IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

JUPITER RESEARCH, LLC,

Petitioner,

v.

VPR BRANDS, L.P.,

Patent Owner.

Case IPR2022-00299

U.S. Patent No. 8,205,622

PETITION FOR *INTER PARTES* REVIEW OF U.S. PATENT NO. 8,205,622

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1010	International Publication No. WO 98/171131 ("Fleischhauer")
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1013	VPR Brands LP v. Jupiter Research, LLC, Dist. of Az. CV-20-02185, Scheduling Order (Feb. 9, 2021) (ECF 19)
1014	Kälvesten et al., "Analytical Characterization of Piezoresistive Square-Diaphragm Silicon Microphone," Sensors and Materials, Vol. 8, No. 2, Department of Signals, Sensors and Systems, Royal Institute of Technology, 1996, pp.113-136. ("Diaphragm Silicon Microphone")
1015	Microchip PIC10F200/202/204/206 Data Sheet

1 In the Petition, citations to Chinese Patent Application Publication No. CN 201104488Y are toward the certified English translation (Ex. 1009). This document was obtained from IPR 2021-00586.

Exhibit	Description
1016	10pcs SCM IC Chips STC11F02E-35I-PDIP20 Original Single Chip Micyoco, www.ebay.com/itm/392512222315, retrieved on 29 November 2021.
1017	Honeywell SenSym SLP004D 0-4 Data Sheet
1018	STC11F-10Fxx Series MCU; STC11L-10Lxx Series MCU Data Sheet
1019	Declaration of Mark Scatterday

CLAIM LISTING

1.Pre	An electronic cigarette comprising
1.1	a tubular electronic inhaler and
1.2	a tubular electronic atomizer that is detachably attached to the electronic inhaler,
1.3	wherein the electronic inhaler includes an electric power source that provides an electric current to the electronic atomizer, and
1.4	wherein the tubular electronic atomizer includes a container and media within the container,
1.5	the media is soaked with a solution to be atomized, and
1.6	between the container and the media there is a side-space for airflow tubular electronic, and
1.7	wherein the tubular electronic inhaler includes an electric airflow sensor configured to turn on and off the electric power source by way of detecting an airflow, and
1.8	the airflow sensor is a diaphragm microphone.

Dependent Claims 2 - 11	
2.Pre	The electronic cigarette of claim 1, wherein the electronic inhaler includes a first electric connector disposed at a second end of the electronic inhaler, wherein the electronic atomizer includes a second electric connector disposed at a first end of the electronic atomizer, and wherein the first electric connector is connected to the second electric connector so that the electronic inhaler and the electronic atomizer form the electronic cigarette.

Dependent Claims 2 - 11	
3.	The electronic cigarette of claim 1, wherein the liquid container prevents or reduces liquid leak and reverse flow.
4.	The electronic cigarette of claim 3, wherein the electronic atomizer includes an electric heating wire which generates heat for atomization of the solution soaked in the media inside the liquid container, a heat equalizer onto which the electric heating wire is wired and is made of fibers that can withstand a temperature up to 2000 degrees centigrade.
5.	The electronic cigarette of claim 4, wherein the electronic atomizer includes a leak-proof member, wherein the leak-proof member and a second electric connector are closer to the first end of the electronic atomizer than the heat equalizer.
6.	The electronic cigarette of claim 5, where the first electric connector is a DC socket and the second electric connector is a DC plug, wherein the DC plug is embedded onto the leak-proof piece through a plug seat, which is connected to the electric heating wire, and wherein the first end of the electronic atomizer is connected to the second of the electronic inhaler by placing the DC plug to the DC socket.
7.	The electronic cigarette of claim 6, wherein the first electric connector is a cylinder terminal, and its outskirt is tightly embedded into the second end of the electric inhaler tube and its exposed portion has a screw thread, wherein the second electric connector is a cylinder terminal, which is tightly embedded into the first end of the electronic atomizer and has a screw thread inside the inhaler tube, and wherein the first electric connector and second electric connector are connected through the screw
8.	The electronic cigarette of claim 1, wherein the electronic atomizer includes, in sequence, a second electric connector, a leak-proof piece, a supporting piece, a heat equalizer coupled with an electric heating wire, the container filled with the media, and an atomizer cap with an air-puffing hole.
9.	The electronic cigarette of claim 1, wherein the electric power source is inside the electronic inhaler.

Dependent Claims 2 - 11	
10.	The electronic cigarette of claim 1, wherein the tubular electronic atomizer includes an exterior wall having an air-puffing hole formed therethrough, wherein the liquid container includes a container wall, there being a chamber disposed between the exterior wall and the container wall, and wherein the tubular electronic atomizer includes a tube extending from the air-puffing hole and into the chamber.
11.	The electronic cigarette of claim 1, wherein the media comprises cotton.

Independent Claim 12	
12.Pre	An electronic cigarette comprising
12.1	a tubular electronic inhaler and
12.2	a tubular electronic atomizer,
12.3	wherein the electronic inhaler includes an electric power source that provides an electric current to the electronic atomizer,
12.4	the electronic cigarette further comprising an integrated circuit board that has a Single Chip Micyoco that controls atomization of a liquid solution.

Independent Claim 13	
13.Pre	An electronic cigarette comprising
13.1	a tubular electronic inhaler and
13.2	a tubular electronic atomizer,
13.3	wherein the electronic inhaler includes an electric power source that provides an electric current to the electronic atomizer,

13.4	the electronic cigarette further comprising an electric airflow sensor that is used to turn on and off the electric power source by way of detecting an airflow and
13.5	sending a signal to a Single Chip Micyoco,
13.6	wherein the Single Chip Micyoco receives the signal from the electric airflow sensor, instructs the electric power source to send an electric current to the electronic atomizer, and a time period and a magnitude of the electric current.

Dependent Claims 14-15	
14.	The electronic cigarette of claim 13, wherein the electric airflow sensor is a diaphragm microphone.
15.	The electronic cigarette of claim 13, further comprising an LED indicator inside the electronic inhaler, wherein the LED indicator is connected to the Single Chip Micyoco and the electric power source, and wherein the on time of the LED indicator is controlled by the Single Chip Micyoco.

Independent Claims 16	
16.Pre	An electronic cigarette comprising
16.1	a tubular electronic inhaler and
16.2	a tubular electronic atomizer,
16.3	wherein the electronic inhaler includes an electric power source that provides an electric current to the electronic atomizer,
16.4	wherein the electronic inhaler includes, sequentially from a first end of the electronic inhaler to the second end, a cigarette cap, an LED indicator, the electric power source, an electric airflow sensor, a circuit board for a Single Chip Micyoco, and a first electric connector.

Independent Claim 17	
17.Pre	An electronic cigarette comprising:
17.1	a tubular electronic inhaler and
17.2	a tubular electronic atomizer that is detachably attached to the electronic inhaler,
17.3	wherein the electronic inhaler includes an electric power source that provides an electric current to the electronic atomizer,
17.4	wherein the tubular electronic atomizer includes a container and media within the container,
17.5	the media is soaked with a solution to be atomized,
17.6	wherein the tubular electronic atomizer includes an exterior wall having an air-puffing hole formed therethrough,
17.7	wherein the liquid container includes a container wall, there being a chamber disposed between the exterior wall and the container wall,
17.8	wherein the tubular electronic atomizer includes a tube extending from the air-puffing hole and into the chamber, and
17.9	wherein the tubular electronic inhaler includes an electric airflow sensor configured to turn on and off the electric power source by way of detecting an airflow,
17.10	and the airflow sensor is a diaphragm microphone.

Dependent Claim 18	
18.Pre	The electronic cigarette of claim 17,
18.1	wherein the tubular electronic atomizer includes, in sequence,
18.2	an electric connector,
18.3	a leak-proof piece,
18.4	a supporting piece,
18.5	a heat equalizer coupled with an electric heating wire,
18.6	the container filled with the media, and
18.7	the air-puffing hole.

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

- **Section 42.8(b)(1):** Jupiter Research, LLC is the real party-in-interest.
- **Section 42.8(b)(2):** The '622 Patent is at issue in the cases listed in the table below that may affect, or be affected by, a decision in this proceeding:

Case Number	Case Title	Court
2:20-cv-02185[2]	VPR Brands LP v. Jupiter Research, LLC	Arizona District Court
2021-cv-01116	VPR Brands LP v. Cool Clouds Distribution, Inc.	Cent. Dist. Ct. of Cal.
2021-cv-03797	VPR Brands LP v. PHD Marketing Inc.	Cent. Dist. Ct. of Cal.
2021-cv-10971	VPR Brands LP v. BAE Worldwide LLC	Mass Dist. Ct.
2021-cv-02445	VPR Brands LP v. Myle Vape Inc. et al.	EDNY
2021-cv-00172	VPR Brands LP v. MONQ, LLC	Tenn. Mid. Dist. Ct.

- **Sections 42.8(b)(3), (4):** A Power of Attorney accompanies this Petition. Jupiter consents to email service at Ameola@IPlawusa.com.

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[2] Case no. 2021-cv-03797, VPR Brands LP v. Jupiter Research, LLC is referred herein to as the "Relevant Litigation."

APPLICABLE STATUTES

References to 35 U.S.C. §§ 102 and 103 are to the pre-AIA versions applicable to the '622 Patent.

INTRODUCTION

U.S. Patent No. 8,205,622 ("the '622 Patent") was issued on June 26, 2012 from U.S. Patent Application Serial No. 12/437,511 filed on May, 2009, which application published on September 30, 2010 as U.S. 2010/0242974 A1.[3] The '622 Patent claims foreign priority to Chinese Patent Application Serial No. 20091000147 filed March 24, 2009.[4] VPR BRANDS, L.P. ("VPR") acquired the '622 Patent via assignment executed on August 26, 2019 and recorded on August 29, 2019.[5] VPR has filed multiple patent infringement suits based on the '622 Patent.[6]

The '622 Patent claims an electronic cigarette having tubular portions that resemble a cigarette: an electronic inhaler and an electronic atomizer that is detachably attached to the tubular electronic inhaler, wherein the tubular electronic inhaler includes an electric airflow sensor that is used to turn on and off the electric power source by way of detecting an airflow.[7]

Among the reasons for allowance the Examiner stated that the prior art teaches

[3] Ex. 1001, cover.
[4] *Id.*
[5] Ex. 1003.
[6] *See* above Mandatory Notices Under 37 C.F.R. § 42.8.
[7] Ex. 1001, Abstract; *see also* Ex. 1003: Amendment dated Nov. 11, 2011.

those electronic cigarettes have the atomizing solution soaked in a media.[8] The Examiner also stated that the prior art does not teach Single Chip Micyoco to control atomization and noted that "Single Chip Micyoco" has been interpreted to be a type of chip and the cited art did not teach using a diaphragm microphone as the airflow sensor.[9]

Hon (U.S. Pat. No. 8,375,957) which was not considered during the original examination, discloses these limitations. Hon teaches a Single Chip Micyoco (or microcontroller) to control atomization. As shown Hon's annotated Figure 5B, MOSFET electric circuit board (205) and sensor (207) are in electrical connection.[10] Hon further explains the role of an MCU (206) and how it receives a pressure signal and responds appropriately to control atomization.[11]

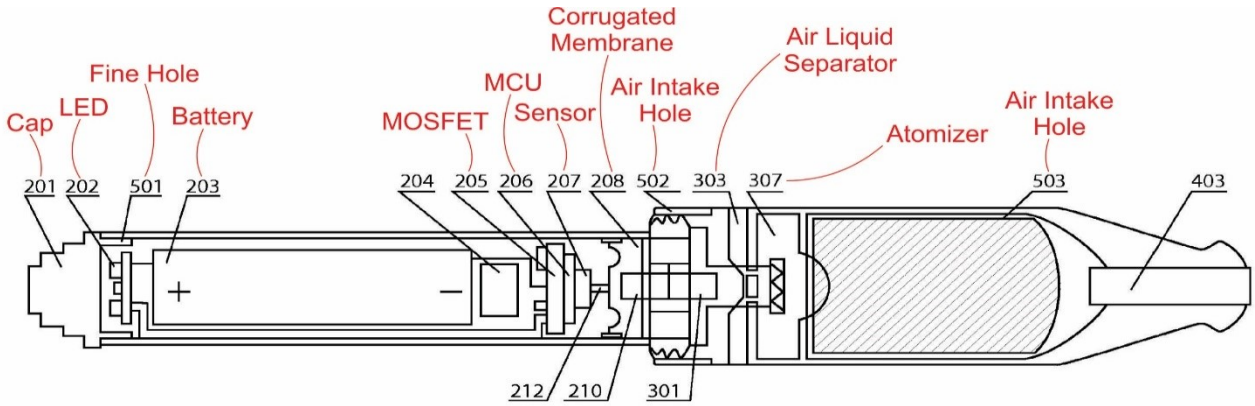


Figure 5B

Hon Annotated FIG. 5B

[8] Ex. 1003: Notice of Allowance dated May 11, 2012, pg. 7, ¶ 2.
[9] *Id.* at ¶ 2 and 3.
[10] Ex. 1007: col. 4, l. 62 – col. 5, l. 42.
[11] *Id.*

