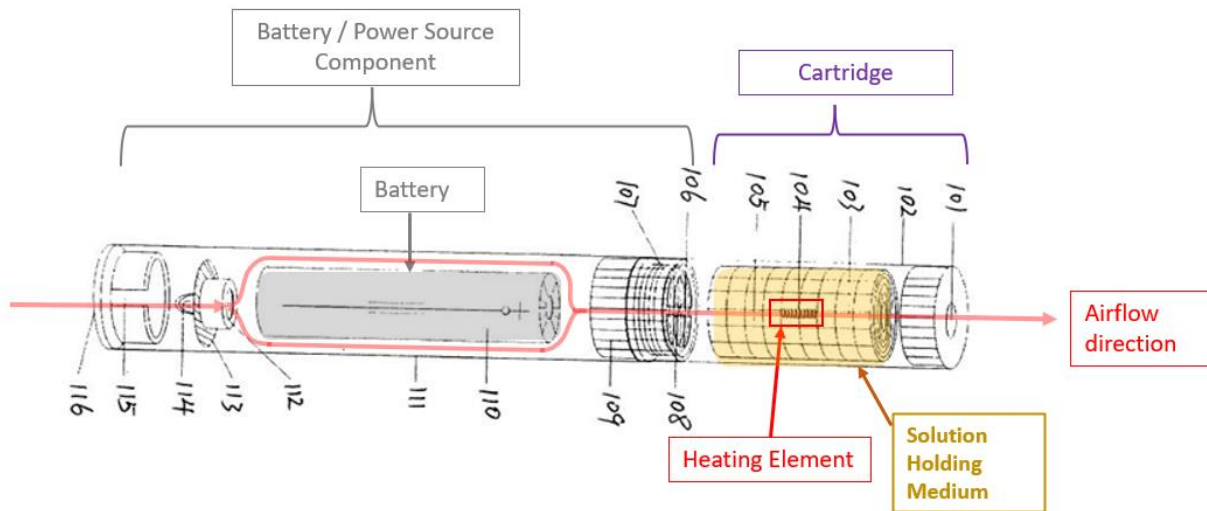
Ex. 1005, Fig 4. Thus, Wang makes clear that the “electric heater 104” in the cartridge is electrically coupled to the “battery 110” in the cigarette rod part, via the

“the first end of the housing,” through elements 107 (and 117) in the cartridge and 109 in the cigarette holder part (containing items 108, 118, and 119 above). Ex. 1007, ¶284.

e. 1[a4]: First and second aperture in communication with one another

i. Wang

Air enters Wang’s cartridge through air inlet 106. Ex. 1005, 8. Air flows into gap in the rolled “organic fiber 105” which contains “tobacco extract 103,” drawing liquid in toward the heater, flows over the “heater 104,” combines with the vaporized tobacco extract from the heater 104, and exits to the user via “air outlet 101”). *Id.*, 7-8. In doing so, the air flow passes through the cartridge from the first aperture to the second. Ex. 1007, ¶286-290.



Ex. 1005, Fig. 1 (annotated).

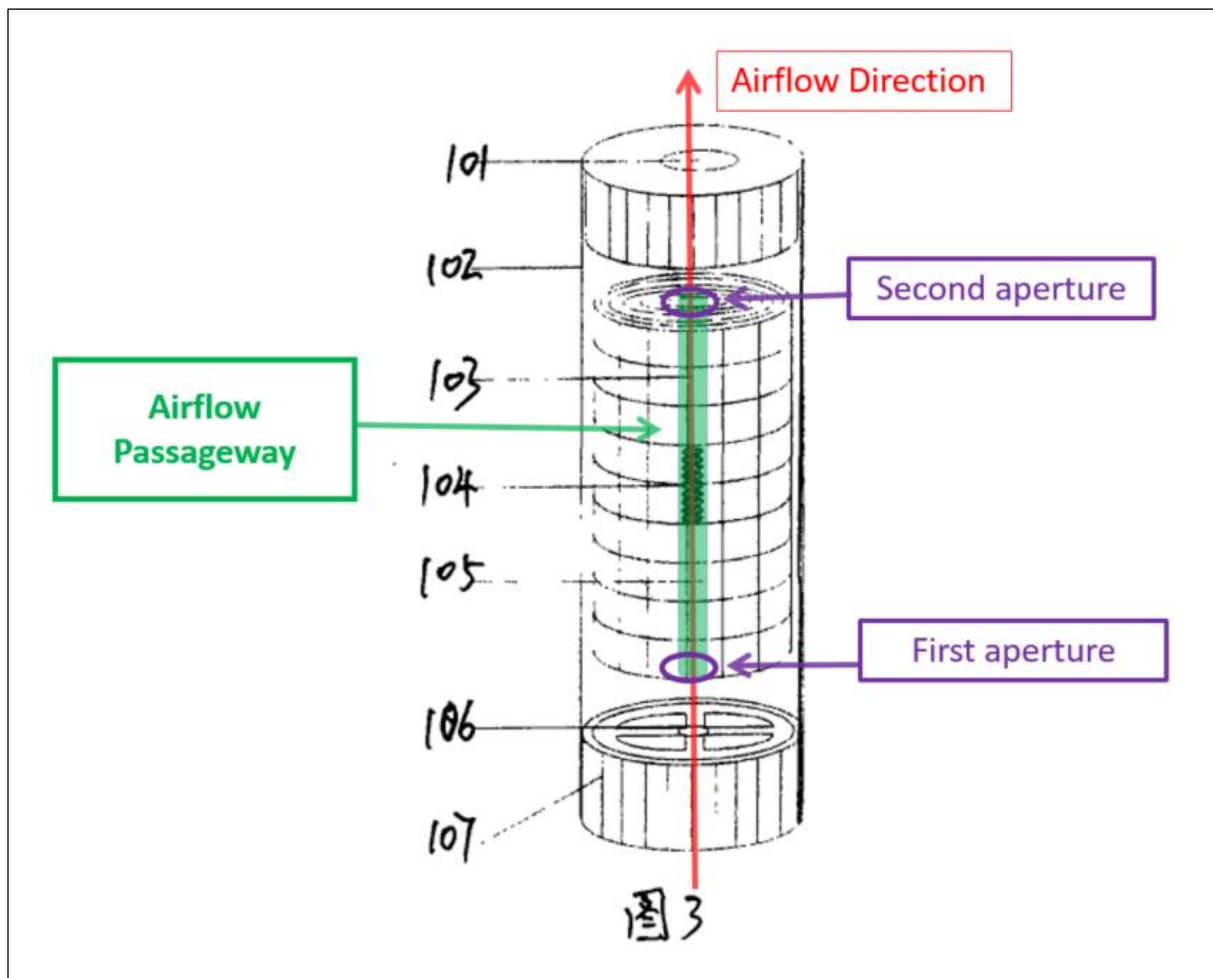
ii. Wang combined with Fang

As established, it was obvious to use Fang's claimed airflow passageway in place of Wang's. In the resulting combination, the airflow passageway would permit an airflow through the housing from the first aperture to the second aperture. Ex. 1007, ¶291.

f. 1[b1]: Transverse heating element partially exposed to the airflow

i. Wang

Wang discloses that heater 104 is within the interior of the housing and is at least partially exposed to the airflow, as depicted in Fig. 3, as the hollow cylindrical channel wherein the heating element is located (see Ex. 1005, Fig. 5) is directly accessible by the air entering through the first aperture on the edge of the solution holding medium, as explained in 1[a2], 1[a4], and 1[c], where the central longitudinal axis is the same as that of the airflow direction. Ex. 1007, ¶292.

