IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

IMIRACLE HK LIMITED,
PETITIONER,

v.

VPR BRANDS, LP,
PATENT OWNER.

Case IPR2023-01255

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

PETITION FOR *INTER PARTES* REVIEW OF USPN 8,205,622 UNDER 35 U.S.C. §§ 311 *ET SEQ.* AND 37 C.F.R. § 42.100 *ET SEQ.*

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1009	Certified English Language Translation of Chinese Patent Publication No. 201029436 ("Yang")
1010	Translation Certification for Chinese Patent Publication No. 201029436 ("Yang")
1011	Chinese Patent Publication No. 201029436 ("Yang")
1012	International Patent Application Publication No. WO 2008/139411 ("Wang411")
1013	U.S. Patent No. 8,375,957 ("Hon")
1014	Certified English Language Translation of Chinese Patent Publication No. 201188868 ("Wang868")
1015	Translation Certification for Chinese Patent Publication No. 201188868 ("Wang868")

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1017	Microphone, https://web.archive.org/web/20080212141853/http://en.wikipedia.org/wiki/Condenser_microphone#Condenser.2C_capacitor_or_electrostatic_microphones (Last visited on June 21, 2023)
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CLAIM LISTING

Independent Claim 1	
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.
3.	The electronic cigarette of claim 1, wherein the liquid container prevents or reduces liquid leak and reverse flow.

Dependent Claims 2 - 11	
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.
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 Claim 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,

Independent Claim 17	
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.	The electronic cigarette of claim 17, 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.

I. INTRODUCTION

U.S. Patent No. 8,205,622 ("the '622 Patent") was issued on June 26, 2012 from U.S. Patent Application No. 12/437,511 filed on May 7, 2009, which application published on September 30, 2010 as U.S. 2010/0242974 A1. EX1001, cover. The '622 Patent claims foreign priority to Chinese Patent Application No. 200910080147 filed March 24, 2009. *Id.* VPR BRANDS, LP ("Patent Owner") acquired the '622 Patent via assignment executed on August 26, 2019 and recorded on August 29, 2019. EX1002.

Pursuant to 35 U.S.C. §§311–319 and 37 C.F.R. §42.100 *et seq.*, Petitioner, iMiracle HK Limited ("Petitioner"), requests *Inter Partes* review of Claims 12–15 and 17-18 (the "Challenged Claims") of the '622 Patent. For at least the reasons discussed below, the Challenged Claims should be found unpatentable and canceled.

II. MANDATORY NOTICES

Petitioner satisfies each requirement for *Inter Partes* Review of the '622 Patent pursuant to 37 C.F.R. §42.8(a)(1).

A. Real Party in Interest Under 37 C.F.R. §42.8(b)(1)

Petitioner identifies iMiracle HK Limited, Shenzhen iMiracle Technology Co. Ltd., Shenzhen Weiboli Technology Co. Ltd., and Heaven Gifts International Limited Ltd. as the real parties in interest.

B. Related Matters Under 37 C.F.R. §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	Filing Date	Status
9:23-cv-80291	VPR Brands, LP v. Shenzhen Sigelei Technology Co., Ltd. et al	SDFL	Feb. 24, 2023	Pending (Complaint answered)
0:23-cv-60357	VPR Brands, LP v. Shenzhen YouMe Information Technology Co., Ltd.	SDFL	Feb. 23, 2023	Pending (Complaint filed)
0:23-cv-60358	VPR Brands, LP v. Shenzhen Daosen Vaping Technology Co., Ltd. et al	SDFL	Feb. 23, 2023	Pending (Complaint filed)
9:22-cv-81977	VPR Brands, LP v. iMiracle HK Limited et al	SDFL	Dec. 27, 2022	Pending (Complaint answered)
0:22-cv-62373	VPR Brands, LP v. Shenzhen iMiracle Technology Co. Ltd. et al	SDFL	Dec. 16, 2022	Pending (Complaint filed)
9:22-cv-81943	VPR Brands, LP v. Shenzhen iMiracle Technology Co. Ltd. et al	SDFL	Dec. 16, 2022	Pending (Complaint filed)
9:22-cv-81576	VPR Brands, LP v. Shenzhen Weiboli Technology Co. Ltd. et al	SDFL	Oct. 13, 2022	Pending (Motion to dismiss – Voluntary Dismissal)

IPR2022-00299	Jupiter Research, LLC v. VPR Brands, LP	PTAB	Dec. 20, 2021	Institution Denied
1:21-cv-10971	VPR Brands, LP v. BAE Worldwide LLC	DMA	Jun. 10, 2021	Settled/Voluntarily Dismissed
2:21-cv-03797	VPR Brands, LP v. PHD Marketing, Inc.	CDCA	May. 04, 2021	Settled/Voluntarily Dismissed
1:21-cv-02445	VPR Brands LP v. Myle Vape Inc. et al.	EDNY	May. 03, 2021	Settled/Voluntarily Dismissed
1:21-cv-21678	VPR Brands, LP v. HQD Tech USA, LLC	SDFL	May. 03, 2021	Settled/Voluntarily Dismissed
0:21-cv-60496	VPR Brands, LP v. Lightfi re Holdings LLC	SDFL	Mar. 03, 2021	Settled/Voluntarily Dismissed
2:21-cv-00361	VPR Brands, LP v. B&G Trading LLC	DAZ	Mar. 02, 2021	Settled/Voluntarily Dismissed
3:21-cv-00172	VPR Brands, LP v. MONQ, LLC	MDTN	Mar. 02, 2021	Dismissed
2:21-cv-01110	VPR Brands, LP v. XL Vape, LLC	CDCA	Feb. 08, 2021	Settled/Voluntarily Dismissed
2:21-cv-01116	VPR Brands, LP v. Cool Clouds Distribution, Inc.	CDCA	Feb. 08, 2021	Settled/Voluntarily Dismissed
2:20-cv-02185	VPR Brands, LP v. Jupiter Research LLC	DAZ	Nov. 13, 2020	Settled/Voluntarily Dismissed

C. Lead and Back-Up Counsel

Pursuant to 37 C.F.R. §§42.8(b)(3) and 42.10(a), Petitioner designates the

following counsel:

Lead Counsel	***Back-up Counsel***
David P. Lindner (USPTO Reg. No. 53,222) Crowell & Moring 455 N. Cityfront Plaza Drive Suite 3600 Chicago, IL 60611 Telephone: 312-321-4200 Facsimile: 312-321-4299 Email: dlindner@crowell.com	Hefeng Su (USPTO Reg. No. L1283) Crowell & Moring 1001 Pennsylvania Ave., NW Washington, DC 20004 Telephone: 202-624-2500 Facsimile: 202-628-5116 Email: hsu@crowell.com

Pursuant to 37 C.F.R. §42.10(b), Powers of Attorney have been filed with this Petition.

D. Service Information

Pursuant 37 C.F.R. §42.8(b)(4), please address all correspondence to the lead and back-up counsel as shown above. Petitioner also consents to service by e-mail at the above e-mail addresses provided for lead and back-up counsel.

E. Payment of Fees

All required fees have been paid with the filing of this Petition. Petitioner further authorizes the U.S. Patent & Trademark Office to charge Deposit Account No. DA05-1323 for any fees, including the fee set forth in 37 C.F.R. §42.15(a) for this Petition.

F. Certification of Word Count

Petitioner certifies that the word count in this Petition, including all

footnotes and annotations, is 12,395 words as counted by the word-processing program used to generate this Petition, where such word count excludes the table of contents, mandatory notices, certificate of service, list of exhibits, and this certificate of word count. This Petition is in compliance with the 14,000 word limit set forth in 37 C.F.R. §42.24(a)(1)(i).

III. APPLICABLE STATUTES

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

IV. GROUNDS FOR STANDING

Pursuant to 37 C.F.R. §42.104(a), Petitioner certifies that the '622 Patent is available for *Inter Partes* review and that Petitioner is not barred or estopped from requesting *Inter Partes* review on the Grounds identified herein.

V. GROUNDS FOR THE CHALLENGES

Pursuant to 37 C.F.R. §§42.22(a)(1) and 42.104(b), the precise relief sought by Petitioner is that the Board review and cancel Claims 12–15 and 17-18 of the '622 Patent as being unpatentable, as set forth by this Petition and supported by the Declaration of Dr. Robert H. Sturges (EX1004), under the following Grounds:

Ground	Proposed Statutory Challenges
1	Claims 12 – 15 are anticipated under 35 U.S.C. §102 and/or rendered obvious under 35 U.S.C. §103 by Tao (EX1006).
2	Claims 12 – 15 are rendered obvious over Yang (EX1009) and Tao under 35 U.S.C. §103.
3	Claims 12 – 14 are anticipated under 35 U.S.C. §102 and/or rendered obvious under 35 U.S.C. §103 by Wang411 (EX1012)
4	Claims 17 and 18 are rendered obvious over Hon (EX1013) and Tao under 35 U.S.C. §103
5	Claims 17 and 18 are rendered obvious over Hon, Tao, and Wang868 (EX 1014) under 35 U.S.C. §103

VI. THE CHALLENGED PATENT

A. The '622 Patent Overview

The '622 patent purports to describe an electronic cigarette that "highly resembles a conventional cigarette and the cigarette smoking process." EX1001, 2:24–25. The '622 patent generally describes the electronic cigarette as including an electronic inhaler and an electronic atomizer 22. *Id.*, 2:25–30.

The electronic inhaler includes an electric power source 5, an electric airflow sensor 6, and an integrated circuit board 14 having a single chip micyoco 3.[1] EX1001, 5:30-35, 7:35-37.

The electric power source 5 "supplies power to the electronic inhaler and electronic atomizer [22] and ensures that both work together like a cigarette." *Id.,* Abstract, 4:7-12. The '622 Patent claims that the electric airflow sensor 6 is a diaphragm microphone. *Id.*, 8:4-5.

The electronic atomizer 22 includes "[an] electric heating wire 265, liquid

[1] The Examiner interpreted the single chip micyoco to be a type of chip. EX1003, 267.

container 261 inside which liquid-storing media 264 being filled with liquids is inserted, and an atomizer cap 262 with an air-puffing hole in the center." *Id.,* 4:35-43. The electronic inhaler and the electronic atomizer 22 are connected by "connectors on both parts to form an entire electronic cigarette." *Id.,* 2:48–50.

The '622 patent teaches that, "[w]hen the user puffs on the electronic cigarette through the air-puffing hole [302] on the first end of the atomizer [22], the electronic sensor [6] detects an airflow and converts it to a signal, which then wakes up the single chip micyoco [3]." *Id.*, 2:51–54. The single chip micyoco 3 "turn[s] on the electricity on/off switch 4 and generate an electric current from the electric power source 5 to the electronic atomizer 22 for vaporizing of a liquid inside the liquid chamber inside the atomizer 22." *Id.,* 4:13-18. The electric current "preferably flows through the electric heat wire [265] inside the atomizer tube, which then heats up" to convert "the liquid into a form of vapor mist" that is "drawn into the mouth of the user." *Id.,* 2:57– 62.