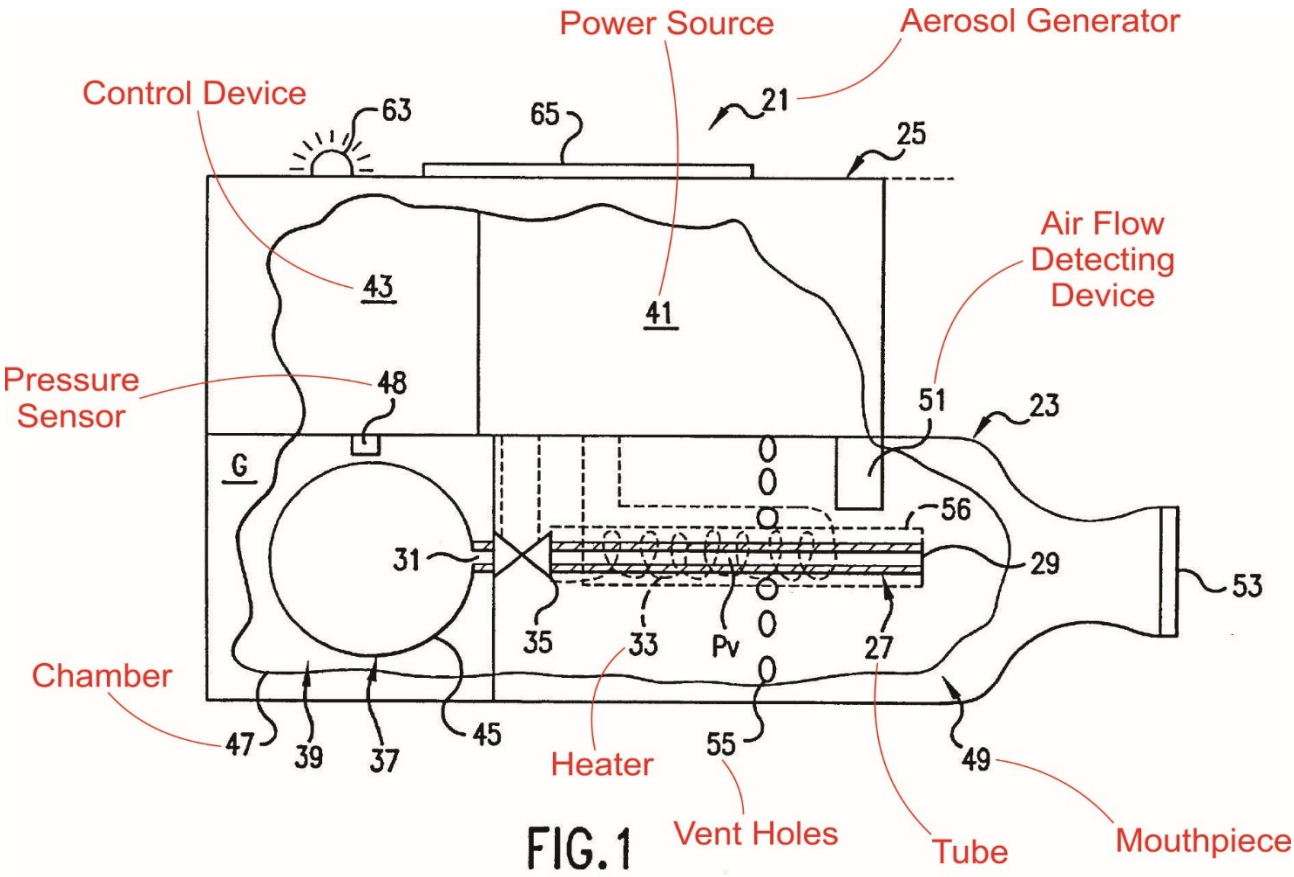
Hon teaches an "electric airflow sensor" sending a signal to a Single Chip Micyoco.[12] The user's action of suction initiates the sensor, then MCU (206) scans the sensor (207) and according to the signal parameters of the sensor (207) sends a signal to the MCU (206) and MOSFET electric circuit board (205).[13]

Cox (U.S. Pat. No. 6,234,167) also teaches these limitations. Cox is directed to an aerosol generator capable of generating aerosols without compressed bas propellants by vaporizing source material, including liquids, such that the resulting aerosol may be inhaled by a user.[14]

[12] *Id.*

[13] *Id.* at col. 5, ll. 14 – 20 and 32 – 34.

[14] Ex. 1008: abstract



Cox Annotated FIG. 1

Cox annotated Figure 1 shows a device having two separable pieces, one of which includes a container (47) holding liquid source material to be vaporized and inhaled, a heater (33) that vaporizes the source material, an airflow sensor (51) that determines that air flow (inhalation) is occurring, and integrated control circuitry (43) that, based on a signal form the airflow sensor (51) indicating that airflow is occurring, issues signals to the heater (33) to turn it on and/or off and control the length of time that power is supplied to the heater (33).[15]

Cox also discloses a "second component" (item (25) of Figs. 1 and 3) that is an

[15] *Id.*

electronic inhaler (it includes a source of power, for example, and a control device such as a microchip for controlling the power).[16] The entire device is disclosed as tubular so consequently, the "second component" (25) (electronic inhaler) of the device is also tubular.[17]

Zhu (Chinese Patent Publication No. CN201104488Y) is directed to an electronic cigarette two parts (referred to as a controller and a generator) that are configured to be removably connected.[18] The electronic cigarette has a chamber (12) for containing a fluid to be vaporized, an airflow sensor for detecting airflow introduced by a user sucking on one end of the electronic cigarette, and a microcontroller and circuit board connected to the airflow sensor and receiving a signal from the airflow sensor.[19] Zhu teaches a heater (9) for vaporizing the fluid to be vaporized, and a power supply for providing power to the airflow sensor, microcontroller and circuit board, an LED, and the heater(9).[20] The heater (9) and LED receive control signals from the microcontroller.[21] When a user draws air the airflow sensor provides signals to the microcontroller, which provides control signals to the heater and other devices to control vaporization and other device functions.[22]

[16] *Id.* at col. 4, ll. 30 – 35.
[17] *Id.* at abstract.
[18] Ex. 1009: abstract.
[19] *Id.* at pg. 5.
[20] *Id.*at pg. 6.
[21] *Id.*
[22] *Id.* at 7.

As the Examiner did not consider Hon as presented here in Ground 1, nor Cox as presented here in Ground 2, nor the obviousness combinations based on Hon, Cox and/or Zhu presented here in Grounds 3 and 4, respectively, institution is warranted. Indeed, instituting a trial here would be an effective and efficient alternative to litigation, and Petitioner thus requests *inter partes* review of claims 13 – 18 of the '622 Patent.

I. STANDING AND IDENTIFICATION OF CHALLENGE UNDER §§ 42.104(a)-(b)

Petitioner certifies the '622 Patent is available for IPR and that Jupiter is not barred or estopped from requesting IPR on the asserted grounds.

Petitioner asks the Board to find claims 13 – 18 (the "Challenged Claims") unpatentable on the following patents in view of the general knowledge of a person having ordinary skill in the art ("POSITA") prior to the purported invention:

Ground	Proposed Statutory Challenges
1	**Hon Anticipates Claims 13 – 15, 17 and 18 under § 102(a), (b) and/or (e).**
2	**Cox Anticipates Claims 13 -15 under § 102(a), (b) and/or (e).**
3	**Cox and Hon render obvious Claim 16 under § 103.**
4	**Cox and Zhu render obvious Claims 16, 17 and 18 under § 103.**

Hon is U.S. Patent No. 8,375,957 issued on February 19, 2013, based on PCT

Application No. PCT/CN2007/001576 filed on May 15, 2007. Hon was published on November 22, 2007, as PCT Publication No. WO2007/131450.[23] Hon is prior art under at least § 102(a), (b) and (e).

Cox is U.S. Patent No 6,234,167 issued on May 22, 2001, based on a U.S. Patent Appl. No. 09/172,023 filed on October 14, 1998.[24] Cox is prior art under at least § 102(a), (b) and (e).

Zhu was filed on September 30, 2007 and published on August 27, 2008.[25] Zhu is prior art under at least 35 U.S.C. § 102(a).

The '622 Patent does not list Hon, Cox, or Zhu in its References Cited section and these references were not considered by the Examiner.[26]

II. STATE OF THE ART BEFORE THE PURPORTED INVENTION

Electronic smoking devices have existed for some time. Before the purported invention, electric cigarettes were well known to include a power source (battery assembly) and a microcontroller to control an atomizer assembly with a heating element to vaporize a liquid element.[27] Such devices did employ suction or airflow sensing devices to detect a user drawing or sucking on the device, did provide electrical signals to the heater/atomizer of the device to vaporize the material.[28]

[23] Ex. 1007: cover.
[24] Ex. 1008: cover.
[25] Ex. 1009: cover.
[26] Ex. 1001: cover.
[27] Ex. 1019: ¶¶ 9 and 23.
[28] *Id.* at ¶ 10.

Some of these devices did employ a flexible diaphragm or membrane as part of the airflow/pressure sensing device and/or a microphone sensor, such that when a user slightly sucked at a hole located somewhere on the device, negative pressure did cause the membrane to move or deform, sending a signal (either mechanically, electrically, or a combination of mechanically and electrically) to cause the heater/atomizer of the device to atomize/vaporize some of the liquid substance so that a user could breathe that substance in.[29]

Before 2009, electronic cigarette devices were available in devices that included at least into two sections, with components making up the electronic cigarette being split between the sections, and the components of the sections having electrical connectors at one end, such that when the sections were connected, the electrical connectors are in contact, allowing electrical contact between components of the sections.[30]

It was also well known for electronic cigarettes to have a microcontrollers (Single Chip Micyoco) to control voltage.[31] A POSITA would have understood that the use of the single chip micyoco configured into a circuit including an electronic airflow sensor and an electronic atomizer as one way to control the power in order to vaporize a liquid.[32]

[29] *Id.* at ¶ 11.
[30] *Id.* at ¶ 12.
[31] Ex. 1004: ¶ 21.
[32] *Id.* at ¶ 23.