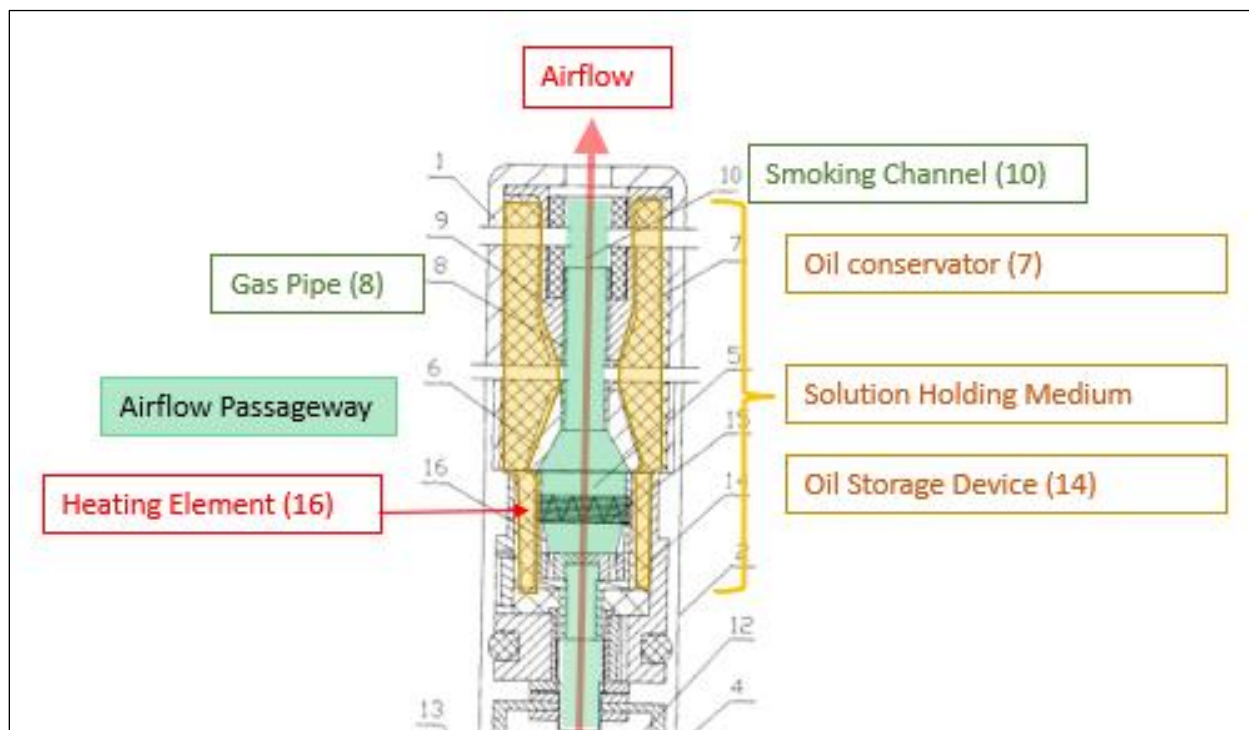


Ex. 1005, Fig. 3 (annotated).

Heater 104 also extends transversely to a central longitudinal axis of the housing. Wang's heating element is consistent with the specification's description of the heating element claimed in this patent and the configurations covered by the claims as explained in Ground 1, 1[b1]. See, e.g. Ex. 1001, 6:64-7:2; Ex. 1007, ¶293-294.

ii. Wang combined with Fang

Additionally, to the extent that Wang does not disclose this limitation, Wang in view of Fang does. As explained above—in Ground 1 element 1[c]—and seen below, Fang teaches a transverse heating element that is at least partially exposed to the airflow. Ex. 1007, ¶295-296.



Ex. 1006, Fig. 1 (partial, annotated).

A POSITA would know that it would have been a simple design choice to modify Wang to contain a heating element and solution holding medium as disclosed in Fang such that the heating element would be transverse to the central and longitudinal axis of the housing and partially exposed to the airflow. Ex. 1007, ¶297. For example, this modification would increase heater's surface area contacting the airflow and the nicotine solution; and provide a wider airflow passageway between

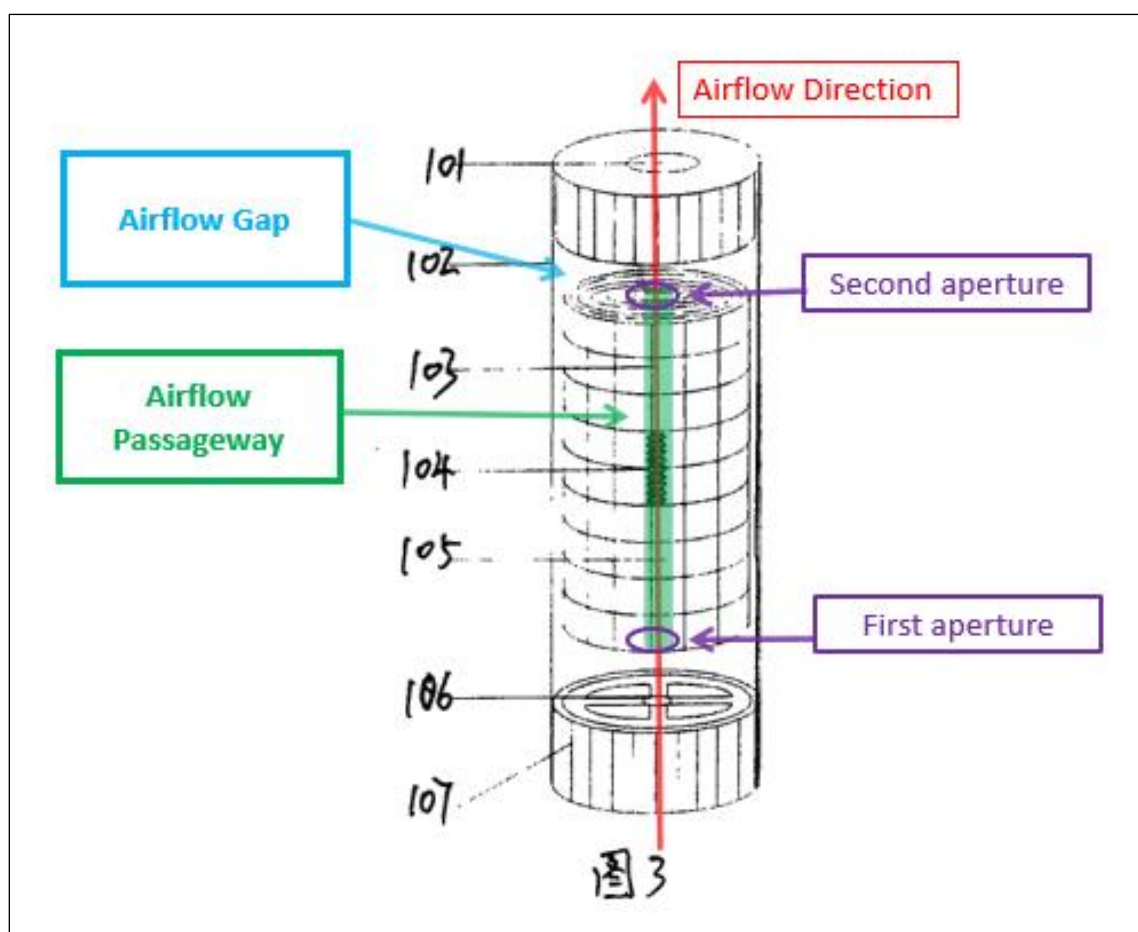
the heater and the mouthpiece while simultaneously helping to reduce the length of the electronic cigarette for increased portability. Ex. 1007, ¶298. Designing the heater in this manner is as equally simplistic of a design as placing the heating in the orientation of the heater in Wang. Ex. 1007, ¶299.