B. Level of Skill in the Art

A person of ordinary skill in the art at the time of the '622 patent (a "POSITA") would have had of a Bachelor's degree in electrical engineering, mechanical engineering, or biomedical engineering or related fields, along with at least five years of experience designing electromechanical devices, including those involving circuits, electroacoustics, fluid mechanics and heat transfer. EX1004, ¶¶45-47.

C. Claim Construction

Petitioner submits that all claim terms should be construed according to the *Phillips* standard. *Phillips v. AWH Corp.*, 415 F.3d 1303 (Fed. Cir. 2005); 37 C.F.R. §42.100. Besides the claim terms discussed below, Petitioner submits that, based on the evidence presented herein and the prior art's description of the

claimed elements being similar to that of the '622 patent specification, no additional claim constructions are necessary in this proceeding. because "claim terms need only be construed to the extent necessary to resolve the controversy." *Wellman, Inc. v. Eastman Chem. Co.,* 642 F.3d 1355, 1361 (Fed. Cir. 2011).

Petitioner construes the following claim terms as having the proposed claim construction stipulated by Patent Owner in the related litigation in the District Court for the District of Arizona, Case No. 2-20-cv-02185. EX1005; EX1004, ¶¶49-51.

Claim Terms	**Claims**	**Proposed Claim Construction**
"electric airflow sensor"	13 and 17	An electric sensor to detect air movement generated by a user's inhaling or puffing act.
"time period and a magnitude of the electric current"	13	The duration of time and the strength of the current that is provided to the heating element.
"diaphragm microphone"	14	A device for converting pressure waves into electrical energy using a thin sheet of material that is capable of vibrating.

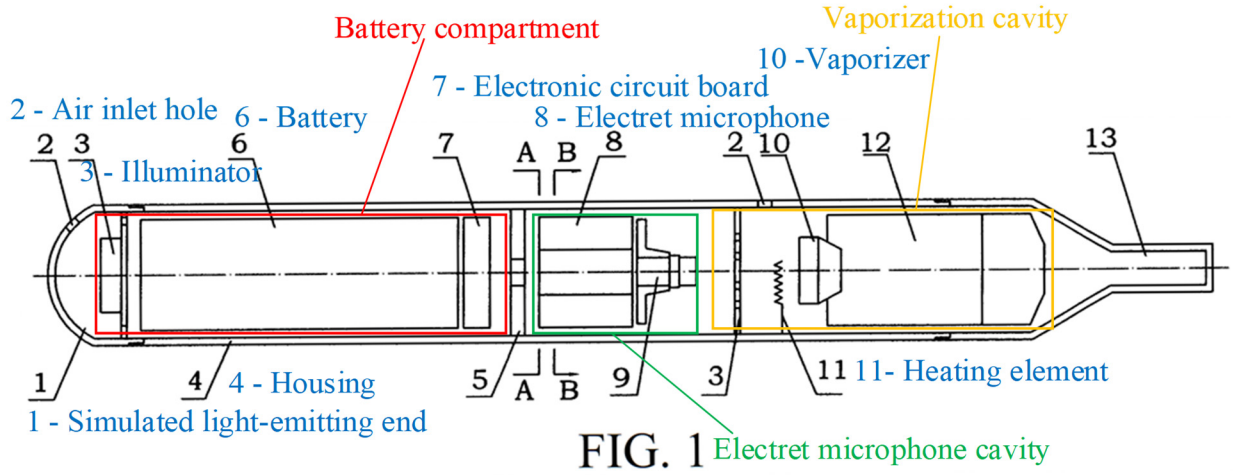
VII. OVERVIEW OF THE PRIOR ART

A. Tao Overview

Chinese Patent Publication No. 201051862 ("Tao") is titled "Simulated Cigarette." EX1006, cover. As reflected on its cover, Tao was filed on June 8, 2007 and was published on April 30, 2008. By virtue of its publication date, Tao is prior

art under 35 U.S.C. §102(a).

Tao is directed to a simulated cigarette simulating the effect of a cigarette. *Id.,* 5. The simulated cigarette may be formed into various shapes such as a cigarette shape and a cigar shape, and may be divided into two or more sections for easy portability. *Id.,* 7. An annotated FIG. 1 of Tao is reproduced below.



Annotated FIG. 1 of Tao

As shown in the annotated FIG. 1, the simulated cigarette includes a housing 4. *Id.*, 5. Two ends of the housing 4 are respectively provided with a simulated light-emitting end 1 and a mouthpiece 13, and an air inlet hole 2 is formed on an outer wall of the housing 4. *Id.* A battery compartment, an electret microphone cavity, and a vaporization cavity are arranged in the housing 4 in sequence from the simulated light-emitting end 1. *Id.*

The battery 6 is arranged in the battery compartment. *Id.* The vaporization

controller is composed of an electret microphone 8 and an electronic circuit board 7, and the electret microphone 8 is arranged in the electret microphone cavity. *Id.* The electronic circuit board 7 is arranged in the battery compartment. *Id.* An output terminal of the electret microphone 8 is connected to the electronic circuit board 7. *Id.* The electronic circuit board 7 comprises a microprocessor and an ultrasonic circuit. *Id.*

The vaporization assembly includes a vaporizer 10 and a reservoir 12 connected to the vaporizer which are arranged in the vaporization cavity. *Id.* An output terminal of the electronic circuit board 7 is connected to the vaporizer 10. *Id.* A heating element 11 is arranged in the vaporization cavity, and the heating element 11 is connected to the output terminal of the electronic circuit board 7. *Id.,* 8.

When a smoker smokes, the airflow entering from the air inlet 2 on the housing 4 at the end of the simulated light-emitting end 1 enters the electret microphone cavity, so that the electret microphone 8 receives the airflow. *Id.* In response to the airflow, the electret microphone 8 sends a signal to the microprocessor in the electronic circuit board 7. *Id.,* 6. The electret microphone 8 may be used to sensitively receive a change in an inhalation amount of a smoker, and quantitatively analyze an amount of airflow, so as to determine a vaporization

amount according to the amount of airflow. *Id.* Accordingly, the microprocessor on the electronic circuit board 7 may transmit an instruction to the ultrasonic circuit on the electronic circuit board 7 to control the smoking quantity of the vaporizer by adjusting the current of the ultrasonic circuit according to the signal of the electret microphone 8. *Id.,* 6 and 8. Under the control of the ultrasonic circuit on the electronic circuit board 7, the vaporizer 10 vaporizes the e-liquid in the reservoir 12. *Id.,* 6 and 8. Vaporized droplets are suspended to form aerosol. *Id.,* 8. In this way, the feeling of smoking is simulated. *Id.,* 6.

As discussed above, when a smoker smokes, the electret microphone 8 receives the airflow and sends a signal to the microprocessor on the electronic circuit board 7. *Id.,* 6. The microprocess may determine the amount of the airflow based on the signal and the amount of the airflow determines the amount of vaporization by the vaporizer 10/heating element 11. *Id.*

Tao teaches that, at the time the microprocessor transmits instructions to supply the current to the vaporizer 10/heating element, the illuminator 3 in the simulated light-emitting end 1, such as an LED, starts to emit light. *Id.,* 8.

Tao further teaches that, as long as airflow exists on the electret microphone 8, the brightness of the LED is generated and changed accordingly. *Id.* That is, the brightness of the LED is changed with the airflow received by the electret

microphone 8. EX1004, ¶116. Because it is the microprocessor that determines the amount of the airflow that the electret microphone 8 receives, to change the brightness of the LED with the airflow received by the electret microphone 8, the LED has to be directly or indirectly connected to the microprocessor. *Id.*

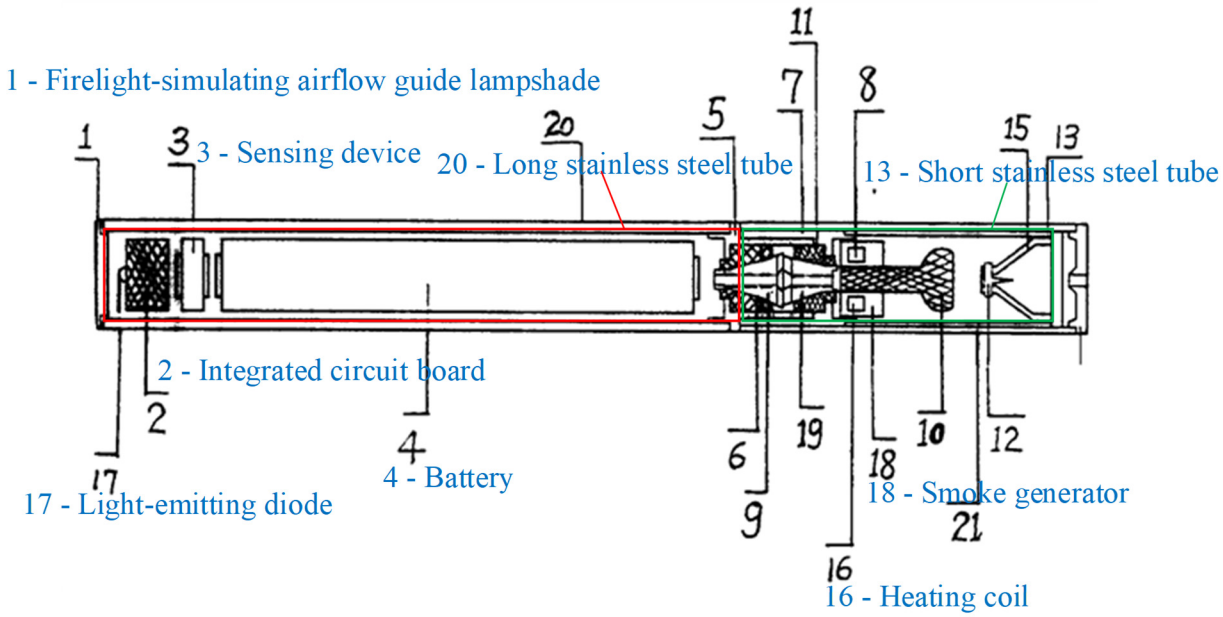
Tao cites Chinese Patent No. 200420031182.0 as a prior art reference in which a mechanical sensor is used to detect whether an airflow passes. EX1006, 4 and 6. Tao teaches that, in comparison with the prior art reference, the entire device in Tao places emphasis on an electronic design instead of a mechanical design. *Id.,* 6. Therefore, Tao chooses to use the electret microphone as the airflow sensor because the electret microphone is able to sensitively receive a change in an inhalation amount of a smoker. EX1004, ¶55; EX1006, 6. Further, the electret microphone may quantitatively analyze an amount of airflow through an A/D conversion circuit inside the microprocessor in the electronic circuit board, so as to determine an ultrasonic vaporization amount according to the amount of airflow. EX1006, 6. That is to say, the current of the ultrasonic circuit is adjusted according to the signal of the electret microphone, and the smoking quantity of the vaporizer is controlled by the ultrasonic circuit, which simulates the feeling of smoking. *Id.*

B. Yang Overview

Chinese Patent Publication No. 201029436 ("Yang") is titled "Improved Cigarette-Simulating Electronic Device." EX1009, cover. As reflected on its cover,

Yang was filed as on May 24, 2007 and was published on March 5, 2008. By virtue of its publication date, Yang is prior art under 35 U.S.C. §102(a) and (b).