It was already well known in the art and commonplace to implement microcontrollers to control voltage, time period and magnitude of signals output by the microcontroller.[33]

Advances in semiconductor manufacturing techniques throughout the 1980's enabled and fueled an adoption of microcontrollers to control countless applications which previously required discrete electronic or mechanical solutions. Specialized "peripherals" were integrated into the microcontroller which allowed for more application-specific handling of signals and computation. Very common examples would be analog-to-digital converters (A2Ds), pulse-width modulation (PWMs), serial ports, or high-speed I/O's[34]

Within various types of electronic cigarette configurations, it was well known to use a signal to the microcontroller to control an electric power source to heat a liquid to a temperature sufficient to vaporize said liquid.[35]

III. THE CHALLENGED PATENT

A. The '622 Patent Overview

The '622 Patent acknowledges that electronic cigarettes including atomizers

[33] *Id.* at ¶ 22
[34] *Id.* at ¶ 18.
[35] Ex. 1019: ¶¶ 23 and 24.

were well known in the art at least early as March 2009.[36] The '622 Patent also acknowledges it was well known to utilize an atomizing device inside a shell to vaporize liquid drops into vapor.[37] As also recognized in the '622 Patent, a simulated cigarette device has existed as prior art having an insulated tube, inside which a heated generator and a media are stored.[38]

But the '622 Patent purports to overcome perceived complexities in the admitted prior art by incorporating an integrated connection between an electronic inhaler and an electronic atomizer making the atomizer art an integrated and disposable part of the electronic cigarette.[39]

B. Level of Skill in the Art

At the time of the purported invention, a POSITA would have had a bachelor's degree in electrical engineering, mechanical engineering, chemical engineering, or a closely related field and one to two years of experience working in the consumer electronics or computer industry in the capacity of a design, application, customer marketing or technical marketing engineer.[40]

C. Claim Construction

In this Petition, Petitioner construes each of the '622 Patent claim terms as

[36] Ex. 1001: col. 1, l. 52 and l. 64.
[37] *Id.* at col. 1, ll. 61-64.
[38] *Id.* at col. 1, ll. 36 – 39.
[39] *Id.* at col. 2, lines 23-50.
[40] Ex. 1004: ¶ 58.

having its ordinary and customer meaning with the following claims terms having the respective proposed claim construction as jointly proposed by the parties in the Relevant Litigation[41] as stated in the Exhibit 1006.[42]

IV. OVERVIEW OF THE PRIOR ART

A. Hon Overview

U.S. Patent No. 8,375,957 ("Hon") is titled "Electronic Cigarette."[43] As reflected on its cover, Hon was filed as a PCT Application on May 15, 2007, and the PCT was published on November 22, 2007.[44] Hon was filed as a U.S. Patent Application No. 12/266,819 on January 15, 2009. By virtue of its PCT publication date and the US. Patent application filing date Hon is prior art under 35 U.S.C. § 102(a), (b), and (e).

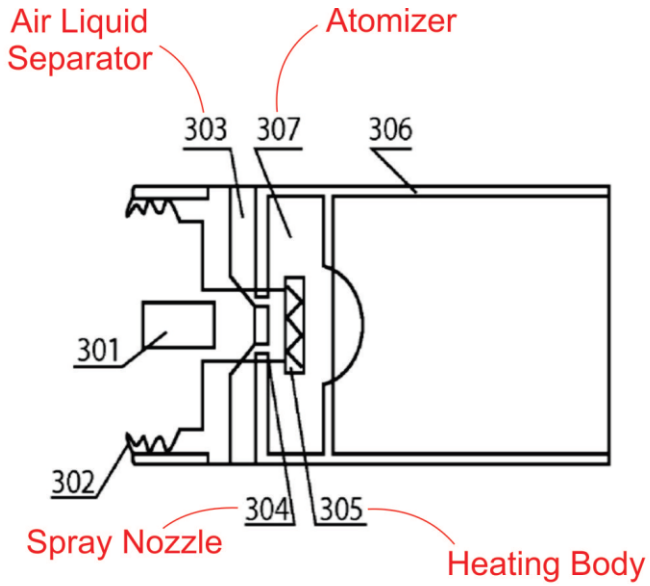
Hon is directed to an electronic cigarette (also referred to as an aerosol sucker). Hon discloses an electronic cigarette having two parts, an atomizer assembly and cigarette bottle assembly, that are configured to be removably connected.[45] The electronic cigarette has a chamber for containing a fluid to be atomized, an airflow sensor for detecting airflow introduced by a user sucking on one end of the electronic cigarette, an MCU and circuit board connected to the airflow sensor and receiving a signal from the airflow sensor, an atomizer for atomizing the fluid to be atomized, and a power supply for providing power to the airflow sensor, MCU and circuit board, LED

[41] *See* Mandatory Notices Under 37 C.F.R. § 42.8
42 Ex. 1006: pgs. 1 – 3.
[43] Ex. 1007: cover.
[44] *Id.*
[45] *Id.* at abstract.

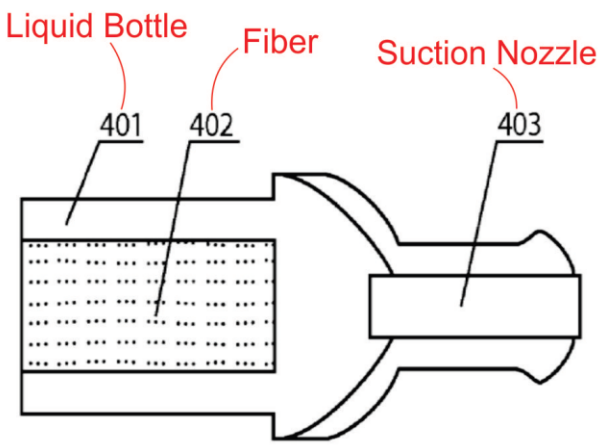
and atomizer, that receives a control signals from the MCU and/or circuit board. When a user puffs on the end of the electronic cigarette, the airflow sensor provides signals to the MCU and circuit board, which in turn provide control signals to the heater and other devices to control atomization and other device functions.[46]

More specifically, referring to Figure 5B, Hon discloses a tubular electronic inhaler that includes a cap with a hole (201), an LED (202), a power source (203), a circuit board (205), an MCU (microcontroller) (206) an airflow sensor (207) with a flexible membrane or diaphragm (208) and an electronic connector (209) (not shown in Figure 5B, but shown in Figure 2A).[47] Hon also discloses an electronic atomizer having an electronic connector (302), a leak-proof piece (303), a supporting piece (306), a container (401) and media within the container soaked with a solution to be atomized (402), an exterior wall with an air hole (Figure 5B, 502) (additionally/alternatively Figure 4, mouthpiece with a hole through which air enters), a chamber between the exterior wall of the atomizer and the container wall (307), a tube from the air-puffing hole into the chamber (403), containing a fluid to be atomized (401), an atomizer with an electric heating wire (305), and an air-puffing hole (end of device through which (403) passes).[48]

[46] Ex. 1004: ¶ 39.
[47] Ex. 1007: at col. 3, ll. 4-24; col. 4, l. 65 – col. 5, l. 15.
[48] *Id.* at col. 1, ll. 57 – 60.



Hon Annotated Fig. 3



Hon Annotated Fig. 4

Hon also discloses that the airflow sensor may be a switch sensor made of an elastic alloy slice, a Hall element of linear output, a semiconductor force-sensitive chip, a semiconductor matrix thermoelectric bridge chip, a capacitance sensor, or an inductance sensor.[49] Hon also discloses the MCU receiving signals from the airflow sensor, and based on that signal, controlling various aspects of the device operation, including by issuing pulse-width modulation signals, providing constant power output, frequency of device operation, the LED indicator, and other functions.[50]

B. Cox Overview

U.S. Patent No. 6,234,167 ("Cox") is titled "Aerosol Generator And Methods Of Making And Using An Aerosol Generator."[51] Cox was filed on October 14, 1998, and issued on May 22, 2001. Cox is prior art under § 102 (a), (b), and (e).

[49] *Id.* at col. 3, ll. 21 – 25.
[50] *Id.* at col. 5. l. 32 – 41.
[51] Ex. 1008: cover.

Cox is directed to an aerosol generator capable of generating aerosols without compressed bas propellants by vaporizing source material, including liquids, such that the resulting aerosol may be inhaled by a user.[52] Cox discloses the device having two separable pieces, one of which includes a container holding liquid source material to be vaporized and inhaled, a heater that vaporizes the source material, an airflow sensor that determines that air flow (inhalation) is occurring, and integrated control circuitry that, based on a signal form the airflow sensor indicating that airflow is occurring, issues signals to the heater to turn it on and/or off and control the length of time that power is supplied to the heater.[53]

Cox further incorporates by reference WO 98/171131 ("Fleischhauer") which is directed to an electrical smoking system having a control device, power source and heater.[54]

Cox teaches an electronic cigarette having a separable electronic atomizer and an electronic inhaler ((23) and (25), respectively in Figure 2).[55] The electronic inhaler includes an electric power source providing power to the components of the system ((41) of Figure 1). Cox teaches providing a substance to be administered ((37) of Figure 1) in a liquid form, and vaporizing the substance by means of an atomizer (heater) ((33) of Figure 1.[56] Cox further teaches that the heating (vaporization) of the subject material

[52] *Id.* at abstract.
[53] *Id.*
[54] *Id.* at col. 4, ll. 18 – 24. A copy of Fleischhauer is included as Ex. 1010.
[55] Ex. 1008: col. 3, ll. 46 – 49.
[56] *Id.* at col. 8, ll. 47 – 48; col. 4, ll. 40 – 41; col. 11, ll. 50 – 56.

is initiated and controlled by a control device based on an input signal received by the control device from an airflow sensor that is configured to send a signal to the control device when airflow (suction) is detected at the mouthpiece of the device.[57] Cox discloses that in addition to, or in alternative to, the airflow sensor, a pressure sensor, or pressure-drop detecting device may be used.[58] Cox discloses the control device being a microchip that is programmed (therefore running software), and that is capable of receiving and processing/responding to input signals, and has outputs, generating control signals that are provided to the heater.[59] Cox discloses the control device controlling the frequency with which the heater is activated, and the length of time (duration) that power is supplied to the heater from the power source.[60]

Cox further discloses that any of the components capable of production as microelectronic devices may be formed into a single chip along with the heater, or may be formed into a separate single chip.[61]

Cox further discloses that the various components of the aerosol generator may be located in whichever of two separable pieces is appropriate.[62]

Cox teaches that the control device may be configured to adjust the length of time that power is supplied to the heater, the rate at which power is supplied to the

[57] *Id.* at col. 4, ll. 42 – 63.
[58] *Id.* at col. 4, ll. 32 – 45.
[59] *Id.* at col. 4, l.33; col. 8, l. 5; col. 4, ll. 29 – 30; col. 4, ll. 30 – 34.
[60] *Id.* at col. 6, ll. 60 – 65; col. 7, ll. 17 – 22.
[61] *Id.* at col. 4, ll. 52 – 61.
[62] *Id.* at col. 10, l. 59 – col. 1, l. 8.

heater and the rate at which the material is vaporized.[63]

C. Zhu Overview

Chinese Patent Publication No. CN201104488Y to Zhu Xiaochun ("Zhu") is titled "A Non-Combusted Mist Electronic Cigarette."[64] As reflected on its cover, Zhu was filed on September 30, 2007, and published on August 27, 2008. Zhu is prior art under at least 35 U.S.C. § 102(a).

Zhu is directed to an electronic cigarette.[65] Zhu discloses the electronic cigarette having two parts (referred to as a controller and a generator) that are configured to be removably connected.[66]

Zhu includes (in the controller – sequentially): a cap with a hole (14); an LED (1); a power supply (2); a circuit board and microcontroller ((3) and IC1 – microcontroller PIC10F206); and an electric connector (6).[67] It further includes (in the "generator" – sequentially): an electric connector (6); a liquid-blocking piece (8); a supporting piece for a heater (1102); a heater with heating wire (9 and 901); container filled with media (12) and an air-puffing hole (13).[68] Zhu also discloses an airflow sensor having a diaphragm ((401), (403), (404), (405), (406)).[69]

Zhu further discloses that 8-bit microcontroller (Figure 7) receives a signal from

[63] *Id.* at col. 7, ll. 17 – 22; col. At 8, ll. 40 – 43.
[64] Ex. 1009: cover.
[65] *Id.*
[66] *Id.*
[67] *Id.* at pg. 4, ¶6.
[68] *Id.* at pg. 5, ¶1.
[69] *Id.* at pg. 5, ¶ 2

the airflow sensor, and evaluates that input signal to control the LED and heater. The microcontroller outputs a control signal to the heating circuit to connect it to the power supply to provide heat to vaporize the liquid, and to illuminate the LED. Zhu does this by commanding one output pin to provide a signal having a duration and magnitude to the LED, and by commanding a different output pin to provide a signal having a duration and magnitude to control the heater.[70]

Figure 7 of Zhu discloses the microcontroller is a PIC10F206.[71] The PIC10F206 has four I/O pins, one that serves only as an input, and three of which are controlled by the microcontroller in real-time to determine if they act as inputs or outputs, and if as outputs, the magnitude and duration of the signal provided as an output, based on the programming of the microcontroller.[72]

V. GROUND 1 - CLAIMS 13 – 15, 17 AND 18 ARE UNPATENTABLE AS BEING ANTICIPATED BY HON

Hon anticipates claims 13 – 15, 17 and 18 and renders them invalid. The limitations of independent claim 17 parallel those of independent claim 13 and the parallel limitations are discussed together in the analysis below.