Moreover, by modifying the airflow passageway and solution holding medium as described in Fang, a POSITA would know it would be beneficial to also adopt the wick (item 15) and heating element wrapped around it (item 16) of Fang, which is a perpendicularly-oriented heating element. Ex. 1007, ¶300.

g. 1[b2]: Heater vaporizes solution for oral provision in the airflow in response to power source

Wang discloses a cigarette rod shell 111 with a battery 110, that connects to a cartridge (“the cigarette holder”), containing a heating element 104, which is powered by the battery, as described in 1[a3] above. Ex. 1005, 2-3. Wang also states that “[s]ince the tobacco extract 103 is in a liquid or paste state, when heated, the tobacco extract 103 is first vaporized into smoke.”) Ex. 1005, 4. Wang discloses that once the tobacco extract is vaporized it is delivered orally to an individual via its second aperture. “[T]he smoke generated by the tobacco extract 103 instantly heated by the heater 104 is partially sucked out from the air outlet 101 of the cigarette holder.” Ex. 1005, 8. Ex. 1007, ¶301-302.

To the extent this element requires mixing of vapor and airflow separately from, or in addition to, air flowing over the heating element, Wang discloses that limitation. For example, in Wang the vapor mixes with existing air in an airflow gap that is immediately after the solution holding medium and the second aperture, through which the combined air and vapor exits. Ex. 1007, ¶305-306.



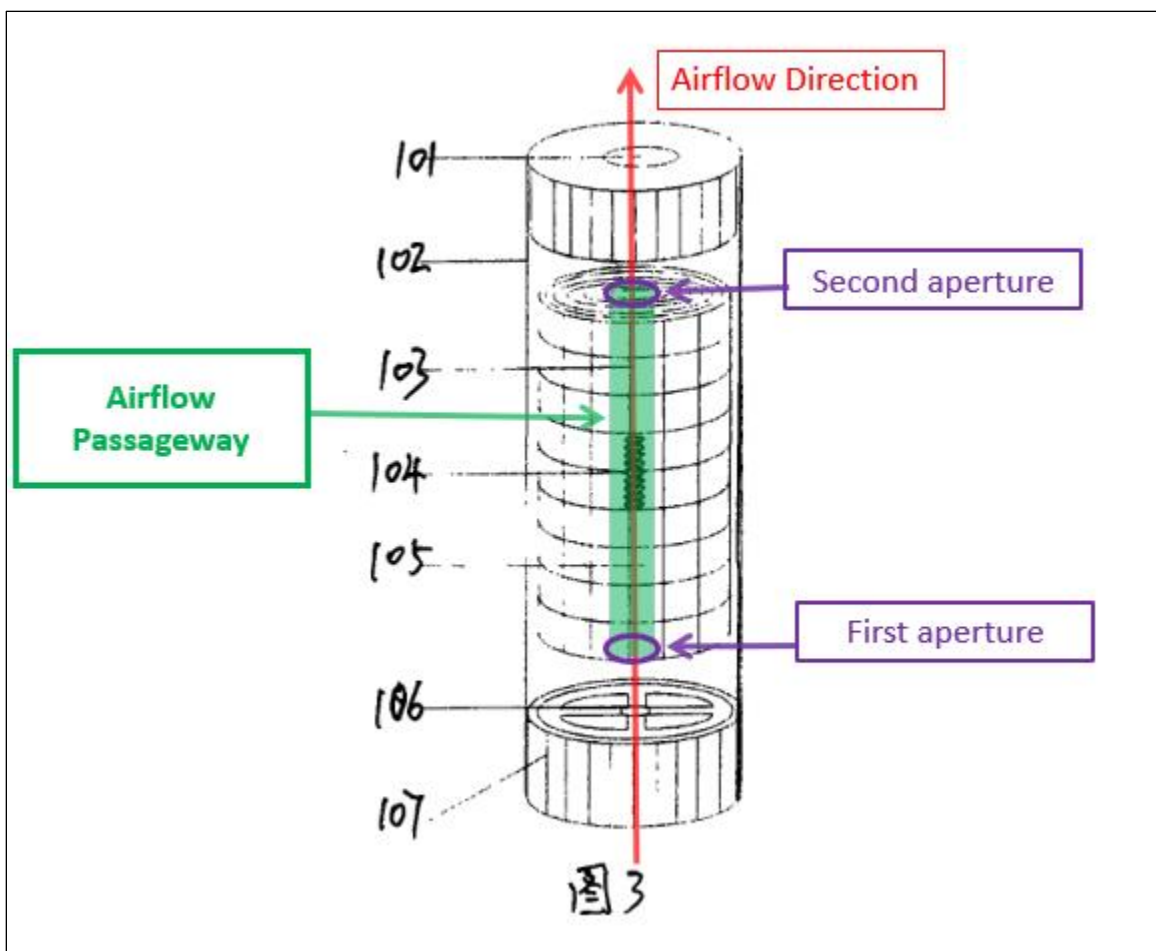
Ex. 1005, Fig. 3 (annotated).

h. 1[c]: Airflow passageway extends centrally and axially with respect to the housing from first aperture to the second aperture

Wang alone, and Wang in combination with Fang, each alternatively discloses or renders obvious this limitation.

i. Wang

Wang discloses this element for the same reasons as discussed in Ground 1, element 1[c]:



To the extent solution holding medium 105 does not already have such a separate passageway through the middle, it would be an obvious and modification.