Yang discloses a cigarette-simulating electronic device. *Id.,* 3. The overall appearance of the cigarette-simulating electronic device is a stainless steel round tubular housing with a dimension ratio similar to a dimension ratio of an actual cigarette. *Id.* The cigarette-simulating electronic device includes a longer cartridge-simulating tube 20 and a shorter mouthpiece-simulating tube 13, which are connected into a whole by an annular airflow guide bolt 5. *Id.* An annotated figure of Yang is reproduced below.



Annotated Figure of Yang

As shown in the annotated figure, a firelight-simulating airflow guide lampshade 1 is arranged at an air inlet of an end of the longer cartridge-simulating

tube 20. *Id.,* 5. An integrated circuit board 2, a sensing device 3, and a battery 4 are arranged inside the long stainless steel tube 20 in sequence from the air inlet end. *Id.*

The smoke generator 18 is arranged inside the shorter mouthpiece-simulating tube 13. *Id.* The smoke generator 18 includes a heating coil 16 and the gas-liquid mixing chamber 8. *Id.*

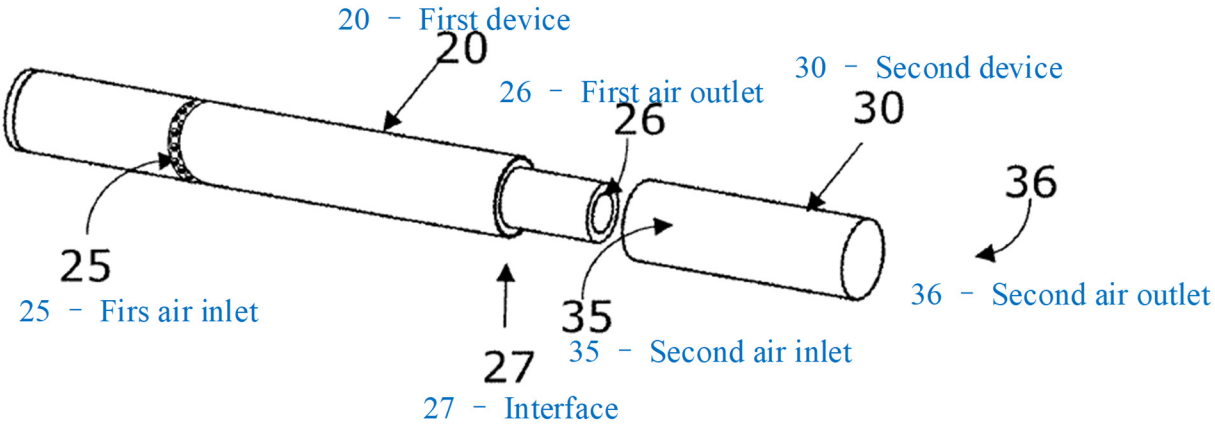
In Yang, the integrated circuit board 2, the sensing device 3, and the battery 4 form an independent control and energy output system. *Id.,* 5. The controller on the integrated circuit board 2 receives the pulse signal from the sensing device 3 and transmits instructions to the power amplifier of the integrated circuit board 2. *Id.* After receiving the instruction from the controller, the power amplifier of the integrated circuit 2 keeps supplying power to the smoke generator 18 for a set period. *Id.* The negative terminal 19 is connected to the annular airflow guide screw 5 and the negative terminal 9 to form the power supply circuit. *Id.*

Yang teaches that a light-emitting diode 17 is arranged on the integrated circuit board 2 adjacent to the firelight-simulating airflow guide lampshade 1 and configured to simulate burning and lighting of cigarettes. *Id.*, 6. When the sensing device stops operating, the smoke generator stops generating smoke, the light-emitting diode 17 is off, and the electronic circuit enters a sleep state. *Id.,* 1. In this

way, a whole simulation process is formed. *Id.*

C. Wang411 Overview

International Patent Application Publication No. WO 2008/139411 ("Wang411") is titled "Smoking Device, Charging Means And Method Of Using It." EX1012, cover. As reflected on its cover, Wang411 was filed as a PCT application on May 10, 2008, and the PCT was published on November 20, 2008. By virtue of its publication date, Wang411 is prior art under 35 U.S.C. §102(a). An annotated FIG. 1B of Wang411 is reproduced below.



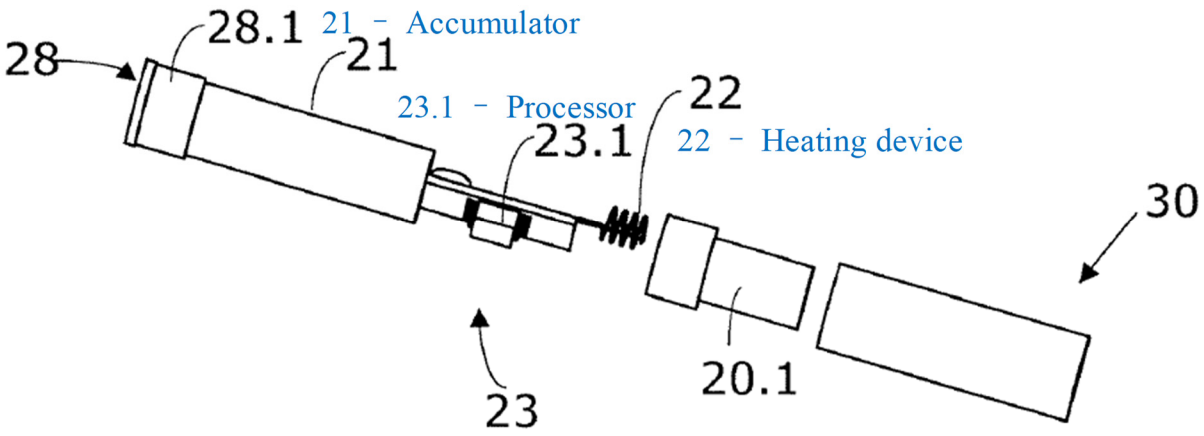
Annotated FIG. 1B of Wang411

Wang411 is directed to a smoking device. In Wang411, the smoking device 10 includes the first device 20 and the second device 30, which may be connected together via the interface 27. *Id.*, ¶[0014].

The first device 20 comprises a first air inlet 25 for letting fresh air enter the device 20 and a first air outlet 26 for letting air exit the first device 20. *Id.*, ¶[0015].

The second device 30 comprises a second air inlet 35 meant to receive the airflow that comes out of the first air outlet 26 and a second air outlet 36 for letting air exit the second device 30. *Id.* This air that exits the second device 30 is meant to be sucked/drawn in by the smoker of the smoking device 10. *Id.*

As shown in annotated FIG. 1C of Wang411 as reproduced below, the first device 20 includes an accumulator 21 for storing and releasing electric energy, a heating device 22 such as a resistive coil, and control electronics 23. *Id.*, ¶[0018].



Annotated FIG. 1C of Wang411

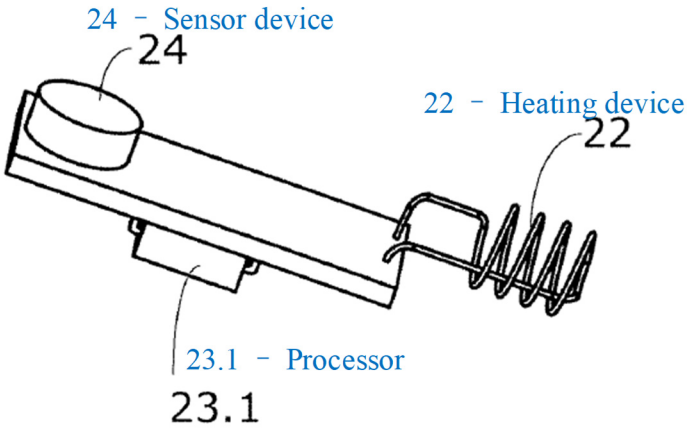
The accumulator 21 can be a rechargeable battery which is able to release enough energy to power the control electronics 23 and the energy demanding heating device 22. *Id.*, ¶[0019].

The heating device 22 can be a resistive coil, capable of generating enough heat to be able to heat up the airflow that passes through to a temperature level that

allows the release of the agent 33 residing in the second device 30. *Id.*, ¶[0021]. The temperature is defined taking into consideration the airflow and the temperature decrease from the heating coil 22 to the end of the mouth piece. *Id.*, ¶[0021].

The control electronics 23 may include a processor 23.1 and can be laid-out on a circuit board. *Id.*, ¶[0022]. This processor 23.1 can be a Field Programmable Grid Array (FPGA) specially set up to achieve all the functions required to operate the smoking device 10. *Id.* These functions comprise electronically filtering signals received from the sensor device 24 and controlling the temperature of the heating device 22. *Id.*

As shown in annotated FIG. 1D of Wang411 as reproduced below, the sensor device 24 has the main purpose to detect airflow through the first device 20 emitting a signal to the control electronics 23 which in turn will cause the accumulator 22 to release its electric energy to the heating device 22 in order to reach the desired temperature level. *Id.*, ¶[0027].



Annotated FIG. 1D of Wang411

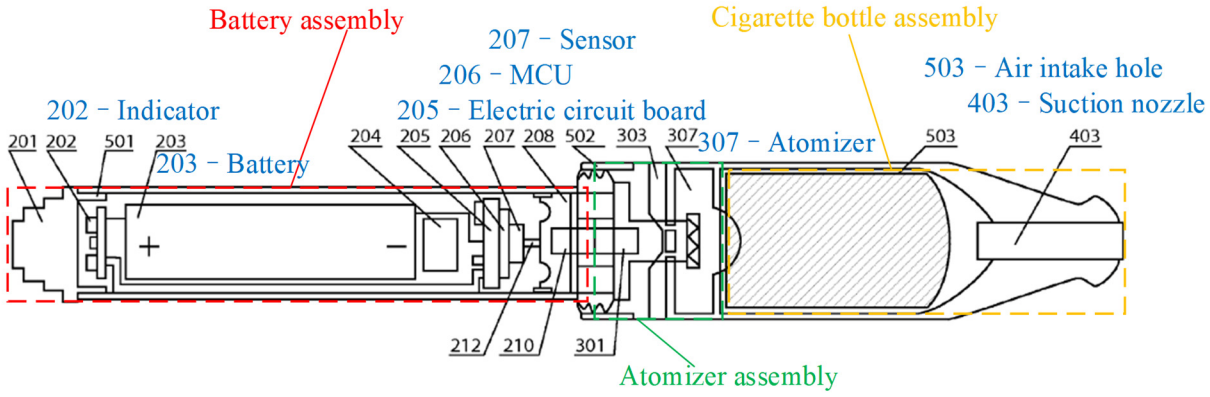
The sensor device 24 can be a specially adapted microphone, and the electret microphone is preferred, which eliminates the need for a power supply by using a permanently charged material. *Id.*, ¶[0031] The main advantage of using an electret microphone is its low cost, reduced size and almost zero energy requirement. *Id.*

Wang411 further teaches the reason to employ a microphone, in lieu of a pressure sensor, as the sensor device 24. *Id.*, ¶[0031]. In particular, a wind or an altitude difference can offset the pressure sensor, which may thus pick up noise and provide the processor 23.1 with false signals that do not actually relate to a suck/ draw on the smoking device 10 by the consumer. *Id.* In contrast, the electret microphone may be specially constructed in order to have a narrow frequency response that corresponds to the frequency of the vibration created by a cigarette consumer's suck/draw. *Id.*, ¶[0030]. This can be done by manufacturing the vibrating element of the microphone from a firmer material. *Id.*

D. Hon Overview

U.S. Patent No. 8,375,957 ("Hon") is titled "Electronic Cigarette." EX1013, cover. 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. *Id.* Hon was filed as a U.S. Patent Application No. 12/266,819 on January 15, 2009. By virtue of its International Patent Application Publication date and the U.S. Patent application filing date, Hon is prior art under 35 U.S.C. §102(a), (b), and (e).