A. Hon Anticipates Independent Claims 13 and 17

Hon discloses every element recited in claims 13 and 17.

[70] *Id.* at pg. 10, ¶ 3 – pg. 11; ¶ 2; Fig 7.
[71] *Id.* at pg. 3. A copy of the data sheet for the PIC10F206 is included as Ex. 1015.
[72] Ex. 1015: pg. 1.

1. Claims 13 and 17 Preambles

"An electronic cigarette comprising"

Hon discloses all elements recited in these preambles, to the extent either limits the claims.

Hon disclose that "[t]he purpose of this invention is to provide an electronic cigarette that substitutes for real cigarettes and helps smokers to quit smoking."[73] Hon teaches "a battery assembly, an atomizer assembly and a cigarette bottle assembly" where "the battery assembly connects with one end of the atomizer assembly, and the cigarette bottle assembly is inserted into the other end of the atomizer assembly, thus forming one cigarette type or cigar type body."[74]

2. Claim Elements 13.1 and 17.1

"a tubular electronic inhaler."

"Tubular" has been construed by the parties to mean "a hollow length of material having substantially parallel sides defining an open space."[75] "Electronic inhaler" has been construed by the parties to mean "a tubular housing comprising one or more electrical components and one or more holes to allow airflow." [76] As shown in annotated Figure 5B Hon teaches a tubular inhaler with a fine hole (501) and "a sensor

[73] Ex. 1007: col. 1, ll. 42-43.
[74] *Id.* at col. 1, ll. 46 – 51.
[75] Ex. 1006: pg. 2.
[76] *Id.*

(207)".[77]

3. Claim Elements 13.2 and 17.2

(a) Claim Element 13.2

"a tubular electronic atomizer."

"Tubular" has been previously discussed[78] and "electronic atomizer" is construed by the parties to mean "a device that converts a solution of a liquid form through vaporization or atomization to a gas form, using electric current."[79]

Hon teaches an "atomizer assembly includes an internal thread electrode (302), air-liquid separator (303), atomizer (307) and a secondary shell (306). One end of the secondary shell (306) is inserted into the cigarette bottle 35 assembly for connection, while the other end has an internal thread electrode (302), in which there is the secondary negative pressure cavity (301). The air-liquid separator (303) and the atomizer (307) are connected with the internal thread electrode (302) successively."[80]

Annotated Figure 5B of Hon includes a lithium ion battery (203) that electrifies the heating body (305) inside the atomizer (307).[81] As "air enters through the air intake hole (502), [air] passes through the run-through hole on the air-liquid separator (303) and helps to form air-liquid mixture in the spray nozzle (304) of the atomizer (307).

[77] Ex. 1007: col. 3, ll. 61 – 66.
[78] *See* Section V.A.2
[79] Ex. 1006: pg. 2.
[80] Ex. 1007: col. 3, ll. 32 – 34.
[81] *Id.* at col. 4, ll. 2 – 4.

The air-liquid mixture sprays onto the heating body (305), gets vaporized, and is quickly absorbed into the airflow and condensed into aerosol, which passes through the air intake hole (503) and suction nozzle (403) to form white mist type aerosol."[82]

(b) Claim Element 17.2

> "a tubular electronic atomizer that is detachably attached to the electronic inhaler."

Hon teaches a tubular electronic atomizer.[83] Hon further teaches the atomizer is detachably attached to the electronic inhaler where "the secondary shell (306)" of the atomizer assembly "is inserted into the cigarette bottle for connection, while the other end has an internal thread electrode (302)." "The air-liquid separator (303) and the atomizer (309) are connected with the internal thread electrode (302) successively."[84]

4. Claim Elements 13.3 and 17.3

> "wherein the electronic inhaler includes an electric power source that provides an electric current to the electronic atomizer,"

Power source is construed by the parties to me a rechargeable or non-rechargeable battery.[85] Hon discloses a "lithium ion battery (203)" that "electrifies the heating body (305) inside the atomizer (307) through MOSFET electric circuit board (205) as well as the internal and external thread electrodes (302, 209), so that

[82] *Id.* at col. 4, ll. 9 – 17.
[83] *See* Section V.A.3(a).
[84] Ex. 1007: col. 3, ll. 34 – 40.
[85] Ex. 1006: pg. 2.

the heating body (305) inside the atomizer (307) produces heat."[86]

5. Claim Element 13.4

> "the electronic cigarette further comprising an electric airflow sensor that is used to turn on and off the electric power source by way of detecting an airflow and"

"Electric airflow sensor" is construed as "an electric sensor to detect air movement generated by a user's inhaling or puffing act."[87] "Detecting an airflow" is construed as "determining that a user is inducing airflow into or out of the device."[88] Hon teaches a sensor (207) that is located on a MOSFET electric circuit board (205). Between a primary screwthread electrode (209) and sensor (207) is a silica gel corrugated membrane (208), on which there is the primary negative pressure cavity (210). The sensor (207) is connected with the silica gel corrugated membrane (208) through the switch spring (212).[89]

When a user slightly sucks the suction nozzle (403) a negative pressure forms on the silica gel corrugated membrane" and under the action of such pressure difference, the silica gel corrugated membrane distorts to drive the switch spring and sensor (207); thus invoking the MCU (206) and MOSFET electric circuit board (205). User suction at the nozzle creates a negative pressure on the corrugated membrane and the sensor then closes the circuit with the MCU and MOSFET causing the battery to

[86] Ex. 1007: col. 4, ll. 2 – 6.
[87] Ex. 1006: pg. 2.
[88] *Id.*
[89] Ex. 1007: col. 3, ll. 14 – 20.

electrify the heating body inside the atomizer through the electric circuit board as the thread electrodes.[90]

6. Claim Element 17.4

"wherein the tubular electronic atomizer includes a container and media within the container,"

Annotated Figures 3 and 4 of Hon show a "cigarette bottle assembly includes the cigarette liquid bottle (401), fiber (402) and suction nozzle (403). The fiber (402) containing cigarette liquid is located on 50 one end of the cigarette liquid bottle (401), and this end is inserted into the secondary shell (306) and lies against [and within] the atomizer (307). The suction nozzle (403) is located on the other end of the cigarette liquid bottle (401). Between the fiber (402) and interior wall of the cigarette liquid bottle (401) is an air intake hole (503)."[91]

Fiber (402) is a "media" that is within a container included in the electronic atomizer (307).[92]

Hon shows the cigarette assembly in a disassembled manner where fiber (402) is located within a container. Once the cigarette assembly is inserted into the secondary shell (306), liquid bottle (401) is a "container" and fiber (402) is a "media" which is included in atomizer (307).[93]

[90] *Id*. at col. 5, ll. 8 – 20.
[91] *Id.* at col. 3, ll. 48 – 56.
[92] *Id.*
[93] *Id.*

7. Claim Element 13.5

"sending a signal to a Single Chip Micyoco,"

"Single Chip Micyoco" is construed by the parties to mean "a microcontroller including a processor, software instructions to be executed by the processor, memory, and I/O processed by the processor."[94] Hon teaches an MCU (206) added between MOSFET electric circuit board (205) and the sensor (207).[95] Hon further explains the role of the MCU (206) and how it receives a pressure signal and responds appropriately to control atomization.[96] Hon also teaches the "electric airflow sensor" (from claim element 13.4) sending a signal to a Single Chip Micyoco.[97] A user's suction implicates the sensor, the MCU (206) scans the sensor (207) and according to the signal parameters of the sensor (207), sends a signal to MCU (206) and MOSFET electric circuit board (205).[98]

8. Claim Element 17.5

"the media is soaked with a solution to be atomized,"

Hone teaches a fiber (402) that is inside a cigarette liquid bottle (401) and contains a liquid.[99] Hon further teaches that when air enters through the air intake hole (502), the passes through the run-through hole on the air-liquid separator (303), and

[94] Ex. 1006: pg. 2.
[95] Ex. 1007: col. 4, l. 62 – col. 5, l. 42.
[96] *Id.*
[97] *Id.*
[98] *Id.* at col. 5, ll. 14, and 32 – 34.
[99] *Id.* at col. 4, ll. 6 – 8.

helps to form air-liquid mixture in the spray nozzle (304) of the atomizer (307). The air-liquid mixture sprays onto a heating body (305), gets vaporized, and is absorbed into the airflow and condensed into aerosol, which passes through the air intake hole (503) and suction nozzle (403) to form white mist type aerosol.[100]

9. Claim Element 13.6

> "wherein the Single Chip Micyoco receives the signal from the electric airflow sensor, instructs the electric power source to send an electric current to the electronic atomizer, and a time period and a magnitude of the electric current."

Hon teaches a MCU and a MOSFET receiving a signal from an airflow sensor.[101]

"Time period and a magnitude of the electric current" is construed as "the duration of time and the strength of the current is provided to the heating element."[102] Hon teaches a microcontroller (the Single Chip Micyoco) instructing the electric power source (battery) to send an electric current to the electronic atomizer when, as Hon teaches, under the action of a user's suction a switch spring (212) is distorted and the sensor (207) invokes MCU (206) and MOSFET electric circuit board (205). The indicators (202) are lit gradually, and the lithium ion battery (203) electrifies the heating body (305) inside the atomizer (307) and sends an electric current to the electronic atomizer through MOSFET electric circuit board (205) as well as the internal and external thread electrodes (302, 209), so that the heating body (305) inside the atomizer (307) produces

[100] *Id.* at col. 4, ll. 9 – 18.
[101] *See* Section V.A.5.
[102] Ex. 1006: pg. 1.

heat.[103]

Hon teaches instructing "the electric power source to send … to the electronic atomizer … a time period and a magnitude of the electric current" when, disclosing that "the action of suction evokes the sensor, MCU (206) scans the sensor (207) and according to the signal parameters the sensor (207), restricts the atomizing capacity with the integral function of frequency to single operation time." Hon also discloses that MCU (206) accomplishes a pulse width modulation which requires sending the duration of time and the strength (magnitude) of the current that provided to the heating element.[104] "When suction stops, the switch spring (212) and sensor (207) are reset; the atomizer (307) stops working; the indicators (202) gradually die down. When the operation times reaches the pre-set value, the atomizer (307) provides a work delay of 5-20 seconds per time."[105]

10. Claim element 17.6

"wherein the tubular electronic atomizer includes an exterior wall having an air-puffing hole formed therethrough,"

"Air puffing hole" is construed by the parties as a "hole through which air can be drawn by a user."[106] Hon teaches the atomizer having an exterior wall with air puffing hole (403) through which air can be drawn.[107]

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[103] Ex. 1007: col. 3, l. 57 – col. 4, l. 18.
[104] Ex. 1004 ¶ 41: *see also* Ex. 1007: col. 5, l. 33 – 41.
[105] Ex. 1007: col. 4, ll. 20 – 23.
[106] Ex. 1006: pg. 3.
[107] See Figure 3, *supra*; *see also* Ex. 1007: col. 3, ll. 7 and 12.

11. Claim element 17.7

"wherein the liquid container includes a container wall, there being a chamber disposed between the exterior wall and the container wall,"

Hon teaches a liquid container (liquid bottle (401) that includes a container wall with a chamber disposed between the exterior wall and the container wall. Annotated Figure 4 above shows a liquid bottle (401) and fiber (402) or chamber disposed in between the exterior wall of the atomizer (307) and the liquid container wall.[108]

12. Claim Element 17.8

"wherein the tubular electronic atomizer includes a tube extending from the air-puffing hole and into the chamber, and"

Hon teaches a tube extending from air puffing hole (403) in the chamber when Hon discloses a chamber defined by the liquid bottle (401), body (306) and filter (402).[109] Figure 5B shows that air is drawn into air intake hole (502) through air liquid separator (503) and atomizer (307), converted into aerosol and ultimately through suction nozzle (403).[110]

13. Claim element 17.9

"wherein the tubular electronic inhaler includes an electric airflow sensor configured to turn on and off the electric power source by way of detecting an airflow,"

As discussed above in connection with claim element 13.4 Hon teaches the

[108] Ex. 1007: col. 4, ll. 49 – 51; col 5, ll. 1, 20 – 25.
[109] *Id.* at col. 3, ll. 8, 18 and 61 – 64.
[110] *Id.* at col. 5, ll. 23 – 31.

inhaler includes an airflow sensor (sensor (207) configured to turn on and off the electric power source (battery (203)) by way of detecting an airflow.[111] Hon teaches that sensor (207) can be a switch sensor made of elastic alloy slice, Hall element of linear output, semiconductor force-sensitive chip, semiconductor matrix thermoelectric bridge chip, capacitance or inductance sensor.[112]

14. Claim element 17.10

"and the airflow sensor is a diaphragm microphone."