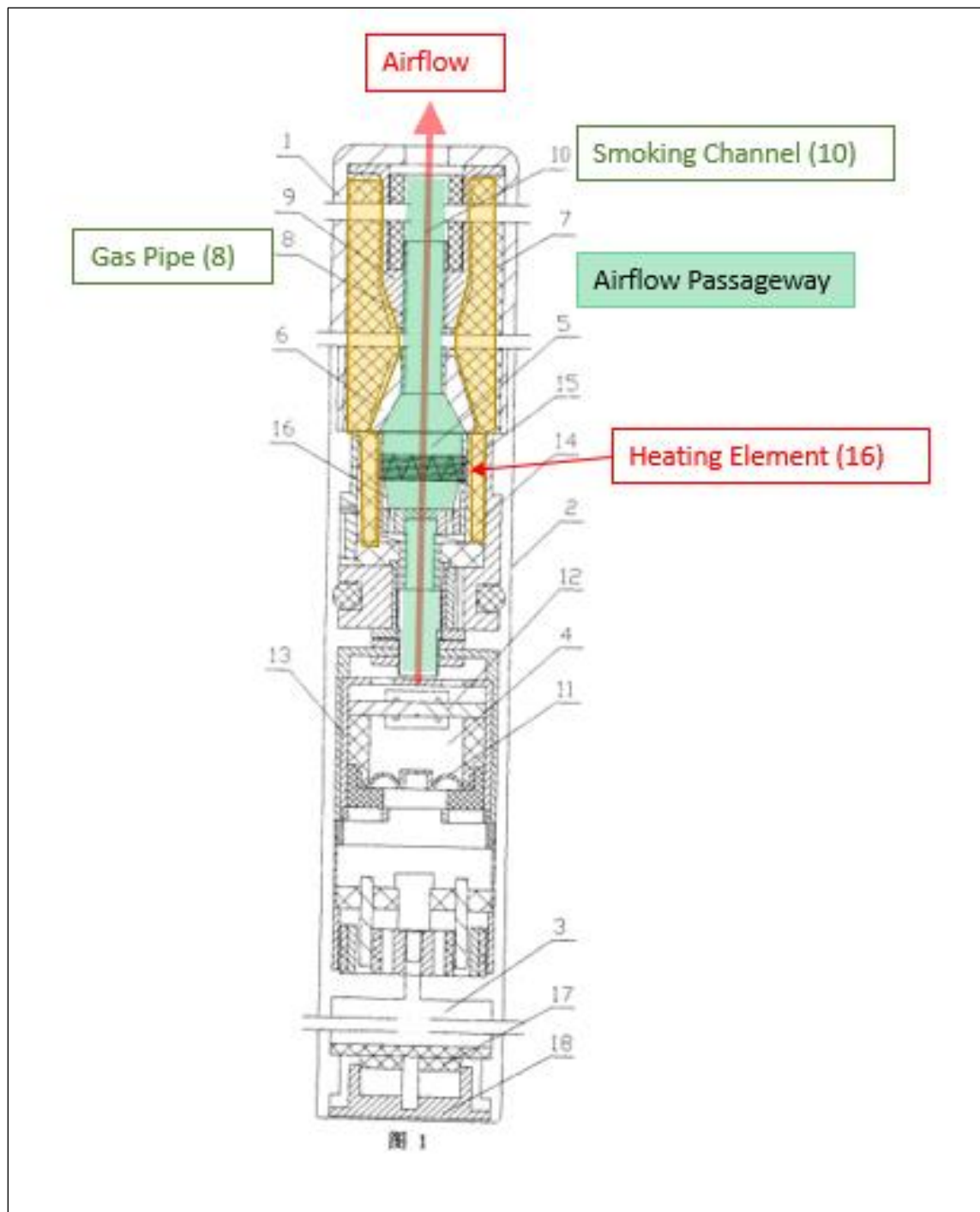
Instead of requiring the air to flow through the fiber, a more defined central passageway would increase airflow and avoid requiring air that is to be inhaled by a user directly flowing over fibrous material, which could cause particles to be picked up in the airflow. Ex. 1007, ¶307-309.

A POSITA would also be motivated to modify the image above so that the solution-holding medium and passageway reached the air inlet 106 and the air outlet 101, which would be an obvious choice to benefit the device because if the solution holding-medium were extended to fill the empty portions of the housing above and below where it currently sits in Figure 3, but still maintain the internal airflow passageway structure, it would hold more liquid. Ex. 1007, ¶ 310.

ii. Wang combined with Fang

Moreover, to the extent that Wang is determined to not disclose this limitation on its own, Wang in combination with Fang does disclose an airflow passageway extending centrally and axially with respect to the housing. Ex. 1007, ¶311.

As explained above—in Ground 1, 1[c] —and seen below, Fang teaches a central and axial airflow passageway.



Ex. 1006, Fig. 1 (annotated); Ex. 1007, ¶311-312.

A POSITA would be motivated to modify Wang such that it had a central and axial uniform, cylindrical passageway through the solution holding medium 105

extending the passageway from one aperture to the other, with the solution holding medium around it the entire way to maximize liquid storage. Ex. 1007, ¶309. One could use the wicking material in the form of item 15 of Fang and the heating element 16 of Fang in conjunction with this change. Ex. 1007, ¶305.

A POSITA would understand the obvious benefits of a simple airflow passageway that runs central and along the housing axis, between the first and the second apertures, in creating a uniform, consistent airflow. Ex. 1007, ¶315-316. The resulting device would: (1) maintain Wang's two-piece system and first aperture, as well as, the electrical components described, but; (2) modify Wang's solution holding medium to wrap around the airflow passageway and heating element and orient the heating element horizontally across the airflow, based on Fang. Ex. 1007, ¶317.

i. 1[d]: Airflow passageway extends centrally and axially from first to second aperture

Wang alone and Wang in combination with Fang discloses or renders this limitation obvious for the reasons set forth with respect to 1[a4], 1[b1]-[b2], and 1[c]. Specifically, both Wang and the proposed modification of Wang with Fang disclose an airflow passageway that extends along the central and axial longitudinal axis of the housing from the first aperture to the second aperture. *See also* Ground 1, 1[c]-[d]. Ex. 1007, ¶322-323.

2. Claim 2:

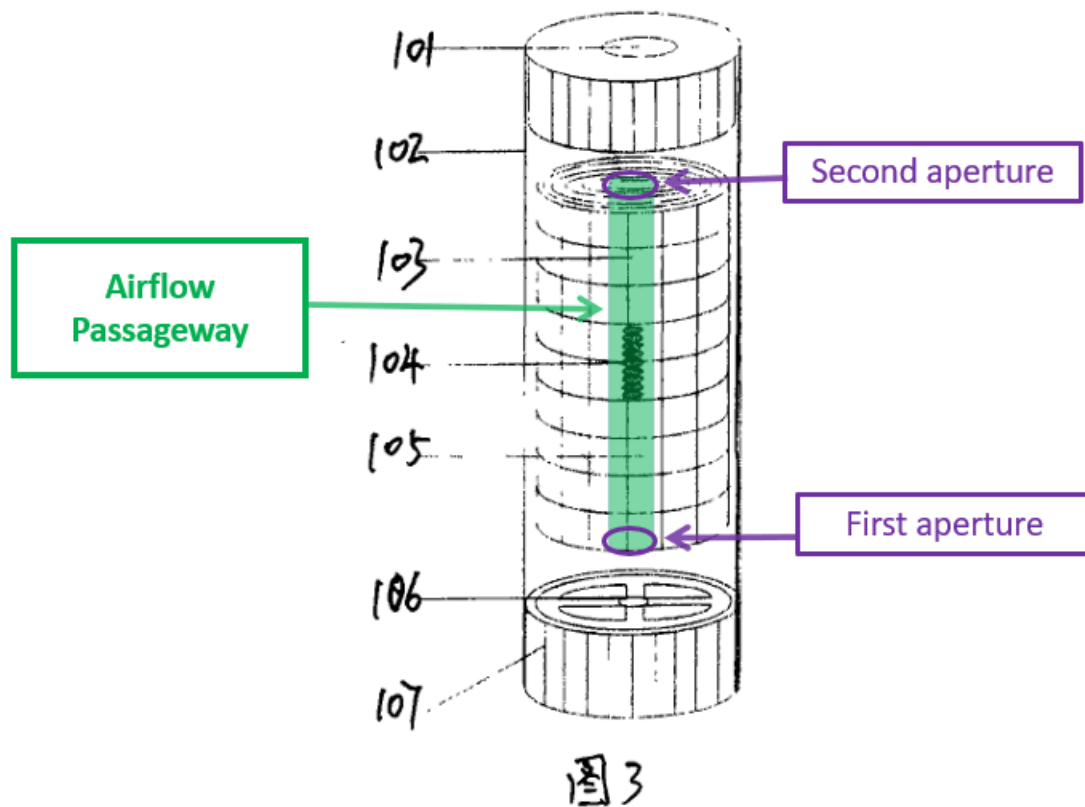
a. Battery

Wang says “electronic clean cigarette includes...battery 110.” Ex. 1004, 5. As explained for Claim 1[p] and 1[a3], the first end of the housing is electrically coupled to the battery. Ex. 1007, ¶320-321.