Hon discloses an electronic cigarette including an atomizer assembly and a battery assembly, that are connected by the internal thread electrode 302 of the battery assembly as shown in FIG. 3 of Hon and the external thread electrode 209 of the atomizer assembly as shown in FIG. 2B of Hon. *Id.,* Abstract, 2:60-3:3.



Annotated FIG. 5B of Hon

As shown in annotated FIG. 5B, the battery assembly includes the indicator 202, the lithium ion battery 203, the MOSFET electric circuit board 205, the

microcontroller unit ("MCU") 206, the sensor 207, the external thread electrode 209 (shown in FIG. 2B), and the primary shell 211 (shown in FIG. 2B). *Id.*, 3:4-10 and 4:66-67. On one end of the primary shell 211 is an external thread electrode 209, while on the other end is an indicator 202 including two red LEDs. *Id.*, 3:9-11 and 3:24-25. The atomizer assembly includes the atomizer 307, the internal thread electrode 302, and the secondary shell 306 (shown in FIG. 3). *Id.*, 3:32-34. The primary shell 211 and the secondary shell 306 are made of stainless-steel tube or copper alloy tube. *Id.*, 4:49-50.

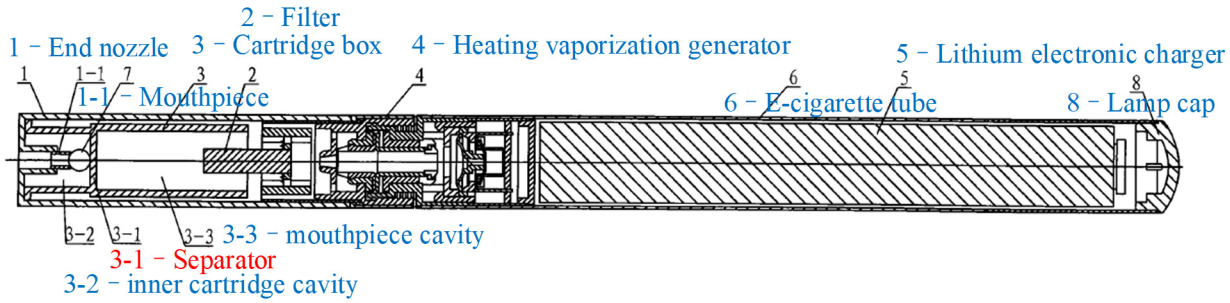
Hon also discloses that the sensor 207 may be a switch sensor made of an elastic alloy slice, a Hall element of linear output, a semiconductor force-sensitive chip, a semiconductor matrix thermoelectric bridge chip, a capacitance sensor, or an inductance sensor. *Id.*, 3:21-25.

When there is a suction on the suction nozzle 403, the negative pressure forms on the silica gel corrugated membrane 208 which distorts to drive the sensor 207, thus invoking the MCU 206 and the MSOFET electric circuit board 205. *Id.*, 5:7-15. As a result, the indicator 202 is lit; the lithium ion battery 203 electrifies the heating body inside the atomizer 307 through MOSFET electric circuit board 205, so that the heating body inside the atomizer 307 produces heat. *Id.*, 5:15-20. When suction stops, the sensor 207 is reset; the atomizer 307 stops working; and

the indictor 202 gradually dies down. *Id.*, 4:19-21.

E. Wang868 Overview

Chinese Patent Publication No. 201188868 ("Wang868") is titled "Anion Generating E-Cigarette." EX1014, cover. As reflected on its cover, Wang868 was filed on May 30, 2008 and was published on February 4, 2009. By virtue of its publication date, Wang868 is prior art under 35 U.S.C. §102(a). An annotated FIG. 1 of Wang868 is reproduced below.



Annotated FIG. 1 of Wang868

As shown in annotated FIG. 1 of Wang 868, the electronic cigarette includes an end nozzle 1 and e-cigarette tube 6. *Id.,* 5. A mouthpiece 1-1 is arranged in a center hole at a left end of the end nozzle 1. *Id.* The cartridge box 3 is arranged in the end nozzle 1. *Id.* The separator 3-1 partitions the cartridge box 3 into an inner cartridge cavity 3-2 and a mouthpiece cavity 3-3. *Id.* The mouthpiece cavity 3-3 includes condensed cartridge. *Id.* A left end of the filter 2 is arranged at a right end of the mouthpiece cavity 3-3, and a right end of the filter 2 is connected to a left end of the heating vaporization generator 4. *Id.*

The lithium electronic charger 5 is arranged in the inner cavity of the e-cigarette tube 6 and a lamp cap 8 is arranged at a right end of the e-cigarette tube 6. *Id.*

VIII. GROUND 1 - CLAIMS 12 – 15 ARE UNPATENTABLE AS BEING ANTICIPATED BY AND/OR OBVIOUS OVER TAO

Claims 12-15 of the ’622 Patent are unpatentable under 35 U.S.C. §102 as anticipated by Tao and/or under 35 U.S.C. §103 as obvious over Tao. The limitations of independent claim 12 parallel those of independent claim 13 and the parallel limitations are discussed together in the analysis below.

A. Claims 12 and 13

1. Claims 12 and 13 Preambles

“An electronic cigarette comprising:”

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

Tao discloses a simulated cigarette “intended to overcome the disadvantages of a complex structure, high manufacturing costs, and a poor simulation effect in the prior art.” EX1006, 1. Tao teaches “the simulated cigarette includes a housing 4 … and a mouthpiece 13” and “battery 6, a vaporization controller, and a vaporization assembly are fixedly arranged in the housing 4.” *Id.,* 5. A POSITA

would have understood the simulated cigarette in Tao to be the electronic cigarette as claimed because the simulated cigarette operates with the aid of the electricity in battery 6 and contains the e-liquid in the reservoir 12 that is vaporized by the vaporizer 10 of the vaporization assembly. EX1004, ¶98.

2. Claim Elements 12.1 and 13.1

"a tubular electronic inhaler."

In Tao, the housing 4 of the simulated cigarette is tubular. EX1006*,* 10; EX1004, ¶99. Tao discloses the simulated cigarette may be formed into various shapes such as a cigarette shape, a cigar shape, a tobacco pipe shape, or the like." EX1006*,* 7. FIG. 1 of the Tao shows that the housing 4 has a hollow length and defines an open space accommodating various components of the simulated cigarette. FIG. 2 and FIG. 3 of Tao are section views of the simulated cigarette, which show that the housing 4 is a round tube. *Id,* 10.

As shown in annotated FIG. 1, a POSITA would have understood the portion of housing 4 arranged with the simulated light-emitting end 1, the battery compartment, and the electret microphone cavity ("Tao Inhaler Portion") to be the tubular electronic inhaler as claimed because it has a cigarette shape and comprises the battery 6, the electronic circuit board 7, the electret microphone 8, and the air inlet hole 2 allowing airflow. EX1004, ¶¶99-100.

3. Claim Elements 12.2 and 13.2

"a tubular electronic atomizer;"

A POSITA would have understood the portion of housing 4 arranged with the vaporization cavity ("Tao Atomizer Portion") to be the tubular electronic atomizer as claimed because it comprises the vaporizer 10 and the heating element 11, which vaporize the e-liquid in the e-liquid reservoir 12 into aerosol using the electric current supplied by the battery 6. In particular, "a heating element 11 is arranged in the vaporization cavity, and the heating element 11 is connected to the output terminal of the electronic circuit board 7." EX1004, ¶101. "The vaporizer 10 starts after receiving the instruction from [the microprocessor of the electronic circuit board 7] and vaporizes an e-liquid in an e-liquid reservoir [12], and vaporized droplets are suspended to form aerosol." EX1006, 8.

4. Claim Element 12.3 and 13.3

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

The Tao Inhaler Portion includes the battery 6 and the ultrasonic circuit. *Id*, 7 A POSITA would have understood the battery 6 plus the ultrasonic circuit to be the electric power source as claimed because it has a battery and provides an electric current to the vaporizer 10/heating element 11 in the Tao Atomizer Portion. EX1004, ¶102. In particular, "the electronic circuit board 7 is composed of

a microprocessor and an ultrasonic circuit." EX1006*,* 5. When receiving the airflow, "the electret microphone 8 sends the signal to the microprocessor in the electronic circuit board 7, and the microprocessor transmits an instruction to the ultrasonic circuit for transmission to the vaporizer 10." *Id.,* 8. "The current of the ultrasonic circuit is adjusted according to the signal of the electret microphone, and the smoking quantity of the vaporizer is controlled by the ultrasonic circuit, which simulates the feeling of smoking." *Id.,* 6.

5. Claim Element 12.4

> "the electronic cigarette further comprising an integrated circuit board that has a Single Chip Micyoco that controls atomization of a liquid solution."

A POSITA would have understood the electronic circuit board 7 of Tao to be the integrated circuit board as claimed and the microprocessor of Tao to be the Single Chip Micyoco as claimed. Tao teaches "[t]he electronic circuit board 7" has "a microprocessor." EX1004, ¶103. The "A/D conversion circuit inside the microprocessor" may "quantitatively analyze an amount of airflow … so as to determine an ultrasonic vaporization amount according to the amount of airflow." *Id.,* 6.

6. 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"

Under the proposed constructions, "electric airflow sensor" means "an electric sensor to detect air movement generated by a user's inhaling or puffing act." EX1004, ¶50. Tao discusses a simulated cigarette disclosed in a prior art reference in which "[a] mechanical sensor detects whether an airflow passes" and teaches that the simulated cigarette in Tao is completely different from that in the prior art reference because "the entire device … lays emphasis on a more reasonable electronic design instead of a mechanical design. EX1006*,* 6. To this end, Tao teaches to use the electret microphone 8 to detect airflow, which "sensitively receive[s] a change in an inhalation amount." *Id.,* 6.

The electret microphone is an electric sensor. EX1004, ¶105. It is known to a POSITA at the time of the invention for the '622 Patent that a microphone is "an acoustic-to-electric transducer or sensor that converts sound into an electrical signal." EX1017, 1. An electret microphone is "a type of condenser microphone," also known as "a *capacitor microphone*," in which "the diaphragm acts as one plate of a capacitor, and the vibrations by sound waves produce changes in the distance between the plates." *Id.* "An electret is a ferroelectric material that has been permanently electrically charged or polarized." *Id.*

In addition, Tao teaches that "the current of the ultrasonic circuit is adjusted according to the signal of the electret microphone, and the smoking quantity of the

vaporizer is controlled by the ultrasonic circuit, which simulates the feeling of smoking." EX1006, 6. That is, the electret microphone 8 is used to turn on and off the electric power source by way of detecting an airflow. EX1004, ¶106.