"Diaphragm microphone" is construed by the parties to mean "a device for converting pressure waves into electrical energy using a thin sheet of material that is capable of vibrating."[113] Hon teaches the device for converting pressure waves into electrical energy when Hon discloses the silica gel corrugated membrane (208) on which there is the primary negative pressure cavity (210). The sensor (207) is connected with the silica gel corrugated membrane (208) through the switch spring (212).[114]

Hon also discloses an airflow sensor (207) with a flexible membrane or diaphragm (208) and an electronic connector (209) (not shown in Fig. 5B, but shown in Fig. 2A).[115] Hon makes it clear that in addition to the airflow sensor being electric,

[111] *See.* Section V.A.5.
[112] *Id.* at col. 5, ll. 21 – 24.
[113] Ex. 1006: pg. 2.
[114] Ex. 1007: col. 3, ll. 5 – 6 and 17 – 20.
[115] *Id.* at col. 3, ll. 4 – 24; col. 4, l. 65; col 5, l. 15.

it may be implemented utilizing a variety of known technologies, including specifically using a capacitance or inductance sensor.[116] A POSITA would have immediately understood a "diaphragm microphone" to be an object that has a diaphragm that moves responsive to air movement or sounds waves, and that causes a signal to be generated a result of that motion.[117] A POSITA would also have understood that a common implementation of such a diaphragm microphone would involve issuing an electrical signal that the diaphragm movements generates by varying capacitance, inductance or voltage.[118] Thus, a POSITA would have seen the diaphragm of the electronic sensor of Hon causing a capacitance, inductance or voltage generated signal to be issued from the sensor to which it was coupled in response to air movement or sound waves, which is, by definition, a diaphragm microphone.[119]

B. Hon Anticipates Dependent Claims 14, 15, and 18

1. Dependent Claim 14

"The electronic cigarette of claim 13, wherein the electric airflow sensor is a diaphragm microphone."

Hon teaches the sensor as a diaphragm microphone as discussed above in connection with claim element 17.10.[120]

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[116] *Id.* at col. 3, ll. 21 – 24.
117 Ex. 1004: ¶ 74.
[118] *Id.*
[119] *Id.*
[120] *See* Section V.A.14.

2. Dependent Claim 15

(a) The Preamble of Dependent Claim 15

"The electronic cigarette of claim 13, further comprising"

Hon discloses that "[t]he purpose of this invention is to provide an electronic cigarette that substitutes for real cigarettes and helps smokers to quit smoking."[121]

(b) Dependent Claim Element 15.1

"further comprising an LED indicator inside the electronic inhaler

"LED indicator" is construed by the parties to mean "a light emitting diode that lights up when the electric current flows and it is turned off when the electric current stops flowing."[122] Hon teaches an LED indicator (LED (202)) that is connected to the Single Chip Micyoco (microcontroller or MOSFET (205)) and the electric power source (battery (203)).[123]

(c) Dependent Claim Element 15.2

"wherein the LED indicator is connected to the Single Chip Micyoco and the electric power source"[124]

Hon teaches that the on time of the LED indicator is controlled by the Single Chip Micyoco when Hon discloses that under the action of a suction pressure difference, this distorts to drive the switch spring (212) and sensor (207), thus invoking

[121] Ex. 1007: col. 1, ll. 42-43.
[122] Ex. 1006: pg. 2.
[123] Ex. 1007: col. 3, ll. 24 – 25.
[124] Ex. 1001: col. 8, ll. 6 – 7.

MOSFET electric circuit board (205). [125]

(d) Dependent Claim Element 15.3

"and wherein the on time of the LED indicator is controlled by the Single Chip Micyoco"

Hon further teaches that "at this moment, the indicators the indicators (202) are lit gradually."[126] Hon teaches that under the action of suction the indicators (202) are lit gradually[127] and "when suction stops, the switch spring (212) and sensor (207) are reset; the atomizer (307) stops working; the indicators (202) gradually die down."[128] As such the LED indicator (202) is controlled by the MCU.[129]

3. Dependent Claim 18

(a) Claim 18 Preamble

"The electronic cigarette of claim 17,"

Hon teaches an electronic cigarette as discussed above.[130]

(b) Claim Element 18. 1

"wherein the tubular electronic atomizer includes, in sequence, an electric connector, a leak-proof piece, a supporting piece, a heat equalizer coupled with an electric heating wire, the container filled with the media, and the air-puffing hole"

Hon teaches each of the elements disclosed below being present in the same

[125] Ex. 1007: col. 4, ll. 1 – 2; Ex. 1004 ¶ 80.
[126] *Id.* at col. 4, ll. 1 – 2.
[127] *Id.* at col. 5, ll. 14 – 16.
[128] *Id.* at ll. 20 – 21.
[129] Ex. 1004 ¶ 81
[130] *See* Section V.A.1.

sequence in the electronic inhaler as in claim 18. Hon discloses an electronic atomizer having an electronic connector (302).[131]

Hon also discloses an electronic atomizer having a leak-proof piece (element (303) – air-liquid separator)[132] and a supporting piece (306) where the atomizer (307) lies against, and is supported by, secondary shell (306).[133] Hon further discloses an electronic atomizer having a heat equalizer (atomizer 307) coupled with an electric heating wire (305).[134] Hon also discloses an electronic atomizer having a container (401) and media within the container soaked with a solution to be atomized (402).[135] Hon also discloses an electronic atomizer having an air-puffing hole where the mouthpiece has a hole through which air enters at the right end of Figure 4.[136]

[131] Ex. 1007: col. 4, ll. 1 – 5; Ex. 1004: ¶ 307
[132] Ex. 1007: col. 3, l. 38; Ex. 1004: ¶ 307
[133] Ex. 1007: col. 3. ll. 51 – 53; Ex. 1004: ¶ 310
[134] Ex. 1007: col 1, ll. 57 – 60; col. 4, ll.12 – 14.
[135] *Id.* at col. 4, ll. 39 – 43.
[136] *Id.*

VI. GROUND 2 - CLAIMS 13 – 15 ARE UNPATENTABLE AS BEING ANTICIPATED BY COX

Cox anticipates claims 13 – 15 and renders them invalid.

A. Cox Anticipates Independent Claim 13

Cox discloses every element recited in claim 13.

1. Claim 13 Preamble

"An electronic cigarette comprising…"

Cox is directed to an electronic cigarette[137] Cox explicitly incorporates by reference Fleischhauer WO 98/17131, noting that it discloses a power controller and method of operating an electrical smoking system.[138] Thus, Cox is directed to, and discloses, an electronic cigarette.

2. Claim Element 13.1

"a tubular electronic inhaler."

"Tubular" has been previously discussed.[139] "Electronic inhaler" has been construed by the parties to mean "a tubular housing comprising one or more electrical components and one or more holes to allow airflow."[140] Cox discloses a "second component" (item (25) of Figs. 1 and 3) that is an electronic inhaler (it includes a source of power, for example, and a control device such as a microchip for controlling

[137] Ex. 1008: cover.
[138] *Id.* at col. 4, ll. 18 – 24.
[139] *See* Section V.A.3.
[140] *Id.*

the power).[141] The entire device is disclosed as tubular, so consequently, the "second component" (25) (electronic inhaler) of the device is also tubular. Cox discloses that the inhaler can be in an end-to-end location relative to the first device.[142]

3. Claim Element 13.2

"A tubular electronic atomizer."

Tubular and electronic atomizer have been previously discussed.[143]

Cox discloses a first component (Figs. 1 & 3 item (23)) that is a tubular electronic atomizer. As noted above, the entire device (which includes elements (23) and (25)) is disclosed as being tubular.[144] Cox discloses the atomizer as including a heater (item (33) of Figs. 1 & 3) (the atomizer), and as being electronic (the heater is powered by an electronic power supply, and is therefore itself electronic).[145]

4. Claim Element 13.3

"wherein the electronic inhaler includes an electric power source that provides an electric current to the electronic atomizer,"

Power source is construed by the parties to mean a rechargeable or non-rechargeable battery.[146] Cox teaches that the inhaler (25) includes a power source 41

[141] Ex. 1008: col. 4, ll. 30 – 35.
[142] *Id.* at col. 3, ll. 55 – 60.
[143] *See* Section V.A.2 and 3.
[144] Ex. 1008: abstract.
[145] *Id.* at 3, ll. 60 – col. 4, l. 9; col. 3, ll. 25 – 38.
[146] Ex. 1006: pg. 2.

that provides power to heater (electronic atomizer) (33)).[147] A POSITA would recognize that because the electric power source supplies power, it necessarily supplies current.[148]

5. Claim Element 13.4

> "the electronic cigarette further comprising an electric airflow sensor that is used to turn on and off the electric power source by way of detecting an airflow and "

"Electric airflow sensor" and detecting an airflow" have been previously discussed.[149] Cox teaches that the electronic cigarette includes an electric airflow sensor (air flow detecting device (51)).[150] The airflow sensor (51) is used to turn on and off the electric power source (41) by way of detecting an airflow and sending a single to a Single Chip Micyoco (control device (43)).[151] More specifically, Cox teaches that control device (43) is a microchip, and that it is a single chip when it discloses that "to the extent that the other components of the aerosol generator (21) disclosed in the present application are subject to production as microelectronic devices, they may also be formed on a single chip."[152] The control device (43) is also disclosed as having a timer for controlling a frequency with which it controls the power

[147] Ex. 1008: col. 4, ll. 10 – 18.
[148] Ex. 1004: ¶ 104.
[149] *See* Section V.A.5.
[150] Ex. 1008: col. 5, ll. 50 – 60; col. 6, ll. 32 – 35.
[151] *Id.* at col. 5, ll. 52 – 60.
[152] *Id.* at col. 4, ll. 12 – 14; col. 4, ll. 55 – 61.

supply (41) to supply power to the heater (33) and other components.[153]

6. Claim Element 13.5

"sending a signal to a Single Chip Micyoco,"

Single Chip Micyoco has been previously construed and discussed.[154] Cox discloses a control device (43) as receiving input signals from airflow detecting device (51) and sending a signal to control device (43).[155] Control device (43) is also disclosed as being programmable.[156]

7. Claim Element 13.6

"wherein the Single Chip Micyoco receives the signal from the electric airflow sensor, instructs the electric power source to send an electric current to the electronic atomizer, and a time period and a magnitude of the electric current."

Cox teaches microcontroller (43) receiving a signal from the electric airflow sensor (51), and then instructing the electric power source (41) to provide power to the electronic atomizer (heater (33)).[157] By providing power to the electronic atomizer, current is provided to the electronic atomizer.[158] The control signal provided by the microcontroller (43) includes a pre-determined magnitude and duration as determined by the programming of the microcontroller.[159] A POSITA would recognize that in order to drive an output signal on the microcontroller to control the heater and/or power

[153] *Id.* at 6, ll. 60 – 66.
[154] *See* Section V.A.7.
[155] Ex. 1008: col at 6, ll. 32 – 33.
[156] *Id.* at col. 6, ll. 32 – 33.
[157] *Id.* at col. 5, ll. 42 – 61.
[158] Ex. 1004: ¶ 71.
[159] *Id.*

supply, the programmer of the microcontroller would have to program the device to load certain values in the configuration registers of the microcontroller telling a specific output pin of the microcontroller to provide an output, the type of output (voltage high, low, or intermediate level), and the duration of time that the output is to be provided at that pin.[160] Furthermore, a POSITA would recognize that the output provided would have a predetermined magnitude and duration.[161]

B. Cox Anticipates Dependent Claims 14 and 15

1. Dependent Claim 14

(a) The Preamble of Dependent Claim 14

As discussed above, Cox teaches each and every element of claim 13.

(b) Dependent Claim Element 14.1

"wherein the electric airflow sensor is a diaphragm microphone."