3. Claim 3:

a. Airflow passageway having cross sectional area no smaller than second aperture

As depicted in claim 1 and below, the airflow passageway has an interior and has no cross-sectional area measured perpendicular to the central longitudinal axis of the housing smaller in cross-sectional area than a cross-sectional area of the second aperture. Ex. 1007, ¶322-323.

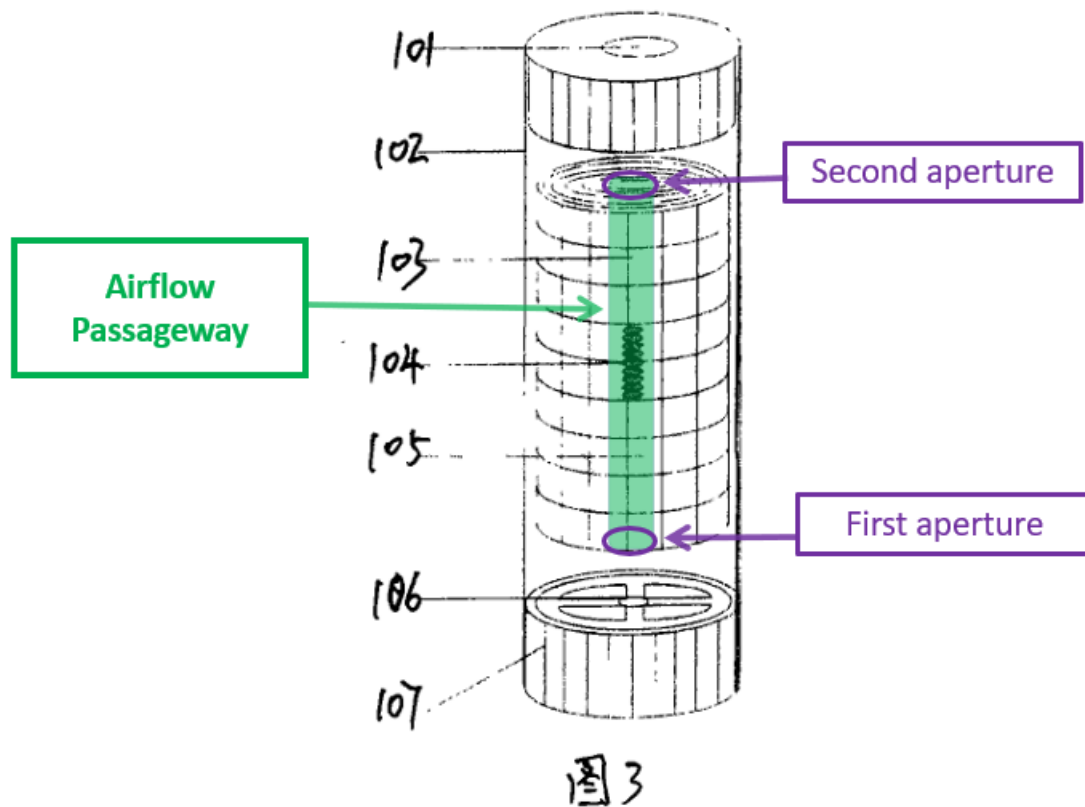


Ex. 1005, Fig. 3.

4. Claim 4:

a. Airflow passageway having substantially uniform cross-sectional area cross a continuous majority of the length of the housing

See claim 3. Further, the airflow passageway has a uniform cross section along the majority of the length of the housing 102:



Ex. 1005, Fig. 3; Ex. 1007, ¶326-327.

5. Claim 5

a. 5[p]

See element 1[p].

b. 5[a]

See elements 1[a1]–[a4].

c. 5[b]

See elements 1[b1]–1[b2].

d. 5[c]

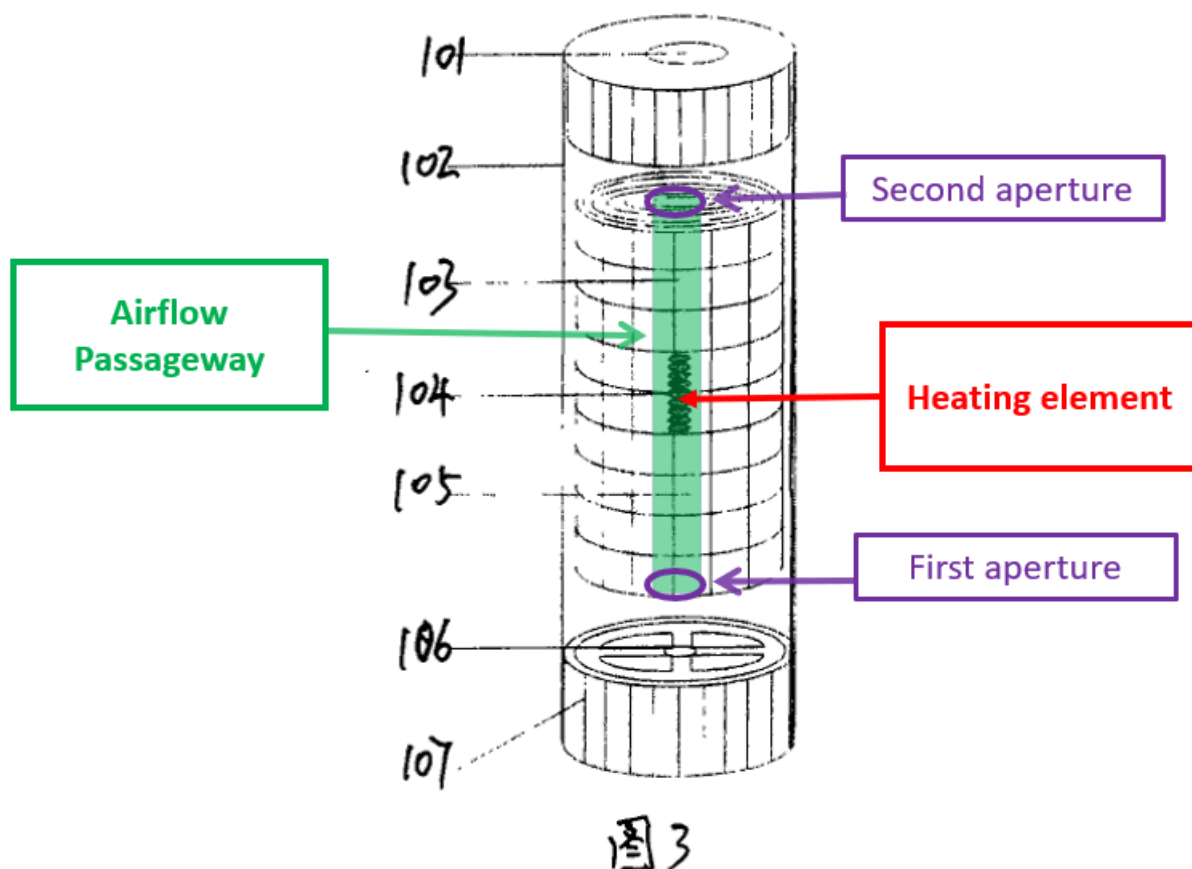
See element 1[c].