7. Claim Element 13.5

"sending a signal to a Single Chip Micyoco,"

Tao teaches "[w]hen a smoker smokes, the airflow entering from the air inlet 2 on the housing 4 … enters the electret microphone cavity …, so that the electret microphone 8 receives the airflow." EX1006, 8. In response to the airflow, "[t]he electret microphone 8 sends the signal to the microprocessor in the electronic circuit board 7." *Id.*

8. 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."

As discussed above in Section VIII.A.4, the ultrasonic circuit plus the battery 6 of Tao correspond to the "electric power source." Tao teaches "[t]he electret microphone 8 sends the signal to the microprocessor in the electronic circuit board 7, and the microprocessor transmits an instruction to the ultrasonic circuit for transmission to the vaporizer 10." *Id.,* 6. "The vaporizer 10 starts after receiving the instruction and vaporizes an e-liquid in an e-liquid reservoir." *Id.* Tao

further teaches the current of the ultrasonic circuit supplied to the vaporizer 10/ heating element 11 is adjusted according to the signal of the electret microphone 8, and the smoking quantity of the vaporizer is controlled by the ultrasonic circuit, which simulates the feeling of smoking. EX1004, ¶106; EX1006, 6.

Under the proposed constructions, "time period and a magnitude of the electric current" means "the duration of time and the strength of the current that is provided to the heating element." EX1004, ¶50. In Tao, the adjustment of the current supplied to the vaporizer 10/ heating element 11 indicates the strength of the current provided to the electric atomizer. EX1004, ¶109. Also, to control the atomization quantity, Tao inherently teaches a duration of time for supplying the current to the vaporizer 10/ heating element 11 for atomization. EX1004, ¶109.

B. Claims 14 and 15

Tao discloses every element recited in claims 14 and 15.

1. Dependent Claim 14

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

Under the proposed constructions, "diaphragm microphone" means "a device for converting pressure waves into electrical energy using a thin sheet of material that is capable of vibrating." EX1004, ¶50. As discussed above in Section V.A.6, an electret microphone is a capacitor microphone in which the diaphragm

acts as one plate of a capacitor and the vibrations by sound waves produce changes in the distance between the plates, which converts the sound into an electrical signal.

Additionally, U.S. patent No. 6,594,369 ("Une," EX1018) issued on Jul. 15, 2003 provides a detailed description of an electric microphone. In particular, Une teaches "[e]lectret capacitor microphones are often provided with a *thin diaphragm* having a thin metal film facing toward an opening in a metal casing and a fixed electrode opposed thereto, and utilize the principal of a change in capacity between the diaphragm and the fixed electrode dependently on *the vibration of the diaphragm due to a sound wave*." EX1018, 1:10-21. A POSITA would have understood the electret microphone 8 to be the diaphragm microphone as claimed. EX1004, ¶¶110-111.

Moreover, because claim 14 acknowledges that the diaphragm microphone is an instance of the electric airflow sensor, the electret microphone is an instance of the electric airflow sensor. This is another reason that Tao teaches the electric airflow sensor as claimed.

2. Dependent Claim 15

(a) The Preamble of Dependent Claim 15

"The electronic cigarette of claim 13, further comprising"

As discussed above in Section A, Tao discloses the electronic cigarette of claim 13.

(b) Dependent Claim Element 15.1

"further comprising an LED indicator inside the electronic inhaler,"

As discussed above in Section VIII. A.4, the Tao Inhaler Portion in Tao includes the simulated light-emitting end 1 and corresponds to the "electric inhaler." Tao teaches that "an illuminator 3 is arranged in the simulated light-emitting end 1." EX1006*,* 7. The illuminator 3 is, for example, "an LED." *Id.,* 8. A POSITA would have understood the illuminator 3 to be the LED indicator as claimed. EX1004, ¶113.

(c) Dependent Claim Element 15.2

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

In Tao, when detecting the airflow, "[t]he electret microphone 8 sends the signal to the microprocessor in the electronic circuit board 7, and the microprocessor transmits an instruction to the ultrasonic circuit for transmission to the vaporizer 10." *Id.,* 8. Meanwhile, "the illuminator 3 in the simulated light-emitting end 1, such as an LED, starts to emit light." *Id*. Tao also teaches that "the simulated light-emitting end 1 [accommodating the illuminator 3] may be an independent part, and is connected to other parts through *threads*." *Id*.

As the light emission of the illuminator 3 is determined by the detection of the electret microphone 8, the illuminator 3 is directly or indirectly connected to the electret microphone 8. EX1004, ¶115. The electret microphone 8 is connected to the microprocessor because the electret microphone 8 sends signals to the microprocessor. *Id*. Accordingly, the illuminator 3 is at least indirectly connected to the microprocessor. *Id*.

Tao further teaches that "[a]s long as airflow exists on the electret microphone 8, the brightness of the LED is generated and changed accordingly." EX1006*,* 8. That is, the brightness of the illuminator 3 is changed with the airflow received by the electret microphone 8. EX1004, ¶116. Because it is the microprocessor, in particular the A/D conversion circuit inside the microprocessor, that determines the amount of the airflow that the electret microphone 8 receives, to change the brightness of the LED with the airflow received by the electret microphone 8, the illuminator 3 has to be directly or indirectly connected to the microprocess. *Id*.

In addition, Tao teaches that the illuminator 3 is a LED. EX1006, 8. To emit light, the LED has to be connected to an electric power source. EX1004, ¶117. Therefore, Tao inherently discloses that the illuminator 3 is connected to the power source of the simulated cigarette, *i.e.*, the ultrasonic circuit plus the battery 6. *Id*.

(d) Dependent Claim Element 15.3

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

In Tao, the brightness of the LED is generated and changed with the airflow received by the electret microphone 8. EX1004, ¶118. It is the microprocessor that determines the amount of the airflow that the electret microphone 8 receives, controls the electric power source, *i.e.*, the ultrasonic circuit, and adjust the output current of ultrasonic circuit. *Id.*; EX1006, 8. Therefore, Tao inherently discloses that the on time of the illuminator 3 is controlled by the microprocessor. EX1004, ¶118.

IX. GROUND 2 - CLAIMS 12-15 ARE UNPATENTABLE AS BEING OBVIOUS OVER YANG IN VIEW OF TAO

Claims 12-15 are unpatentable over Yang in view of Tao and are rendered invalid. The limitations of independent claim 12 parallel those of independent claim 13 and the parallel limitations are discussed together in the analysis below.

A. Claims 12 and 13

1. Claims 12 and 13 Preambles

"An electronic cigarette comprising"

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

Yang discloses that "[t]he utility model relates to a cigarette-simulating

electronic device … which resemble a cigarette" EX1009, 3. The cigarette-simulating electronic device includes "the long stainless steel tube 20" and "the short stainless steel tube 13." *Id.*, 4-5. The long stainless steel tube 20 includes "an integrated circuit board 2, a sensing device 3, a battery 4." *Id.*, 5. The short stainless steel tube 13 includes "the smoke generator 18 [and] a gas-liquid mixing chamber 8." *Id.* A POSITA would have understood the cigarette-simulating electronic device in Yang to be the electronic cigarette as claimed because the cigarette-simulating electronic device operates with the aid of the electricity in battery 4 and vaporize the liquid tobacco in the gas-liquid mixing chamber 8. EX1004, ¶119; EX1009, 6.

2. Claim Elements 12.1 and 13.1

"a tubular electronic inhaler."

Yang teaches "the cigarette-simulating electronic device has a stainless steel round tubular housing in shape, including a longer cartridge-simulating tube [20] and a shorter mouthpiece-simulating tube [13], which are connected into a whole by an annular airflow guide bolt." EX1009, 3. The long cartridge-simulating tube 20 has "an air inlet" at an end. *Id.*, 5. "[A]n integrated circuit board 2, a sensing device 3, a battery 4 … are arranged inside the long stainless steel tube [20] in sequence from the air inlet end." *Id.* Therefore, a POSITA would have understood the long stainless steel tube 20 to be the tubular electronic inhaler as claimed.

EX1004, ¶120.

3. Claim Elements 12.2 and 13.2

"a tubular electronic atomizer."

A POSITA would have understood the short stainless steel tube 13 in Yang to be the tubular electronic atomizer as claimed. EX1004, ¶121. The short stainless steel tube 13 is a "round tubular housing in shape." EX1009, 3. In addition, the short stainless steel tube 13 includes the smoke generator 18, which includes a heating coil 16 and the gas-liquid mixing chamber 8. EX1009, 5. "The heating coil 16 is placed in the center of the gas-liquid mixing chamber 8." *Id.*, 6. When the heating coil 16 operates, "the liquid tobacco has been transported into the gas-liquid mixing chamber 8 …, and the tobacco is gasified to form smoke." *Id.*, 6.

4. Claim Element 12.3 and 13.3

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

Yang teaches that the long stainless steel tube 20 includes, among other things, an integrated circuit board 2, a sensing device 3, a battery 4, "thereby forming an independent control and energy output system." EX1009, 5. A power amplifier of the integrated circuit 2 keeps supplying power to a smoke generator 18 in the short stainless steel tube 13 for a set period after receiving an instruction from the controller of the integrated circuit board 2, so that the smoke generator

operates to form smoke. EX1009, 5. A POSITA would have understood the battery 4 plus the power amplifier of the integrated circuit 2 to be the electric power source as claimed. EX1004, ¶122.

5. Claim Element 12.4

> "the electronic cigarette further comprising an integrated circuit board that has a Single Chip Micyoco that controls atomization of a liquid solution."

Yang teaches that the cigarette-simulating electronic device includes "an integrated circuit board 2" EX1009, 5. The integrated circuit board 2 has "a controller," also referred to as "an electronic controller." *Id.*, 5. Yang indicates "[i]t is the main technical method of the smoke generator 18 that the electronic controller in the integrated circuit board 2 controls the electric energy to supply power to the heating coil as a heat source." *Id.*, 6. In particular, "[w]hen airflow enters from the air inlet end, the vibration of the airflow causes the sensor 3 to work and send out a pulse signal, so that a controller in the integrated circuit 2 is started." *Id.* Then, Yang teaches the controller sends instruction to a power amplifier of the integrated circuit 2 such that the power amplifier "keeps supplying power to a smoke generator 18 for a set period." *Id.* A POSITA would have understood the electronic controller to be the "Single Chip Micyoco." EX1004, ¶123.

6. 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" has been previously construed. Yang teaches "[w]hen airflow enters from the air inlet end, the vibration of the airflow causes the sensor 3 to work and send out a pulse signal" to the controller in the integrated circuit 2. EX1009, 5. "A power amplifier of the integrated circuit 2 keeps supplying power to a smoke generator 18 for a set period after receiving an instruction from the controller." *Id.*, 5.