Cox teaches an electric airflow sensor (51).[162] Cox also teaches that this device may be (alternatively) a pressure detecting device, and specifically cites the Honeywell SLP004D 0-4 product.[163] SLP004D 0-4 is disclosed as being designed to detect changes in air pressure.[164] The device includes a diaphragm that moves responsive to changes in pressure on either side of the diaphragm, and issues a signal to devices

[160] *Id.*
[161] *Id.*
[162] *See* Section VI.A.7.
[163] Ex. 1008: col. 6, ll. 32 – 58.
[164] Ex. 1014: pg. 3 – 4.

connected to the SLP004D 0-4 corresponding to the movement of the diaphragm.[165] The diaphragm is connected to a Wheatstone Bridge, the output of which is the output signal of the SLP004D 0-4166. An output is provided at the V+ and V- output pins, and varies based on the movement of the diaphragm.[167] Such a configuration of a diaphragm microphone is specifically disclosed in the Exhibit 1016 ("Diaphragm Silicon Microphone").[168] Diaphragm Silicon Microphone discloses the diaphragm microphone as having a diaphragm, and the diaphragm being connect to four resistors in a "Wheatstone bridge."[169] Thus, Cox specifically teaches the airflow sensor being a diaphragm microphone.

2. Dependent Claim 15

(a) The Preamble of Dependent Claim 15

"The electronic cigarette of claim 13, further comprising"

Cox is directed to an electronic cigarette."[170]

(b) Dependent Claim Element 15.1

"further comprising an LED indicator inside the electronic inhaler"

"An LED indicator" has been previously discussed.[171] Cox discloses an indicator

[165] *Id.*
166 Ex. 1014: pg. 3-4
[167] *Id.*
[168] Ex. 1016: pg. 3
[169] *Id.* at pg. 2.
[170] Ex. 1008: cover.
[171] *See* Section V.B.2 .

light (element (63)(Fig. 1) located inside the electronic inhaler (25).[172]

(c) Dependent Claim Element 15.2

> "wherein the LED indicator is connected to the Single Chip Micyoco and the electric power source"

Cox teaches that the LED is connected to the microcontroller (43) and electric power source (41). The light is connected to timer (59) of microcontroller (43) where the light is connected to power source (41). [173] Indicator (2) is shown connected to control device (43) and power source (41).[174]

(d) Dependent Claim Element 15.3

> "and wherein the on time of the LED indicator is controlled by the Single Chip Micyoco"

Cox teaches the on time of the LED being controlled by the microcontroller (43) and the light is specifically disclosed as being associated with timer (59) of microcontroller (43), and discloses the microcontroller (43) controlling power to the LED, therefore controlling if and for how long the LED is on.[175]

[172] Ex. 1008: col. 7, ll. 30 – 34; col. 7, ll. 40 – 46.
[173] Ex. 1008: col. 3, ll. 63 – 66; col. 7, ll. 30 – 36.
[174] *Id.*
[175] *Id.* at col. 7, ll.31 – 43.

VII. GROUND 3 – CLAIM 16 IS UNPATENTABLE OVER COX IN VIEW OF HON

A. Independent Claim 16

1. Claim 16 Preamble

"An electronic cigarette comprising"

Cox discloses an electronic cigarette as discussed above in connection with claim 13.[176]

2. Claim Element 16.1

"a tubular electronic inhaler."

Cox discloses a "second component" (item (25) of Figures 1 and 3) that is an electronic inhaler (it includes a source of power, for example, and a control device such as a microchip for controlling the power).[177] The entire device is tubular and the "second component" (25) (electronic inhaler) of the device is also tubular.[178] Cox discloses that the inhaler can be in an end-to-end location relative to the first device.[179]

3. Claim Element 16.2

"a tubular electronic atomizer"

"Tubular" and "electronic atomizer" have been previously construed.[180] Cox

[176] *See* Section V.A. 1.
[177] Ex. 1008: col. 4, ll. 30 – 35.
[178] *Id.* at abstract.
[179] *Id.* at col. 3, ll. 55 – 60.
[180] *See* Section V.A.5. 2 and 3.

discloses a tubular electronic atomizer (heater/atomizer) (33).[181]

4. Claim Element 16.3

> "wherein the electronic inhaler includes an electric power source that provides an electric current to the electronic atomizer"

Cox teaches an inhaler (25) that includes a power source (41) that provides power to heater (electronic atomizer)(33).[182] A POSITA would recognize that because the electric power source supplies power, it necessarily supplies current.[183]

5. Claim Element 16.4

> "wherein the electronic inhaler includes, sequentially from a first end of the electronic inhaler to the second end, a cigarette cap, an LED indicator, the electric power source, an electric airflow sensor, a circuit board for a Single Chip Micyoco, and a first electric connector."

"Cigarette cap" has been construed by the parties to mean cap with holes attached to the device.[184] "An LED indicator" has been previously discussed.[185] The electric power source and the electric airflow sensor have been previously discussed.[186] A "circuit board" is construed by the parties to mean "a board on which electronic components are mounted circuit."[187] An "electric connector" is construed by the parties to mean "a conductive connector."[188]

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[181] Ex. 1008: col. 4, ll.10 – 18.
[182] *Id.* at col. 4, ll. 10 – 18.
[183] Ex. 1004: ¶ 104.
[184] Ex. 1006: pg. 2.
[185] *See* Section V.B.2.
[186] *See* Section V.A.4 and 5.
[187] Ex. 1006: pg. 3.
[188] *Id.*

Cox teaches that both the location of individual components in the inhaler or atomizer is not material to the functioning of the device, and discloses, therefore, the components being located in either device, and in any sequence.[189] Cox discloses that the different features (components) of the aerosol generator (21) (electronic cigarette) "can be provided on whichever one of the components (23) and (25) seems appropriate for a particular application."[190] Thus, the components may be in either component (23) and (25) in any order.

Annotated Figure 5B Hon teaches and every element of claim 16 including a cigarette cap (201).[191] In Hon the airflow sensor and the circuit board are reversed relative to the sequence of '622 Patent claim element 16.4.[192]

Cox teaches that the ordering of the elements within the electronic cigarette does not change function of the device.[193] During prosecution the patentee argued that the order of two of the components, specifically heating wire and fluid, in a cited reference was reversed relative to the sequence in the '622 Patent.[194] Patentee further argued that if these two components were reversed, it would yield unpredictable results, because it would allegedly be inconsistent with the airflow direction in the other combined reference.[195] However these two elements as argued by the patentee

[189] Ex. 1008: col. 10, l. 59 – col. 11, l. 13; Ex. 1004: ¶ 121.
[190] Ex. 1008: col. 11, ll. 5 – 12.
[191] *See* Introduction, *supra.*
[192] *Id.*
[193] Ex. 1008: col. 10, l. 59 – col. 11, l. 13; Ex. 1004: ¶ 121.
[194] Ex. 1003: Amendment dated Mar. 2, 2012, pg. 11.
[195] *Id*.

are different in nature, in that the size of the MCU (206) and its associated circuit board are small enough (see Fig. 2B – the elements do not extend to the edge of the cylinder wall, and in fact are even smaller than the MOSFET circuit board, which itself does not extend to the cylinder wall) such that even if moved to the right of sensor (207), they would still permit airflow.[196] This is true whether the MCU (206) and circuit board are simply located to the right of sensor (207), or if they are moved to the right of diaphragm (208).

The combination of Cox and Hon teach that a device with the same elements, even if out of order electrically is equivalent to the device as taught in the '622 Patent. A POSITA would recognize that juxtaposing the positions of the electric airflow sensor and the circuit board for the microcontroller do not change the function of the combination of Cox and Hon and these features could be rearranged as desired.[197] Thus the combination of Cox and Hon constitute a device that is equivalent to claimed sequence of claim 16 in the '622 Patent. It would have been obvious for a POSITA to combine Cox and Hon to sequentially list the elements that are disclosed.[198]

[196] Ex. 1004: ¶ 130.
[197] *Id.* at ¶ 123.
[198] *Id.*

VIII. GROUND 4 – CLAIMS 16, 17 AND 18 ARE UNPATENTABLE OVER COX AND IN VIEW OF ZHU

A. Independent Claim 16

1. Claim 16 Preamble

"An electronic cigarette comprising"

Cox discloses that an electronic cigarette as discussed above in connection with claim 13.[199]

Zhu also teaches an electronic cigarette ("non-combusted mist electronic cigarette").[200]

2. Claim Element 16.1

"a tubular electronic inhaler."

"Tubular" and "electronic inhaler" have been previously discussed.[201]

Cox discloses a "second component" (item (25) of Figs. 1 and 3) that is an electronic inhaler (it includes a source of power, for example, and a control device such as a microchip for controlling the power).[202] The entire device is disclosed as tubular (see Abstract), so consequently, the "second component" (25) (electronic inhaler) of the device is also tubular.[203] Cox discloses that the inhaler can be in an end-to-end

[199] *See* Section V.A. 1.
[200] Ex. 1009: pg. 5, ¶ 2.
[201] *See* Section V.A.2.
[202] Ex. 1008: col. 4, ll. 30 – 35.
[203] *Id.*

location relative to the first device.[204]

Zhu discloses an inhaler portion (the "controller") that is tubular and electronic including components such as a power supply and integrated circuit board.[205] Figure 1 of Zhu discloses that controller (100) is tubular.[206]

3. Claim Element 16.2

"a tubular electronic atomizer"

"Tubular" and "electronic atomizer" have been previously discussed.[207]

As discussed above, Cox teaches a "tubular electronic atomizer."[208]

Zhu discloses a tubular electronic atomizer (referred to as generator (200), which includes a heater (electronic atomizer).[209] Figure 1 of Zhu shows generator (200) as being tubular.[210]

Zhu teaches an electronic inhaler (controller (100) of Figure 1) that is detachably attached to an electronic atomizer (generator (200) of Figure 1). Figure 1 shows the two components detached, while Figure 2 of Zhu shows two components attached. Zhu further discloses two components being connected by a threaded

[204] *Id.* at col. 3, ll. 55 – 60.
[205] Ex. 1009: pg. 5, ¶ 2.
[206] *Id.*
[207] *See* Section V, A.2 and 3.
[208] *See* Section VI, A.3.
[209] Ex. 1009: pg. 5, ¶ 2.
[210] *Id.; see also, id.* at Fig 1.

connector (conducting connector (6)).[211]

4. Claim Element 16.3

> "wherein the electronic inhaler includes an electric power source that provides an electric current to the electronic atomizer,"

Power source has been discussed previously.[212] Figures 1 and 3 of Cox show that the inhaler (25) includes a power source (41) that provides power to heater (electronic atomizer) (33).[213] Zhu discloses an inhaler (controller (100)) and a power source (battery (2)) that provides power to the electronic atomizer.[214] A POSITA would recognize that because the electric power source supplies power, it necessarily supplies current.[215]

5. Claim Element 16.4

> "wherein the electronic inhaler includes, sequentially from a first end of the electronic inhaler to the second end, a cigarette cap, an LED indicator, the electric power source, an electric airflow sensor, a circuit board for a Single Chip Micyoco, and a first electric connector."

"Cigarette cap" has been previously discussed.[216] "An LED indicator" has been previously discussed.[217] The electric power source and the electric airflow sensor have been previously discussed.[218] A "circuit board" is construed as "a board on

[211] *Id.* at pg. 6, ¶ 3, and Fig. 1.
[212] *See* Section V.A.5.
[213] Ex. 1008: col. 4, ll. 10 – 18.
[214] Ex. 1009: pg. 7
[215] Ex. 1004: ¶ 104.
[216] *See* Section VII.A.5.
[217] *See* Section V.B.2.
[218] *See* Section VI.A.5.

which electronic components are mounted circuit."[219] "Single Chip Micyoco" is construed as "a microcontroller including a processor, software instructions to be executed by the processor, memory, and I/O processed by the processor."[220] An "electric connector" is construed as "a conductive connector."[221]

Cox teaches the electronic inhaler includes an LED indicator(63), the electric power source (41), a circuit board for a Single Chip Micyoco (43), and a first electric connector."[222] Cox teaches an electric airflow sensor (51) also present in the electronic cigarette, although not explicitly in the inhaler portion.[223]

Zhu discloses controller (100) of Figure 1 (electronic inhaler) having a cigarette cap (element (14) of Figure 1) and an LED (1)[224] and a power supply (battery (2)).[225]

Zhu discloses an airflow sensor having elements (401), (403), (404), (405), and (406).[226] Zhu discloses element (401) as being an elastic ring that moves responsive to negative pressure created adjacent to it by airflow of a user inhaling on the device (a diaphragm that moves as a result of airflow). Zhu also discloses the sensor as being electronic at least in that it includes contact piece (404) and piece

[219] Ex. 1006: pg. 3.
[220] *Id.* at pg. 2.
[221] *Id.* at pg. 3.
[222] Ex. 1008: col. 8, ll. 12 – 18.
[223] *Id.* at: col. 5, ll. 50 – 60; col. 6, ll. 32 – 35.
[224] Ex. 1009: pg. 7, ¶ 6.
[225] *Id.*
[226] *Id.* at pg. 8, ¶ 3.