e. 5[d]: Airflow passageway extends in a straight path from first to second apertures with only the heating element obstructing the airflow

See elements 1[a4] and [c]; see also Ground 1, 5[d].

i. Wang

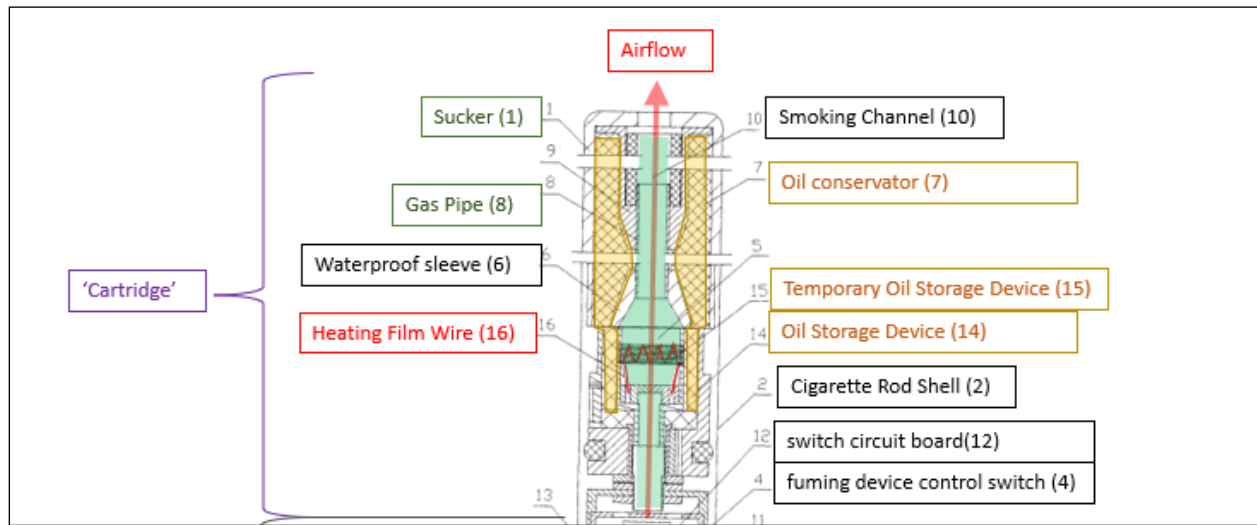
Wang's Figure 1 shows a heating element as the only obstruction in the airflow passageway, which extends in a straight path:



Ex. 1005, Fig. 3; Ex. 1007, ¶333.

ii. Wang combined with Fang

Fang also discloses this limitation, as there is no obstruction in its passageway other than the heating element 16:



Ex. 1006, Fig. 1 (annotated); Ex. 1007, ¶334.

To the extent that neither Wang nor Fang discloses this limitation, a POSITA would have been motivated to modify the heating element of Wang with that of Fang because such a simple design as allowing airflow to only be obstructed by the heating element as it flows to the user is beneficial to the device as a whole since such a modification supports a more uniform airflow to the user that is free from obstructions or choke-points. Ex. 1007 ¶ 335. As described above, in 1[b1]-[b2], a POSITA would also be motivated to modify Wang's heater and airflow passageway with Fang—keeping this element in mind—to create constant airflow and deliver vaporized solution to the user. Ex. 1007 ¶ 336.

6. Claim 6:

See claim 2.

7. Claim 7:

See claims 3-4.

8. Claim 8:

See claims 3-4.

9. Claim 9:

a. 9[p]

See element 1[p].

b. 9[a]

See elements 1[a1]-[a4].

c. 9[b]

See elements 1[b1]-[b2].

d. 9[c]: First and second portions of the airflow path proximate to the first and second apertures being along the central and longitudinal axis of the housing

See elements 1[a2], 1[a4], 1[c], and 1[d]. In both Wang alone and Wang as modified with Fang, the air flows centrally down the middle of the housing, from the first aperture to the second and thus does so proximate the first and second apertures. Ex. 1007, ¶343-344.

10. Claim 10:

See claim 2.

11. Claim 11:

a. Airflow passes on both transverse sides of the heating element

See element 1[b1]. Patent Owner argues that a device infringes this limitation if air flows over the heating element in the parallel ITC litigation. Ex. 1033 at 19-20. The '864 patent does not explain what it means for airflow to pass on both transverse sides, but applying the closest explanation in the specification, as explained in 1[b1], this element is obvious. Ex. 1007, ¶346-347.

i. Wang

As described in claim 1, air travels over the entirety of the heating element in Wang, and thus the airflow in Wang passes on both transverse sides of the heating element, although that phrase is not used or explained in the '864 patent. Ex. 1007, ¶348.

ii. Wang combined with Fang

To the extent Wang does not disclose or render this limitation obvious, Wang in combination with Fang does. Fang depicts a perpendicular heating element over which air flows, as discussed in Ground 1. Ex. 1007, ¶349.

12. Claim 12:

a. Wicking element operable to allow solution to be drawn toward the heating element

i. Wang

Wang discloses that the organic fiber (105) is operative to contain the tobacco extract 103 within itself and permit the tobacco extract 103 to be drawn into the heater 104 to be vaporized, at least from the edges of the fiber, toward the middle of the fiber where the heater is located. Ex. 1005 at 7 (“smoke produced when the tobacco extract 103 in the organic fiber 105 is heated by the electric heater 104”). Alternatively, a POSITA would know that a beneficial modification would be to use a second, refillable or replaceable liquid storage medium within the cartridge that then connects to the organic fiber 105. Ex. 1007, ¶ 351-352.

ii. Wang combined with Fang

As detailed in 1[c], the proposed modification of Wang with Fang would optionally result in the heating element being wrapped around the wicking element 15 from Fang such that at least a portion of the solution in the solution holding medium would be drawn toward the heating element to be vaporized. Ex. 1007, ¶353-357.