As discussed above in Section VIII.A.6, Tao teaches to use a specific electric airflow sensor, *i.e.*, the electret microphone 8, in an electronic cigarette. The '622 patent explains that electric airflow sensors "makes the puffing of users on the cigarette much easier and smoother." EX1001, 3:34–38. Similarly, Tao explicitly teaches that, because of the use of the electret microphone, "the overall design requires a small amount of airflow, and the user does not need to exert very much strength in use and feels relaxed." EX1006, 6. The electret microphone 8 in Tao and the sensor 3 in Yang are used for the same purpose of detecting airflow generated by a user's inhaling or puffing act. EX1004, ¶72. When being faced with the problem of how to make puffing easier and smoother, the POSITA would have been motivated to use the electret microphone as the sensor 3 in Yang. EX1004,

¶¶68-74, 125.

7. Claim Element 13.5

"sending a signal to a Single Chip Micyoco,"

Yang teaches "[w]hen airflow enters from the air inlet end, the vibration of the airflow causes the sensor 3 to work and send out a pulse signal, so that a controller in the integrated circuit 2 is started." EX1009*,* 8.

8. 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."

"Time period and a magnitude of the electric current" has been previously construed. Yang teaches "[w]hen airflow enters from the air inlet end, the vibration of the airflow causes the sensor 3 to work and send out a pulse signal, so that a controller in the integrated circuit 2 is started." EX1009*,* 5. "A power amplifier of the integrated circuit 2 keeps supplying power to a smoke generator 18 for a set period after receiving an instruction from the controller, so that the smoke generator operates to form smoke." *Id.*

B. Claims 14 and 15

1. Dependent Claim 14

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

As discussed above in Section A, Yang in combination with Tao discloses the electronic cigarette of claim 13.

"Diaphragm microphone" has been previously construed. As discussed above in Section VIII.B.1, a POSITA would have understood the electret microphone 8 in Tao to be the diaphragm microphone as claimed. Also, a POSITA would have been motivated to use the electret microphone as the sensor 3 in Yang. EX1004, ¶¶68-74, 125.

2. Dependent Claim 15

(a) The Preamble of Dependent Claim 15

"The electronic cigarette of claim 13, further comprising"

As discussed above in Section IX.A, Yang in combination with Tao discloses the electronic cigarette of claim 13.

(b) Dependent Claim Element 15.1

"further comprising an LED indicator inside the electronic inhaler,"

As discussed above in Section IX.A.2, the long stainless steel tube 20 in Yang includes the integrated circuit board 2 and corresponds to the electric inhaler as claimed. Yang teaches that "a light-emitting diode [17] for simulating burning and lighting of cigarettes is arranged on the integrated circuit board [2]" EX1009, 3 and 4. Therefore, a POSITA would have understood the light-emitting diode 3 to

be the LED indicator as claimed. EX1004, ¶130.

(c) Dependent Claim Element 15.2

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

In Yang, the "controller [is] in the integrated circuit 2" and "[a] light-emitting diode 17 is arranged on the integrated circuit board 2." EX1009, 5. Therefore, the light-emitting diode 17 is directly or indirectly connected to the controller. EX1004, ¶131.

In addition, to emit light, the light-emitting diode 17 has to be connected to an electric power source. EX1004, ¶132. Therefore, Yang inherently discloses that the light-emitting diode 17 is connected to the power source of the cigarette, *i.e.*, the power amplifier of the integrated circuit 2 plus the battery 4. *Id.*

(d) Dependent Claim Element 15.3

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

Yang teaches that, during operation, airflow enters from an air inlet of the tube 20, and energy is supplied to an electronic heater 16 after a controller is activated by a sensing device 3, and a light-emitting diode 17 at the other end is on to indicate an operating state. EX1004, ¶133; EX1009, 1. "When the negative pressure around the airflow guide hole disappears, the sensing device 3 stops

operating, the smoke generator 18 stops generating smoke, the light-emitting diode is off, and the electronic controller enters a sleep state after a few seconds." EX1004, ¶133; EX1009, 1. "In this way, a whole simulation process is formed." EX1009, 1.

X. GROUND 3 – CLAIMS 12 – 14 ARE UNPATENTABLE AS BEING ANTICIPATED BY AND/OR OBVIOUS OVER WANG411

Claims 12-14 of the '622 Patent are unpatentable under 35 U.S.C. §102 as anticipated by WANG411 and/or under 35 U.S.C. §103 as obvious over WANG411. The limitations of independent claim 12 parallel those of independent claim 13 and the parallel limitations are discussed together in the analysis below.

A. Claims 12 and 13

1. Claims 12 and 13 Preambles

"An electronic cigarette comprising"

Wang411 discloses all elements recited in these preambles, to the extent either limits the claims.

Wang411 relates to "a smoking device (10) comprising a first device (20) and a second device 30." EX1012, Abstract, ¶[0012]. "The first device (20) comprises an accumulator [21] for storing electric energy and releasing it to a heating device (22) as a response to a sensor device (24) detecting a suck/ draw of the smoking device (10) by a consumer." *Id.* The accumulator 21 may be a

"rechargeable battery." *Id.*, ¶[0019]. "The second device (30) comprises an agent (33) …, releases said agent (33) by means of dispensing means (37) and streams out into the mouth of a consumer." *Id.* The heating device 22 is provided with energy to "sufficiently heat up the airflow to be able to dissolve the agent 33." *Id.*, ¶[0023]. The agent 33 may be "nicotine." *Id.*, ¶[0012]. A POSITA would have understood the smoking device in Wang411 to be the electronic cigarette as claimed because the smoking operates with the aid of the electricity in the accumulator 21 and vaporize the agent 33. EX1004, ¶134.

2. Claim Elements 12.1 and 13.1

"a tubular electronic inhaler."

As shown in annotated FIG. 1B, the first device 20 is in tubular shape. "The first device 20 comprises a first air inlet 25 for letting fresh air enter the device 20" EX1012, ¶[0015] The internal parts of the first device 20 includes "an accumulator 21 for storing and releasing electric energy, a heating device 22 such as a resistive coil …, and control electronics 23." *Id.*, [0018]. A POSITA would have understood the portion of the first device 20 including the first air inlet 25, the accumulator 21 and the control electronics 23 ("Wang411 Inhaler Portion") to be the tubular electronic inhaler as claimed. EX1004, ¶135.

3. Claim Elements 12.2 and 13.2

"a tubular electronic atomizer."

A POSITA would have understood the portion of the first device 20 including the heating device 22 in Wang411 ("Wang411 Atomizer Portion") to be the tubular electronic atomizer as claimed. EX1004, ¶136. Wang411 teaches "The heating device 22 is a resistive coil made of Cr20Ni80, capable of generating enough heat to be able to heat up the airflow that passes through to a temperature level that allows the release of the agent 33 residing in the second device 30." EX1012, ¶[0021].

4. Claim Element 12.3 and 13.3

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

As discussed above in Section X.A.2, Wang411 Inhaler Portion includes an accumulator 21. Wang411 teaches "in response to the detection of the sucking/ drawing of air, releasing electric energy from said accumulator (21) for heating said heating device (22) and for heating air streaming through said smoking device (10)." EX1012, ¶[0022]. A POSITA would have understood the accumulator 21 to be the electric power source as claimed. EX1004, ¶137.

5. Claim Element 12.4

> "the electronic cigarette further comprising an integrated circuit board that has a Single Chip Micyoco that controls atomization of a liquid solution."

Wang411 teaches "the components making up the control electronics 23 are

preferably laid-out on a circuit board." EX1012, ¶ [0021]. "Besides other electric and electronic components, the circuit board accommodates a processor 23.1." EX1012, ¶[0022]. "This processor 23.1 is preferably a Field Programmable Grid Array (FPGA) specially set up to achieve all the functions required to operate the smoking device 10." *Id*. Wang411 further teaches "[t]hese functions comprise: … [c]ontrolling the temperature of the heating device 22 according to a temperature variation scheme in order to ensure that the airflow is hot enough to dissolve the agent 33." *Id.*

6. 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" has been previously construed. Wang411 teaches "[t]his sensor device 24 has the main purpose to detect airflow through the first device 20 emitting a signal to the control electronics 23 which in turn will cause the accumulator 22 to release its entire electric energy to the heating device 22 in order to reach the temperature level." EX1012, ¶[0027].

Wang411 further teaches "the sensor device 24 is a specially adapted microphone." *Id.*, [0026]. "Most preferred are electret microphones, which eliminate the need for a power supply by using a permanently charged material."

Id. "The main advantage of using an electret microphone is its low cost, reduced size and almost zero energy requirement." *Id.*, [0026]. As discussed above in Section VIII.A.6, a POSITA would have understood the electret microphone to be the electric airflow sensor.

7. Claim Element 13.5

"sending a signal to a Single Chip Micyoco,"

Wang411 teaches "the control electronics 23 comprise a complex and powerful enough processor 23.1, an active, electronic signal filtering is implemented in said processor 23.1." EX1012, ¶[0030]. "In this case an unfiltered signal representing all vibrations around the sensor device 24 are transmitted to the processor 23.1, where this signal will be electronically filtered in order to detect the suck/ draw and only the suck/ draw on the smoking device 10, while all noise is to be ignored." *Id*.

8. 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."

Wang411 teaches, in response to the signal emitted from the sensor device 24, the control electronics 23 "cause[s] the accumulator 22 to release its entire electric energy to the heating device." EX1012, ¶[0027]. Wang411 teaches

"usually this heating period is about 5 seconds." *Id.*, [0021]. Wang411 further teaches "the processor 23.1 of the control electronics 23 can be programmed to apply a specially customized temperature variation scheme … takes into account the ambient temperature since a variation of it has direct influence of the temperature of the air entering the smoking device 10, *i.e.* the lower the ambient temperature, the more energy must be provided to the heating device 22 to sufficiently heat up the airflow to be able to dissolve the agent 33." *Id.*, [0023].

B. Claim 14

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

As discussed above in Section X.A, Wang411 discloses the electronic cigarette of claim 13.

"Diaphragm microphone" has been previously construed. As discussed above in Section VIII.B.1, the electret microphone is a diaphragm microphone as claimed. Wang411 explicitly teaches to use the electret microphone as the sensor device 24. EX1012, ¶[0026].

XI. GROUND 4 – CLAIMS 17 AND 18 ARE UNPATENTABLE OVER AS BEING OBVIOUS OVER HON IN VIEW OF TAO

Claims 17 and 18 are unpatentable over Hon in view of Tao and are rendered invalid.

A. Claim 17

1. Claim 17 Preamble

"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." EX1013, 1:42-43. 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." *Id.*, 1:46-51.

2. Claim Element 17.1

"a tubular electronic inhaler; and"

A POSITA would have understood the battery assembly in Hon to be the "tubular electronic inhaler." EX1004, ¶145. Hon teaches that "the battery assembly includes the indicator (202), lithium ion battery (203), MOSFET electric circuit board (205), sensor (207), … and primary shell (211)." EX1013, 3:5-8. Hon teaches that the primary shell (211) is "made of stainless steel tube or copper alloy tube." *Id.*, 4:49-51. Hon further teaches that the battery assembly includes "MCU

(206)" as shown in FIG. 2B. *Id.*, 4:65-67. Hon further teaches "[i]n the battery assembly, there is a fine hole (501) on the indicator cap (201) for balancing the pressure difference on both sides of the silica gel corrugated membrane (208)." *Id.*, 4:42-45.