(403) that is connected to the integrated circuit board (3).[227] Figure 7 of Zhu shows airflow sensor switch S1 electrically coupled to microcontroller IC1 (a "Micyoco").[228]

Zhu discloses an integrated circuit board (element (3) of Figure 1) for a "Micyoco" (designated IC1) in the inhaler (controller (100)) and that the microcontroller is located on the circuit board (3).[229]

Zhu discloses the inhaler (controller 100) having a first electric connector (element (6), "connecting connector").[230]

As discussed above, Cox discloses that the location of individual components in the inhaler or atomizer is not material to the functioning of the device, and also discloses the components being located in either device.[231]

Moreover, Cox discloses that the ordering of the elements within the electronic cigarette does not change the function of the device. Zhu discloses that each of the elements disclosed the elements discussed above are present in the electronic inhaler, and in the same order as claim 16, with the exception of the electric airflow sensor and circuit board for the microcontroller.[232] With respect to the specific sequencing of the elements in Zhu, a POSITA would recognize that the function of the device is

[227] *Id.* at pg. 8, ¶¶ 2 and 3.
[228] *Id.* at Fig. 7.
[229] *Id.* at pg. 10, ¶ 3.
[230] *Id.* at pg. 7, ¶ 6.
[231] *See* Section 7.A.5.
[232] Ex. 1004: ¶ 141.

equivalent as claimed in the '622 Patent regardless of the order of these specific components. As such the combination Zhu's elements and the teachings of Cox leads to a device that is equivalent to claims of the '622 Patent.

A POSITA would therefore recognize that juxtaposing the positions of the electric airflow sensor and the circuit board for the microcontroller does not change the function of the combination of Cox and Zhu and these features could be arranged as desired.[233] Thus, a combination of Cox and Zhu constitute a device that is equivalent to claimed sequence of claim 16.[234]

It would have been obvious for a POSITA to combine Cox and Zhu to the sequentially list the elements that are disclosed in the references.[235]

B. Independent Claim 17

1. Claims 17 Preamble

"An electronic cigarette comprising,"

For the same reasons set forth above with respect to the Claim 16 Cox discloses an electronic cigarette.[236] Zhu is directed to an electronic cigarette.[237]

2. Claim Element 17.1

"a tubular electronic inhaler and"

[233] *Id.*
[234] *Id.* at ¶ 142.
[235] *Id.*
[236] *See* Section VII.A.2.
[237] *Id.*

For the same reasons set forth above with respect to Claim 16 Cox teaches a tubular electronic inhaler.[238] Zhu teaches an electronic cigarette.[239]

3. Claim Element 17.2

> "a tubular electronic atomizer that is detachably attached to the electronic inhaler,"

As noted above with respect to anticipation of claim element 13.2, Cox discloses a first component (item (23)) that is a tubular electronic atomizer.[240] Cox also discloses that the electronic atomizer is detachably attached to the electronic inhaler.[241] Zhu discloses the electronic cigarette having two parts (referred to as a controller and a generator) that are configured to be removably connected.[242]

4. Claim Element 17.3

> "wherein the electronic inhaler includes an electric power source that provides an electric current to the electronic atomizer,"

As noted above with respect to anticipation of claim element 13.3, Cox teaches Cox teaches that the inhaler (25) includes a power source (41) that provides power to heater (electronic atomizer)(33).[243] A POSITA would recognize that because the electric power source supplies current, it necessarily supplies current.[244]

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[238] *See* Section VII.A.2.
[239] Ex. 1009: abstract.
[240] *See* Section VII.A.3.
[241] Ex. 1008: col. 4, ll. 48 – 51.
[242] Ex. 1009: abstract.
[243] Ex. 1008: col. 4, ll. 10 – 18.
[244] Ex. 1004: ¶ 104.

Zhu discloses the inhaler portion (referred to as the "controller" (100) and a power supply (battery (2) of Fig. 1).[245] The power source (battery (2)) provides power (which by definition is a current and voltage) to the electronic atomizer that is provided to one end of the heater, which is the electronic atomizer.[246] Figures 1 and 2 of Zhu show that heater (9) and battery (2) are electrically connected via connection conductor (6) and that the heating wire connects the power supply to generate heat.[247]

5. Claim Element 17.4

> "wherein the tubular electronic atomizer includes a container and media within the container, the media is soaked with a solution to be atomized,"

Cox teaches element (45) as being a flexible container for containing a "source of material" (element (37) of Figure 1) to be volatilized (atomized).[248] The material to be atomized is understood to include solutions (for example, medicaments in liquid form).[249] The device disclosed in Cox utilizes pressure to deliver the liquid to the heater, and does not require the use of media to improve wicking (delivery) of the liquid to the heater.[250]

Zhu discloses the electronic atomizer (generator (200)) as having a container with liquid storage chamber (12).[251]

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[245] Ex. 1009: Fig. 1.
[246] *Id.* at pg. 7, ¶ 6; pg. 10, ¶ 3.
[247] *Id.* at pg. 10, ¶ 3.
[248] Ex. 1008: col. 4, ll. 62 – 42.
[249] *Id.* at col. 9, ll. 35 – 38.
[250] Ex. 1004: ¶ 162.
[251] Ex. 1009: pg. 9, ¶ 3.

Zhu discloses the container containing a media that is soaked with a solution to be atomized where the liquid storage chamber (12) is a tube with an open end having medicinal cotton fibers that are placed in the middle, and the stock solution of the medicine is filled in.[252]

It would have been obvious to a POSITA to include the media taught by Zhu to promote wicking and improve delivery of the liquid to the heater if they were not to use a pressurized delivery system.[253]

6. Claim element 17.5

"wherein the tubular electronic atomizer includes an exterior wall having an air-puffing hole formed therethrough,"

Figure 1 of Cox shows an electronic atomizer having an exterior wall element (23) in where the exterior wall has an air-puffing hole formed therethrough.[254] Element (53) is an air puffing hole is formed in the atomizer and there is also an open end of mouthpiece section (49) of atomizer (23).[255]

Figure 1 of Zhu shows the electronic atomizer (generator (200)) having an exterior wall having an air-puffing hole formed therethrough on the right end of generator (200).[256]

[252] *Id.*
[253] Ex. 1004: ¶ 162.
[254] Ex. 1008: col. 5, ll. 55 – 58.
[255] *Id.* at col. 5, ll. 42 - 67.
[256] Ex. 1009: pg. 8, ¶ 1.

7. Claim element 17.6

"wherein the liquid container includes a container wall, there being a chamber disposed between the exterior wall and the container wall,"

Figure 1 of Cox shows the liquid container (element (45)) having a wall where the line shown therein designates the container wall of the container (45) and shows chamber (47) between the exterior wall of atomizer (23) and the container wall of container (45).[257]

Figure 6 of Zhu shows the liquid container including a container wall with the wall of liquid container (12) having walls shown in cross-hatching, and a chamber between that wall and the container wall ((1301) of Figure 6).[258] Figure 6 of Zhu teaches airflow through the chamber that exists between the wall of the liquid container (12) and the container wall (1301).[259]

8. Claim Element 17.7

"wherein the tubular electronic atomizer includes a tube extending from the air-puffing hole and into the chamber, and"

Cox discloses the atomizer (23) including a tube (27) having a first and (29) and a second end (31) that extends from the air-puffing hole (53) and into the chamber (47).[260]

Figure 6 of Zhu shows the electronic atomizer has a tube in the center of the

[257] Ex. 1008: col. 5, ll. 19 – 20.
[258] Ex. 1009: Fig. 6.
[259] *Id.*
[260] Ex. 1008: col. 3, ll. 61 – 63.

cylinder that extends from the air-puffing hole in the center of the electronic atomizer cylinder into the chamber discussed above to allow air to flow through the device.[261]

9. Claim element 17.8

> "wherein the tubular electronic inhaler includes an electric airflow sensor configured to turn on and off the electric power source by way of detecting an airflow,"

As discussed above, Cox teaches that the electronic cigarette includes an electric airflow sensor (air flow detecting device (51)).[262] The airflow sensor (51) is used to turn on and off the electric power source (41) by way of detecting an airflow and sending a single to a Single Chip Micyoco (control device (43)).[263] Cox further discloses that the electronic inhaler may be located either in the electronic atomizer (23) or in the electronic inhaler (25).[264]

Zhu discloses an airflow sensor having elements (401), (403), (404), (405), and (406).[265] Zhu discloses element (401) as being an elastic ring that moves responsive to negative pressure created adjacent to it by airflow of a user inhaling on the device (a diaphragm that moves as a result of airflow).[266] Zhu discloses the sensor as being electronic at least in that it includes contact piece (404) and piece (403) that is

[261] Ex. 1009: Fig. 6.
[262] *See* Section V.A.5; Ex. 1008: col. 5, ll. 50 – 60; col. 6, ll. 32 – 35.
[263] Ex. 1008: col. 5, ll.52 – 60.
[264] *Id.* at col. 6, ll.1 – 8.
[265] Ex. 1009: pg. 8, ¶¶ 2 – 3.
[266] *Id.*

connected to the integrated circuit board (3).[267] Figure 7 of Zhu shows an airflow sensor switch S1 electrically coupled to microcontroller IC1 (a "Micyoco").[268] Figures 1 and 2 of Zhu show the airflow sensor controls the real-time heating of heater (9).[269] Zhu discloses that the airflow sensor sends a control signal to the microcontroller.[270] Zhu further teaches that the microcontroller ("IC Control") receives an input signal from the airflow sensor, and controls both the signal indicator (LED) and heater (atomizer) at the same time.[271]

10. Claim element 17.9

"and the airflow sensor is a diaphragm microphone."

As discussed in detail above with respect to claim element 14.1, Cox discloses the electronic airflow sensor being a diaphragm microphone.[272] As noted previously, Cox discloses an electric airflow sensor (51).[273] A POSITA would have immediately understood a "diaphragm microphone" simply to be an object that has a diaphragm that moves responsive to air movement or sounds waves, and that causes a signal to be generated a result of that motion.[274] Thus, in terms of implementation of the sensor disclosed in Cox, a POSITA would have seen the SLP004D 0-4 electronic airflow

[267] *Id.*
[268] *Id.*
[269] *Id.* at pg. 9, ¶ 1.
[270] *Id.* at pg. 10.
[271] *Id.*
[272] *See* Section VI.6.1(b).
[273] *See* Section VI.A.5.
[274] Ex. 1004: ¶ 110.

sensor of Cox as a diaphragm that causes a signal to be generated as a result of motion of its diaphragm, by definition, a diaphragm microphone.[275]

Zhu also teaches a diaphragm microphone.[276] As noted previously, Zhu discloses an airflow sensor having elements (401), (403), (404), (405), and (406).[277] It discloses element (401) as being an elastic ring that moves responsive to negative pressure created adjacent to it by airflow of a user inhaling on the device (a diaphragm that moves as a result of airflow).[278]

A POSITA would have understood a "diaphragm microphone" to be an object that has a diaphragm that moves responsive to air movement or sounds waves, and that causes a signal to be generated a result of that motion.[279] In Zhu, a signal (the closing of switch S1) is generated responsive to air movement (inhalation at the end of the electronic cigarette).[280] Thus, in terms of implementation of the airflow sensor disclosed in Zhu, a POSITA would have seen the diaphragm of the electronic sensor of Zhu causing a signal to be issued to the microcontroller IC1 to which it was coupled in response to inhalation (sound or pressure waves) as a diaphragm microphone.[281] Alternatively, it would have been obvious to a POSITA to utilize the diaphragm microphone taught in Cox to signal to the microcontroller to turn on the heater of the

[275] *Id.*
[276] Ex. 1009: pg. 9.
[277] *See* Section VIII.A.5.
[278] *Id*.
[279] Ex. 1004: ¶ 173.
[280] *Id.*
[281] *Id.*

electronic cigarette.[282]

C. Dependent Claim 18

1. Claim 18 Preamble

"The electronic cigarette of claim 17,"

As discussed above with respect to claim 17, Claim 17 is unpatentable over Cox in view of Zhu because the combination of the references teaches each and every element of Claim 17, and it would have been obvious to a POSITA at the time of the filing of the '622 Patent to combine the references, each of which is directed to an electronic cigarette.[283]

(a) Claim Element 18.1:

"wherein the tubular electronic atomizer includes, in sequence,"

In Cox, a number of components are in the electronic inhaler, while others are in the tubular electronic atomizer.