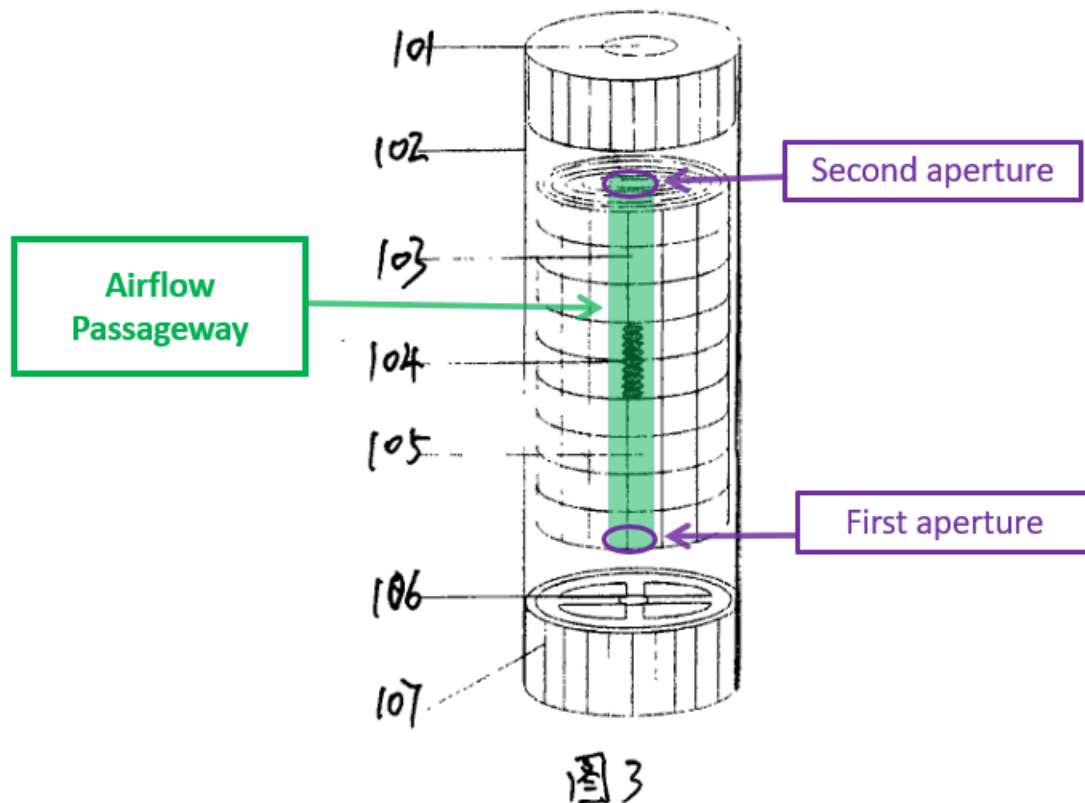
13. Claim 13:

a. First aperture smaller than second aperture

i. Wang

To the extent the first aperture on the first end is not seen as smaller than the second aperture on the second end, in Figure 3 of Wang below, a POSITA would have been motivated to make this change, ensuring that the first aperture was smaller

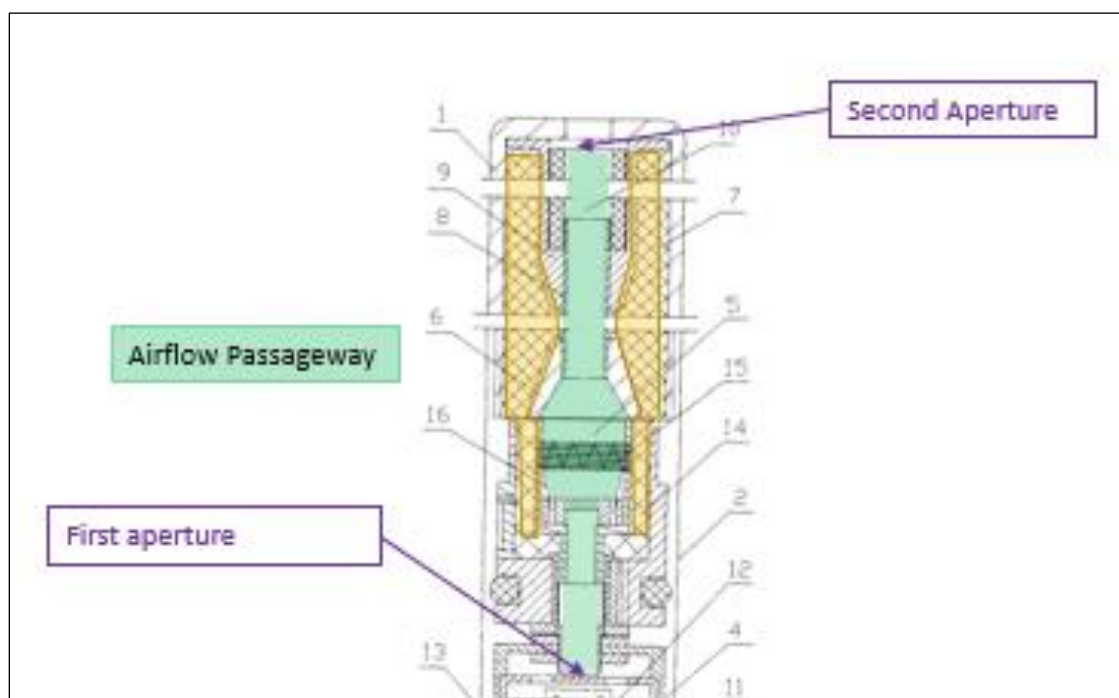
than the second aperture to ensure proper airflow exiting the device, as it would increase the pressure drop, propelling air through the device. Ex. 1007, ¶359.



Ex. 1005, Fig. 3.

ii. Wang combined with Fang

The proposed modification of Wang with Fang would not affect this limitation, as the analysis above would remain true. Furthermore, Fang explicitly discloses a second aperture that is larger than the first aperture, as depicted in Fang's Figure 1.



Ex. 1006, Fig. 1 (partial, annotated); Ex. 1007, ¶360-361.

14. Claim 14:

a. Solution containing either nicotine or propylene glycol

i. Wang

Wang's heater vaporizes "natural tobacco absolute oil, [in which] a certain proportion of nicotine is mixed in after the tobacco extract." Ex. 1004, 7. Lastly, it would have been obvious to a POSITA to modify the tobacco solution from Wang to contain propylene glycol as explained above with Ground 1, claim 14. Ex. 1007, ¶ 362-366.

ii. Wang combined with Fang

Both Wang and Fang are directed to electronic cigarettes such that both employ the use of a solution consisting of either nicotine and/or propylene glycol. Ex. 1007, ¶367.

15. Claim 15:

See elements 1[a4] and 1[c].

16. Claim 16:

See claims 3-4.

17. Claim 17:

a. Heating element is a coil

Wang's electric heater in Figures 1 and 3 and Fang's heating element in Figure 1 are clearly a coil, and are described as such, and, as stated previously, a POSITA would have been motivated to design a device that uses a coil as the heating element. Ex. 1007, ¶370-371.

18. Claim 18:

See claims 3-4.

19. Claim 19:

See claims 3-4.

20. Claim 20:

a. Heating element includes a material adapted to vaporize the solution

See element 1[b2].

21. Claim 21

a. 21[p]

See element 1[p].

b. 21[a]

See elements 1[a1]-[a4].

c. 21[b]

See elements 1[b1]-1[b2] and claims 11, and 17.

d. 21[c]

See element 1[c].

e. 21[d]

See element 1[d].

22. Claim 22:

See claim 2.

23. Claim 23:

See claims 3-4.

24. Claim 24:

See claims 3-4.

25. Claim 25:

a. 25[p]

See element 1[p].

b. 25[a]

See elements 1[a1]-[a4].

c. 25[b]

See element 1[b] and claims 11, and 17.

d. 25[c]

See elements 1[c]-1[d].

e. 25[d]

See element 5[d].

26. Claim 26:

See claim 2.

27. Claim 27:

See claims 3-4.

28. Claim 28:

See claims 3-4.