3. Claim Element 17.2

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

A POSITA would have understood the atomizer assembly and the cigarette bottle assembly in assembled state in Hon to be the tubular electronic atomizer as claimed. EX1004, ¶146. Hon teaches the "atomizer assembly includes … atomizer (307) and a secondary shell (306)." EX1013, 3:32-24. The secondary shell (306) is "made of stainless steel tube or copper alloy tube." *Id.*, 4:49-51. "[T]he lithium ion battery (203) in the battery assembly electrifies the heating body (305) inside the atomizer (307)." *Id.*, 5:15-17. "[T]he cigarette bottle assembly includes the cigarette liquid bottle (401), fiber (402) and suction nozzle (403)." *Id.*, 3:48-50. The atomizer assembly is "inserted into the cigarette bottle assembly." *Id.*, 5:4-7. "The air-liquid mixture sprays onto the heating body (305), gets vaporized, and is quickly absorbed into the airflow and condensed into aerosol." *Id.*, 4:14-16.

Hon further teaches that "[a]n external [screwthread] electrode (209) is located in one end of the battery assembly, and an internal [screwthread] electrode

(302) is located in one end of the atomizer assembly," and "the battery assembly and atomizer assembly are connected through the [external thread electrode (209) and the internal thread electrode (302)] into an emulation cigarette." *Id.*, 2:63-3:1, 6:1-3, and 6:12-15. Because the battery assembly and the atomizer assembly are connected through the screw threads, the atomizer assembly is detachably attached to the battery assembly. EX1004, ¶147.

4. Claim Element 17.3

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

Hon teaches "the battery assembly includes … lithium ion battery (203)." EX1013, 3:4-5. "The lithium ion battery (203) may be either a rechargeable polymer lithium ion battery or a rechargeable lithium ion battery." *Id.*, 3:25-27. "[T]he lithium ion battery (203) electrifies the heating body (305) inside the atomizer (307) …, so that the heating body (305) inside the atomizer (307) produces heat." *Id.*, 5:16-20.

5. Claim Element 17.4

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

As discussed in Section XI.A.3, the atomizer assembly and the cigarette bottle assembly in assembled state correspond to the tubular electronic atomizer as

claimed. Hon teaches "the cigarette bottle assembly includes the cigarette liquid bottle (401) [and] fiber (402)." Id., 3:48-49. A POSITA would have understood the cigarette liquid bottle 401 to be the container as claimed and the fiber 402 to be the media as claimed. As shown in FIG. 4 of Hon, the fiber 402 is arranged within the cigarette liquid bottle 401. EX1004, ¶148.

6. Claim Element 17.5

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

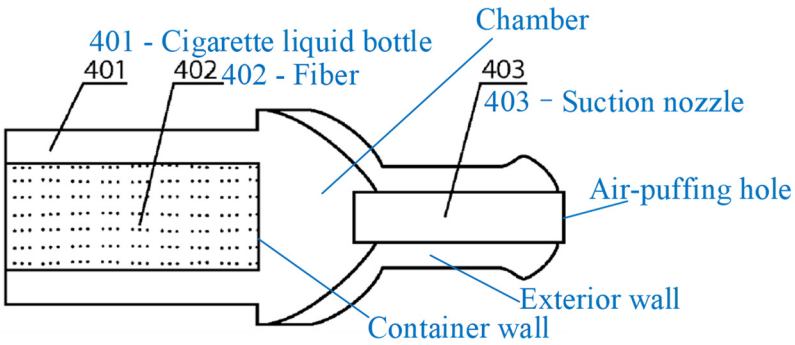
Hon teaches "[t]he fiber (402) inside the cigarette liquid bottle (401) contains cigarette liquid, which soaks the micro-porous ceramics (801) inside the atomizer through the fiber (402)." EX1013, 5:20-23. "The cigarette liquid contains 0.1-3.5% nicotine, 0.05-5% tobacco flavor, 0.1-3% organic acid, 0.1-0.5% stabilizer, and propanediol for the remaining." *Id.*, 4:46-48.

7. Claim element 17.6

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

As discussed in Section XI.A.3, the atomizer assembly and the cigarette bottle assembly in assembled state correspond to the tubular electronic atomizer as claimed. Hon teaches "the cigarette bottle assembly includes … suction nozzle (403)." EX1013, 3:48-49. As shown in annotated FIG. 4 of Hon, the suction nozzle 403 is formed through the exterior wall of the cigarette bottle assembly. Hon

teaches that the suction nozzle can be sucked by the user. *Id.*, 5:8. Therefore, Hon inherently teaches that the suction nozzle 403 has an air-puffing hole at the end exposed from the exterior wall of cigarette bottle assembly, as shown in annotated FIG. 4 of Hon. EX1004, ¶150.



Annotated FIG. 4 of Hon

8. 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,"

As discussed in Section XI.A.5, the cigarette liquid bottle 401 in Hon corresponds to the liquid container as claimed. Annotated FIG. 4 of Hon shows the cigarette liquid bottle 401 includes a container wall with a chamber disposed between the exterior wall of the cigarette bottle assembly and the container wall of the cigarette liquid bottle 401. EX1004, ¶151.

9. Claim Element 17.8

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

As discussed in Section XI.A.3, the atomizer assembly and the cigarette bottle assembly in assembled state correspond to the tubular electronic atomizer as claimed. Hon teaches "the cigarette bottle assembly includes … suction nozzle (403)." EX1013, 3:48-49. A POSITA would have understood the suction nozzle 403 to be the tube as claimed because the suction nozzle 403 extends from the air-puffing hole and into the chamber, as shown in annotated FIG. 4 of Hon. EX1004, ¶152.

10. 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,"

"Electric airflow sensor" has been previously construed. Hon teaches the battery assembly includes "sensor (207)." EX1013, 3:4-6. When the user slightly sucks the suction nozzle (403), the negative pressure forms on the silica gel corrugated membrane (208) which, under the action of suction pressure difference, distorts to drive sensor (207), thus invoking MCU (206) and MOSFET electric circuit board (205). EX1004, ¶153; EX1013, 5:7-20. At this moment, the indicators (202) gradually die down; the lithium ion battery (203) electrifies the heating body (305) inside the atomizer (307) through MOSFET electric circuit board (205), so that the heating body (305) inside the atomizer (307) produces heat. EX1004, ¶153; EX1013, 5:7-20. When Suction stops, the sensor (207) is reset; the atomizer

(307) stops working; the indicators (202) gradually die down. EX1004, ¶153; EX1013, 5:7-20.

Additionally, as discussed above in Section VIII.A.6, Tao teaches to use a specific electric airflow sensor, *i.e.*, the electret microphone 8, in a simulated cigarette. The electret microphone 8 in Tao and the silica gel corrugated membrane 208 plus the sensor 207 in Hon are used for the same purpose of detecting airflow generated by a user's inhaling or puffing act. EX1004, ¶93. The POSITA thus would have been motivated to use the electret microphone to detect the airflow in Hon. EX1004, ¶¶ 90-96, 154.

11. Claim element 17.10

"and the airflow sensor is a diaphragm microphone."

"Diaphragm microphone" has been previously construed. Additionally, as discussed above in Section XI.A.10, a POSITA would have been motivated to use the electret microphone to detect the airflow in Hon. As discussed above in Section VIII.B.1, the electret microphone is a diaphragm microphone as claimed.

B. Dependent Claim 18

"The electronic cigarette of claim 17, 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

sequence in the tubular electronic atomizer as in claim 18. As discussed in Section X.A.3, the atomizer assembly plus the cigarette bottle assembly in Hon correspond to the tubular electronic atomizer as claimed.

Hon discloses electric connector as in claim 18. Hon teaches that "[a]n external thread electrode (209) is located in one end of the battery assembly, and an internal thread electrode (302) is located in one end of the atomizer assembly." EX1013, 2:63-3:1. The battery assembly and atomizer assembly are connected through the external thread electrode (209) and the internal thread electrode (302) into an emulation cigarette. EX1004, ¶156; EX1013, 6:1-3, and 6:12-15. Therefore, the internal thread electrode 302 of the atomizer assembly serves as a connector connecting the atomizer assembly to the battery assembly. EX1004, ¶156.

Hon further teaches that both the internal thread electrode 302 and the external thread electrode 209 are "a gold-coated stainless steel or brass part with a hole drilled in the center." EX1013, 3:27-29 and 3:42-44. Hon further teaches "the lithium ion battery (203) [in the battery assembly] electrifies the heating body (305) inside the atomizer (307) [of the atomizer assembly] through MOSFET electric circuit board (205) as well as the internal and external thread electrodes (302, 209)." EX1013, 5:16-19. Therefore, a POSITA would have understood the

internal thread electrode 302 to be the electric connector as claimed. EX1004, ¶157.

Hon discloses the leak-proof piece as in claim 18. Hon teaches that "the atomizer assembly includes … air-liquid separator (303)." EX1013, 3:32-33. "The air-liquid separator (303) is made of stainless steel or plastic with a hole drilled." *Id.*, 3-41-42. As shown in FIG. 3 of Hon, "[t]he air-liquid separator (303) and the atomizer (307) are connected with the internal thread electrode (302) successively." *Id.*, 3:38-40. During operation of the electronic cigarette, "[t]he 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)." *Id.*, 5:23-26. Therefore, a POSITA would have understood the air-liquid separator 303 in Hon to be the leak-proof piece as claimed. EX1004, ¶158.

In Hon, FIGs 8-10 show exemplary atomizers 307. EX1013, 3:45-47. In particular, the diagram of the structure of the capillary impregnation atomizer and FIG. 9 is the left view of FIG. 8. EX1013, 2:43-45. FIG. 10 is the diagram of the structure of the spray atomizer and FIG. 11 is the left view of FIG. 10. EX1013, 2:46-48. The atomizer 307 includes "the micro-porous ceramics (801)" and "the heating body (305)" producing heat. *Id.*, 5:22-23 and 5:16-20. As shown in FIGs. 8-10, the micro-porous ceramics 801 supports the heating body 305. Therefore, a

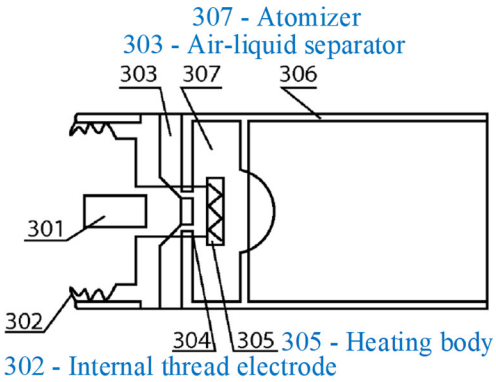
POSITA would have understood the micro-porous ceramics 801 in Hon to be the supporting piece as claimed. EX1004, ¶159.