The electronic cigarette of Zhu includes each of the elements in claim 18 being present in the electronic atomizer, and in the order disclosed in the '622 Patent. Zhu discloses a controller (100) of Figure 1 (electronic inhaler) having a cigarette cap (element (14)) and an LED (1).[284] Zhu also discloses in the inhaler portion (referred to as the "controller" (100)) a power supply (battery (2)).[285] With respect to the

[282] *Id.*
[283] *See* Section VIII.B.1.
[284] Ex. 1009: pg. 7, ¶ 6.
[285] *Id.*

specific sequencing of the elements in Cox, a POSITA would recognize that the function of the device is equivalent to that in the '622 regardless of the order of these specific components.[286]

As noted above, Cox discloses that the components of the electronic cigarette may be located in either the inhaler or atomizer, and that the location, and therefore order, is not material to the functioning of the device.[287] Cox discloses that the ordering of the elements within the electronic cigarette does not change the fact that the function of the device is equivalent to the device disclosed in the '622 patent.[288]

With respect to the specific sequencing of the elements in Zhu, a POSITA would recognize that the function of the device is equivalent to that in the '622 regardless of the order of these specific components.[289] Cox discloses that the components of the electronic cigarette may be located in either the inhaler or atomizer, and that the location, and therefore order, is not material to the functioning of the device. Because of this, Cox teaches that the ordering of the elements within the electronic cigarette does not change the function of the combine device. The function of the combined device is equivalent to the device disclosed in the '622 patent. Regardless, each of the elements listed in the sequence of '622 claim 18 is present in the same order in Zhu.[290]

[286] Ex. 1004: ¶ 176.
[287] Ex. 1008: col. 6, ll. 1 – 8; col. 11, ll. 5 – 9.
[288] *Id.*
[289] Ex. 1004: ¶ 177.
[290] *Id.*

(b) Claim Element 18.2:

"an electric connector,"

As discussed in detail above with respect to claim element 17.10, components that are electrically connected .[291]

Cox also teaches that two components (atomizer (23) and inhaler (25)) are separate components that can be removably connected.[292] Thus, a POSITA would recognize that each of the two components (atomizer (23) and inhaler (25)) must have an electric connector in order to enable for the electrical components within each of the two components to be electrically connected when the two portions are joined together.[293] Therefore, a POSITA would recognize that Cox implicitly requires that the atomizer includes an electric connector.[294]

Figure 1 of Zhu discloses the atomizer (generator (200)) having a first electric connector as element (6), referred to as a "connecting connector".[295]

***(c)* Claim Element 18.3**:

"a leak-proof piece,"

Figure 1 of Cox shows a leak-proof piece in the atomizer (23) as the barrier shown between chamber (47) and the mouthpiece section (49) of atomizer (23).[296] A

[291] *See* Section VIII.B.11.
[292] Ex. 1008: col. 4, ll. 48 – 51.
[293] Ex. 1004: ¶ 153.
[294] *Id.*
[295] Ex. 1009: pg. 7, ¶ 6.
[296] Ex. 1008: col. 5, ll. 27 – 41.

line separating chamber (47) and the mouthpiece section (49) is leak-proof as Cox teaches that a gas G is retained in chamber (47) and exerts pressure on flexible container (45) that contains the material to be vaporized. Without a leak-proof barrier between the chamber (47) and the mouthpiece section (49) the device would not function.[297]

Figure 1 of Zhu discloses the electronic atomizer (generator (200)) having a leak proof piece (8) which is referred to as a "liquid blocking piece".[298]

(d) Claim Element 18.4:

"a supporting piece,"

Figure 1 of Cox teaches the atomizer (heater (33)) being supported by a supporting piece (tube (27)), on which the heater is positioned.[299]

Figure 5 of Zhu shows a heater (9) (atomizer) having a thermal insulation seat (902), which appears from the figure to provide support for the heater 9, and is located outside the heater 9.[300]

(e) Claim Element 18.5*:*

"a heat equalizer coupled with an electric heating wire,"

Figure 1 of Cox teaches the atomizer (23) including a heat equalizer as the

[297] Ex. 1004: ¶180.
[298] Ex. 1009: pg. 8, ¶ 1.
[299] Ex. 1008: col. 3, ll. 61 – 64.
[300] Ex. 1009: pg. 9, ¶ 3: pg. 6, ¶ 3.

insulation material (56) coupled with an electric heating wire (33).[301]

Figure 7 of Zhu discloses the heat equalizer (heater (9) in the atomizer) coupled with an electric heating wire element (901).[302]

(f) Claim Element 18.6:

"the container filled with media"

Figure 1 of Cox teaches element (45) as being a flexible container for containing a "source of material" (element (37)) to be volatilized (atomized).[303] The material to be atomized is understood to include solutions (for example, medicaments in liquid form).[304] The claimed device of the '622 Patent utilizes pressure to deliver the liquid to the heater, and does not require the use of media to improve wicking (and delivery) of the liquid to the heater.[305] It would have been obvious to include the media taught by Zhu to promote wicking and improve delivery of the liquid to the heater in a non-pressurized delivery system.[306]

Figure 1 of Zhu shows the electronic atomizer (generator (200) as having a container as the liquid storage chamber (12).[307] Zhu discloses the container containing a media that is soaked with a solution to be atomized as liquid storage chamber (12) being a tube with an open end having medicinal cotton fibers placed in the middle, the

[301] Ex. 1008: col. 6, ll. 25 – 31.
[302] Ex. 1009: pg. 8.
[303] Ex. 1008: col. 4, ll. 62 – 42.
[304] *Id.* at col. 9, ll. 35 – 38.
[305] Ex. 1004: ¶ 186.
[306] *Id.*
[307] Ex. 1009: pg. 9, ¶ 3.

stock solution of the medicine is filled in".[308]

(g) **Claim Element 18.7*:***

"and the air-puffing hole."

Figure 1 of Cox teaches that the exterior wall of element (23) (atomizer) has an air-puffing hole formed therethrough via element (53) being an open end of mouthpiece section (49) of atomizer (23).[309]

Figure 7 of Zhu shows the electronic atomizer (generator (200)) having an exterior wall having an air-puffing hole formed therethrough on the right end of generator (200) (showing the end-wall with a hole formed in the center).[310]

IX. DISCRETIONARY FACTORS FAVOR INSTITUTION

Under § 325(d), the Board should not exercise a discretionary denial because the Petition's anticipation and obviousness combinations are not substantially the same or cumulative of what the Examiner already considered. During prosecution of the '622 Patent, the Examiner did not consider the Hon, Cox or Zhu references, nor the grounds proposed in Grounds 1 – 4.

Similarly, under § 314(a), the Patent Owner's district court action against Petitioner provides no reason to deny institution. An analysis of the six *Fintiv* factors confirms that conclusion.

[308] *Id.*
[309] Ex. 1008: col 5, ll. 55 – 58.
[310] Ex. 1009: pg. 8, ¶ 1.

1. Factor 1: whether a stay exists or is likely to be granted if a proceeding is instituted

This is the first petition to challenge the '622 Patent. Jupiter intends to request a stay in the district court if the Board institutes IPR. Recent statistics suggest district courts, in general, are becoming more likely to stay cases pending IPR.[311] Thus, it is likely a stay will be granted if the Board institutes IPR, which favors institution.[312]

2. Factor 2: proximity of the Court's trial date to the Board's projected statutory deadline

The district court matter against Jupiter is still in the early stages. The court has yet to issue a claim construction order for which the parties have stipulated. The scheduling order set the close of fact discovery Friday, June 3, 2022, with dipositive motions set for July 6, 2022 and pre-trial disclosure to be complete on Monday, August 1, 2022.[313] A trial date has not yet been set. When further considering potential trial delays due to the ongoing pandemic it is likely that the projected statutory deadline to issue a final at or near resolution of any jury trial and before any post-trial motions.[314] As such this factor weighs against denying the Petition under § 314(a).

3. Factor 3: investment in the parallel proceeding by the court and parties

Investment in the district court action has been minimal. The court has not yet issued any substantive orders relating to the '622 Patent. "If, at the time of the

[311] Ex. 1012 (noting success rate for stay motions pending IPR was 70% and rising).
[312] IPR2020-00019, *Apple v. Fintiv,* Paper 11 (Mar. 20, 2020), 6.
[313] Ex. 1013 at 2.
[314] 35 U.S.C. §§ 314(b) and 316 (a)(11); 37 C.F.R. § 42.107(b).

institution decision, the district court has not issued orders related to the patent at issue in the petition, this fact weighs against exercising discretion to deny institution."[315] While some depositions have occurred, additional discovery and depositions are scheduled to occur after the filing of this Petition. Substantial fact and expert discovery as well dispositive motions are still months away. Institution, and the likely stay, will preserve substantial resources for the parties and the court.

4. Factor 4: overlap between issues raised in the petition and in the parallel proceeding

Even though the claims challenged in the petition are those asserted in the district court litigation, the prior art references cited in this Petition have not been considered or argued in the district court. As such the issues raised in this petition are on material different grounds, arguments and/or evidence than those presented in the district court. This fact weighs against exercising discretion to deny institution.

5. Factor 5: whether the petitioner and the defendant in the parallel proceeding are the same party

Although the parties to Patent Owner's district court action against Jupiter are the same, this only weighs against institution if the final decision deadline is after the trial date.[316] Here, the Board is likely to issue its final decision on or before the trial, which favors institution.

[315] IPR2020-00019, *Apple v. Fintiv,* Paper 11 (Mar. 20, 2020)10.
[316] *Id.*

6. Factor 6: other circumstance that impact the Board's exercise of discretion, including the merits and Parties

In a separate district court matter, Patent Owner asserts the '622 Patent against at least 7 other defendants in various federal courts all of which matters are also in early stages.[317] Thus, the respective Courts are unlikely to reach the issues raised in the Petition any earlier in the other cases. There are no efficiency reasons that warrant denying the Petition.

The interests of enhancing patent quality favor institution because the Petition's anticipation and obviousness grounds are strong. The institution of a trial in this case will serve the interest of overall system efficiency and integrity because it will allow the proceeding to continue in the event that the parallel proceeding settles or fails to resolve the patentability question presented in the PTAB proceeding.[318]

In sum, the Board should not exercise its discretion deny institution, either under §§ 314(a) or 325(d).

[317] *See* Mandatory Notices Under 37 C.F.R. § 42.8 *, infra.*

[318] IPR2020-00019, *Apple v. Fintiv,* Paper 11 (Mar. 20, 2020)15, "Were a final judgment entered on the patentability issues in the parallel proceeding, the parties may jointly request to terminate the PTAB proceeding in light of the fully resolved parallel proceeding. See 37 C.F.R. § 42.72."

X. CONCLUSION

In view of Grounds 1 – 4, there is a strong and reasonable likelihood the Challenged Claims are unpatentable. As such, the Board should institute *inter partes* review.

Respectfully submitted,

/Anthony L. Meola/
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CERTIFICATE OF COMPLIANCE

Per 37 C.F.R. § 42.24(a) and (d), the undersigned hereby certifies that the Petition complies with the type-volume limitation of 37 C.F.R. § 42.24(a)(i) because, exclusive of exempted portions, it contains 13,546 words as counted by the word-processing program used to prepare it.

Dated: December 20, 2021

Respectfully submitted,

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CERTIFICATE OF SERVICE

The undersigned certifies service pursuant to 37 C.F.R. § 42.6(e) and 42.105(b). The Patent Owner consents to electronic service of this Petition via dropbox link and/or at the following email addresses:

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