29. Claim 29:

a. 29[p]

See element 1[p].

b. 29[a]

See elements 1[a1]-[a4].

c. 29[b]

See element 1[b] and claims 11, and 17.

d. 29[c]

See elements 1[c]-1[d].

30. Claim 30:

See claim 2.

31. Claim 31:

See claim 12.

32. Claim 32:

See claim 13.

33. Claim 33:

See claim 14.

34. Claim 34:

See elements 1[c]-1[d].

35. Claim 35:

See elements 1[c]-[d] and claim 4.

36. Claim 36:

See claims 3-4.

37. Claim 37:

See claims 3-4.

38. Claim 38:

a. 38[p]

See element 1[p].

b. 38[a]

See element 1[a1]-[a4].

c. 38[b]: Airflow entering first aperture will separate and then pass on both transverse sides of the heating element and then continue along an airflow path co-axial with the central longitudinal axis of the housing

Although the '864 patent does not describe any separation of airflow, Wang and Fang disclose this limitation to the extent it has support in the specification by allowing air to flow over the heating element. Ex. 1001, 6:64-7:21.¹⁰ Afterward, in Wang and in in Wang modified in view of Fang, airflow continues traveling through the airflow passageway in a direction that is coaxial with the central longitudinal axis of the device toward the second aperture. Ex. 1007, ¶404-405.

d. 38[c]

See element 1[c].

e. 38[d]

See element 1[d].

39. Claim 39:

See claim 2.

40. Claim 40:

See element 1[b].

¹⁰ Petitioner's understanding of this requirement is based on Patent Owner's assertions of infringement based on the same theory. Ex. 1033 34-35.

41. Claim 41:

See claim 14.

42. Claim 42:

See claims 3-4.

43. Claim 43:

See claims 3-4.

44. Claim 44:

See claims 3-4.

45. Claim 45:

a. 45[p]

See element 1[p].

b. 45[a]

See elements 1[a1]-[a4].

c. 45[b]

See elements 1[b1]-[b2] and claim 11.

d. 45[c]

See element 1[c].

e. 45[d]

See elements 1[a4] and 5[d].

46. Claim 46:

See claim 2.

47. Claim 47:

See claims 3-4.

48. Claim 48:

See claims 3-4.

XI. SECONDARY CONSIDERATIONS CANNOT OVERCOME THE STRONG EVIDENCE OF OBVIOUSNESS

Where, as here, a strong prima facie case of obviousness exists secondary considerations may not disturb the final conclusion of obviousness. *See Leapfrog Enters., Inc. v. Fisher-Price, Inc.*, 485 F.3d 1157, 1162 (Fed. Cir. 2007). At the institution stage, in light of the “absence of a complete evidentiary record,” Petitioner need not further address secondary considerations. *Ranir, LLC v. The Procter & Gamble Co.*, IPR2017-01878, Paper 7 at 32 (Feb. 7, 2018); *accord 3Shape A-S v. Align Tech., Inc.*, IPR2019-00160, Paper 9 at 34 (June 11, 2019) (at the institution stage, “it is premature to determine how much weight to give to...evidence of objective indicia”). This is particularly appropriate here, where Examiner did not rely on evidence of secondary considerations in allowing the claims of the ’864 Patent. *See Zip Top, LLC v. Stasher, Inc.*, IPR2018-01216, Paper 14, at 37 (Jan. 17, 2019). Petitioner reserves the right to respond to any evidence of secondary considerations that Patent Owner may proffer.

A. Non-Institution Under 35 U.S.C. §325 Would be Improper

If Patent Owner asserts redundancy with the art considered by the Patent Office in the prosecution of the challenged patents, non-institution under § 325 would be improper based on weighing the factors in *Becton, Dickinson & Co. v. B. Braun Melsungen AG*, IPR2017-01586, Paper 8, at 17–18 (PTAB Dec. 15, 2017) and material error on the PTO’s part in granting the challenged claims. See *Advanced Bionics, LLC v. MED-EL Elektromedizinische Geräte GmbH*, IPR2019-01469, Paper 6 (Feb. 13, 2020) (designated precedential on March 24, 2020).

Although Fang, Wang, and Xia were all disclosed during examination, the examiner did not substantively review these references or raise any of the arguments Petitioner has made in this petition. Therefore, the examination of the ’864 Patent is silent on the consideration of this art. “For example, if the record of the Office’s previous consideration of the art is not well developed or silent, then a petitioner may show the Office erred by overlooking something persuasive under factors (e) and (f).” *Advanced Bionics*, IPR2019-01469, Paper 6, at 10. There is no indication that the examiner reviewed Xia, Fang, or Wang, nor is there any substantive discussion of their disclosures. Therefore, non-institution under §325 would be improper based on weighing the factors in *Becton*.

Regarding factor (e), the Examiner erred in allowing the claims to issue at least because “the Examiner was simply not aware” of the teachings of the most

pertinent art. *Oticon Med. AB v. Cochlear Ltd.*, IPR2019-00975, Paper 15 at 19–20 (PTAB Oct. 16, 2019) (precedential) (granting institution). Additionally, the prosecution history is silent as to the disclosures in Wang, Fang, and Xia, which, as described in detail above, render the claims of the '864 Patent obvious. See § VIII.A - B; see also *Advanced Bionics*, IPR2019-01469, Paper 6, at 10.

Factor (f) is inapplicable because none of the asserted combinations were substantively considered by the Examiner. The Board has consistently declined exercising its discretion under Section 325(d) when the only fact a Patent Owner can point to is that a reference was disclosed to the Examiner during the prosecution. See, e.g., *Digital Check Corp. d/b/a ST Imaging v. E-Imagedata Corp.*, IPR2017-00178, slip op. at 12–13 (PTAB Apr. 25, 2017) (Paper 6) (acknowledging that a prior art reference was cited in an IDS, but granting institution because there was no indication that the claims were rejected based on those references or that the Examiner substantively discussed those references during prosecution). Weighing the factors together, non-institution under §325 would be improper.

XII. CONCLUSION

For the foregoing reasons, the PTAB should institute *inter partes* review against claims 1-48 of the '864 patent and ultimately cancel each of these claims.

U.S. Patent No. 11,497,864 B2
Petition for *Inter Partes* Review

Dated: November 8, 2023

/s/ William A. Meunier

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CERTIFICATE OF COMPLIANCE

Pursuant to 37 C.F.R. § 42.24(d), Patent Owner hereby certifies, in reliance on the word count of the word-processing system (Microsoft Office Word 2010) used to prepare this petition, that the number of words in this paper is 13,994. This word count excludes the tables of contents, tables of authorities, mandatory notices under 37 C.F.R. § 42.8, certificate of word count, certificate of service, or appendix of exhibits or claim listing. Petitioner certifies that this Petition for *Inter Partes* Review does not exceed the applicable type-volume limit of 37 C.F.R. § 42.24(a).

Dated: November 8, 2023

/s/ William A. Meunier

William A. Meunier (Reg. No. 41,193)

CERTIFICATE OF SERVICE

I certify that copies of the foregoing Petition for *Inter Partes* Review, all referenced exhibits, and the Petitioner's Power of Attorney were served on November 8, 2023, via overnight courier upon the following counsel of record for Patent Owner:

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P.O. Box 8910
Reston, VA 20195

Courtesy copies of this Petition and accompanying exhibits were also served via electronic mail on Patent Owner's counsel of record in a related litigation at:

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