Hon discloses a heat equalizer coupled with an electric heating wire in claim 18. Hon teaches "[t]he heating body (305) [of the atomizer 307] is made of the microporous ceramics on which nickel-chromium alloy wire, iron-chromium alloy wire, platinum wire, or other electrothermal materials are wound." EX1013, 4:29-35. Hon further teaches "the lithium ion battery (203) electrifies the heating body (305) … so that the heating body (305) inside the atomizer (307) produces heats." EX1013, 5:16-20. Therefore, a POSITA would have understood the microporous ceramics of the heating body 305 to be the heat equalizer as claimed and the electrical wire wound on the microporous ceramics of the heating body 305 to be the electric heating wire as claimed. EX1004, ¶160.

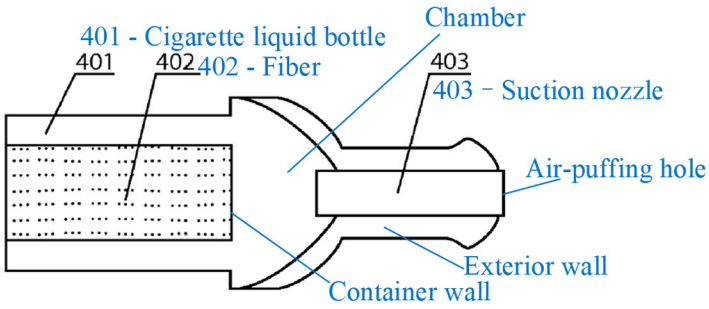
Additionally, as discussed in Section XI.A.5, the cigarette liquid bottle 401 corresponds to the container as claimed and the fiber 402 corresponds to the media as claimed. As discussed above in Section XI.A.7, the suction nozzle 403 has an air-puffing hole at the end exposed from the exterior wall of cigarette bottle assembly.

As shown in annotated FIG. 3 and FIG. 4 reproduced as below including the atomizer assembly and the cigarette bottle assembly in disassembled manner, the

tubular electronic atomizer includes, in sequence (from left to right), an electric connector (the internal thread electrode 302), a leak-proof piece (the air-liquid separator 303), a supporting piece (the micro-porous ceramics 801 in the atomizer 307), a heat equalizer (the microporous ceramics of the heating body 305) coupled with an electric heating wire (electrical wire wound on the microporous ceramics of the heating body 305), the container (the cigarette liquid bottle 401) filled with the media ("the fiber 402"), and the air-puffing hole (an end of the suction nozzle 403). EX1004, ¶162.



Annotated FIG. 3 of Hon



Annotated FIG. 4 of Hon

XII. GROUND 5 – CLAIMS 17 AND 18 ARE UNPATENTABLE AS BEING OBVIOUS OVER HON IN VIEW OF TAO AND WANG868

Claims 17-18 are unpatentable over Hon in view of Tao and Wang868 and is rendered invalid.

A. Claim 17

1. Claim 17 Preamble

"An electronic cigarette comprising:"

As discussed above in Section XI.A.1, Hon discloses the preamble in claim 17.

2. Claim Element 17.1

"a tubular electronic inhaler; and"

As discussed above in Section XI.A.2, Hon discloses the claim element 17.1.

3. Claim Element 17.2

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

As discussed above in Section XI.A.3, Hon discloses the claim element 17.2.

4. Claim Element 17.3

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

As discussed above in Section XI.A.4, Hon discloses the claim element 17.3.

5. Claim Element 17.4

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

As discussed above in Section XI.A.5, Hon discloses the claim element 17.4.

6. Claim Element 17.5

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

As discussed above in Section XI.A.6, Hon discloses the claim element 17.5.

7. Claim element 17.6

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

As discussed above in Section VIII.A.7, Hon discloses the claim element 17.4.

8. 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,"

Wang868 discloses an e-cigarette (electronic cigarette). Id., 4. Wang868 teaches that the electronic cigarette includes "an end nozzle 1, a filter 2, a cartridge box 3, a heating vaporization generator 4" EX1014, 4. As shown in annotated FIG. 1 of Wang868, "a separator 3-1 is arranged in the cartridge box 3" and "[t]he separator 3-1 partitions the cartridge box 3 into an inner cartridge cavity 3-2 and a mouthpiece cavity 3-3." *Id.* Wang868 further teaches "[a] left end of the filter 2 is arranged at a right end of [mouthpiece cavity 3-3], and a right end of the filter 2 is connected to a left end of the heating vaporization generator 4." *Id.* Therefore, the mouthpiece cavity 3-3 serves as a liquid container as claimed. EX1004, ¶170. Accordingly, the separator 3-1 serves as the container wall as claimed and the inner cartridge cavity 3-2 serves as the chamber as claimed. *Id*.

As discussed above in Section XI.A.5, the cigarette liquid bottle 401 in Hon serves as the liquid container as claimed. In order to separate the fiber 402 from the chamber in the cigarette liquid bottle 401 so as to, for example, prevent the liquid in the fiber 402 from being drawn into the chamber and then getting into the user's mouth through the suction nozzle 403, a POSITA would have been motivated to modify the cigarette liquid bottle 401 to arrange a separator serving as the container wall between the fiber 402 and the chamber, as taught by Wang868. EX1004, ¶¶171-172.

9. Claim Element 17.8

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

As discussed above in Section XI.A.9, Hon discloses the claim element 17.8.

10. 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 Section XI.A.10, Hon in combination with Tao discloses the claim element 17.9.

11. Claim element 17.10

"and the airflow sensor is a diaphragm microphone."

As discussed above in Section XI.A.10, Hon in combination with Tao

discloses the claim element 17.10.

B. Dependent Claim 18

As discussed above in XI.B, Hon in combination with Tao discloses the claim element 18.

XIII. DISCRETIONARY FACTORS FAVOR INSTITUTION

Under 35 U.S.C. §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 Tao, Yang, Wang411, Hon or Wang868 references, nor the grounds proposed in Grounds 1 – 5. While Hon was cited in IPR2022-00299 ("Jupiter Petition"), the instant petition presents substantially different arguments based on Hon than those presented in the Jupiter Petition. First, this petition does not rely on Hon as an anticipatory reference, and does not rely on Hon with respect to the claimed electric airflow sensor and the claimed diaphragm microphone, as did the Jupiter Petition. Second, the Jupiter Petition asserted an obviousness combination of Hon with U.S. Pat. No. 6,234,167 ("Cox"), while this petition is based on a combination of Hon with Tao and Hon with Tao and Wang868. Cox and Tao are substantially different patents because they describe substantially different electronic cigarette structures. Cox teaches a mechanical sensor, whereas Tao discloses an electric

airflow sensor. More specifically, Tao discloses an electret microphone and an electronic circuit board. EX1006, 6; EX1004, ¶55. A microphone is "an acoustic-to-electric transducer or sensor that converts sound into an electrical signal. EX1004, ¶105 citing EX1017, 1. Thus, under *Becton, Dickinson* factors (a) and (b), the combination of Hon with Tao is not the same and is substantially different from the art presented in the Jupiter Petition. Due to the difference in the proposed combination of Hon and Tao, the arguments presented in the instant petition with respect to that obviousness combination (or the combination of Hon, Tao, and Wang868) is not the same or substantially the same as was presented in the Jupiter Petition (*Becton, Dickinson* factor (d)), and favors institution.

Given the difference between Tao and Hon and Cox, the Board need not reach part 2 of the *Advanced Bionics* analysis, because as noted above part 1 is not satisfied. *Advanced Bionics, LLC v. MED-EL Elektromedizinische Geräte GmbH*, IPR2019-01469, Paper 6, 8-11 (PTAB Feb. 13, 2020) (precedential). The Office has not made aware of Tao and Wang868, and thus the combination of Tao with Hon or Tao and Wang868 with Hon has never formed the basis of any prior art rejection. Accordingly, *Becton, Dickinson* factor (c) weighs in favor of institution.

Nonetheless, to the extent that the Board reaches part 2 of the *Advanced Bionics* analysis, the instant petition favors institutions. The instant petition

explains how the electret microphone of Tao operates to interact with the device's ultrasonic circuit to simulate the feeling of smoking. EX1004, ¶¶104-105. Such detail was absent from Hon and Cox, and the Jupiter Petition. By not considering a combination based on Tao (or Tao and Wang868), the Office erred in its evaluation of the prior art. *Advanced Bionics*, Paper 6, 10 (discussing petitioner's evidence of previous Office error in the context of *Beckton, Dickinson* factors (e) and (f)). In Sections XI and XII, Grounds 4 and 5, respectively, demonstrate that further consideration is warranted. The Jupiter Petition did not consider the teachings presented herein, or the evidence of those combinations as supported by Dr. Sturges' declaration. As such, even if the Board reaches part 2 of the *Advanced Bionics* analysis, *Becton, Dickinson* factors (c), (e), and (f) weigh in favor of institution.

Similarly, under 35 U.S.C. §314(a), the Patent Owner's district court action against Petitioner provides no reason to deny institution under *Fintiv*. *Apple Inc. v. Fintiv Inc.*, IPR2020-00019, Paper 11 (PTAB Mar. 20, 2020) (precedential) ("*Fintiv*"). The district court matters against the real parties in interest are still in the very early stages, and currently there is no evidence that the court will or will not grant a stay if trial is instituted (factor 1). The court has yet to issue a scheduling order, fact discovery has not started, no trial date has yet been set (factor 2). There are not any substantive issues related to the '622 Patent that have

been considered or argued in the district court matters (factor 3). Although Patent Owner has initiated district court proceedings against Petitioner (factor 5), there is a minimal risk of the Board redoing the work of another tribunal given the parallel litigation is at such an early stage. *Fintiv*, 13-14. The same is true with respect to the first three cases identified in the Related Matters Section, *see supra* §II.B. Each of those matters are still in the early stages, such as addressing a motion to dismiss (No. 9:23-cv-80291), or the complaint having not yet even been answered (No. 0:23-cv-60357 and No. 0:23-cv-60358). Finally, it is unknown as to the amount of overlap there will be between the issues raised in the current petition and the district court action between the Patent Owner and Petitioner, as no infringement contentions have yet been served and the complaints have only alleged infringement of claim 13 of the '622 Patent (factor 4). *See*, *e.g.*, EX1025, ¶125; EX1026, ¶125.

As established above, Petitioner has set forth strong Grounds that overwhelmingly establish that the Challenged Claims are not patentable. Based on the strength of the merits, denial of the Petition under 35 U.S.C. §314(a) is inappropriate.

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

XIV. CONCLUSION

Petitioner respectfully submits that the Board should institute IPR and cancel the Challenged Claims.

Date: July 29, 2023

Respectfully submitted,

/David P. Lindner/

David P. Lindner, Lead Counsel
Reg. No. 53,222

CERTIFICATE OF SERVICE

The undersigned hereby certifies that I caused a true and correct copy of the foregoing Petition for *inter partes* review of US Patent No. 8,205,622 and all supporting documents including exhibits and power of attorney to be served via overnight FedEx, for delivery on July 31, 2023, on the Patent Owner at the following correspondence address of record, as listed on Patent Center, for the subject patent:

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Date: July 29, 2023

Respectfully submitted,

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