

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

NJOY, LLC and NJOY HOLDINGS, INC.,
Petitioners,

v.

JUUL LABS, INC.,
Patent Owner

PETITION FOR *INTER PARTES* REVIEW
OF U.S. PATENT NO. 10,130,123

TABLE OF CONTENTS

	Page
I. MANDATORY NOTICES	1
A. Real Party-in-Interest	1
B. Related Matters.....	1
C. Lead and Back-up Counsel and Service Information	2
II. GROUNDS FOR STANDING.....	2
III. BACKGROUND AND OVERVIEW OF THE '123 PATENT	2
IV. STATUTORY GROUNDS FOR THE CHALLENGES	5
V. LEVEL OF ORDINARY SKILL IN THE ART.....	7
VI. CLAIM CONSTRUCTION	7
VII. PROSECUTION HISTORY OF THE '123 PATENT.....	8
VIII. INTRODUCTION TO THE PRIOR ART	9
A. Differential Pressure Sensors	9
B. MEMS Sensor	10
C. Worm (EX1004) (Base Reference).....	12
D. Levitz (EX1010) (Secondary Reference).....	20
E. Thorens (EX1016) (Base Reference)	21
F. Weigensberg (EX1006) (Secondary Reference).....	23
G. Lamb (EX1005) (Secondary Reference).....	26

IX.	IDENTIFICATION OF HOW THE CHALLENGED CLAIMS ARE UNPATENTABLE.....	28
A.	Ground 1: Worm Anticipates Claims 14, 27 and 32 of the '123 Patent	28
1.	Claim 14	28
a.	[14.A] A vaporizer device body comprising:	28
b.	[14.B] a cartridge receptacle configured to insertably receive a cartridge containing a vaporizable material;	30
c.	[14.C] a pressure sensor configured to output sensor readings, ...	31
d.	[14.D] wherein a first side of the pressure sensor is exposed to a sealed air flow path and a second side of the pressure sensor is exposed to a device air path open to ambient pressure, ...	34
e.	[14.E] the sealed air flow path comprising a channel formed between an interior surface of the cartridge receptacle and an exterior surface of the cartridge, ...	40
f.	[14.F] the sealed air flow path passing from an air inlet, through the channel and to a heater and an outlet of a mouthpiece within the cartridge; and	42
g.	[14.G] a gasket around the pressure sensor, the gasket configured to seal the device air path from the sealed air flow path.	45
2.	Claim 27	46
a.	[27.A] A vaporizer device comprising:	46

Petition for *Inter Partes* Review of U.S. Patent No. 10,130,123

b.	[27.B] a cartridge comprising a reservoir configured to hold a vaporizable material, a heater configured to heat the vaporizable material, and a mouthpiece in fluid communication with the heater; and.....	47
c.	[27.C] a device body comprising:	48
d.	[27.D] a cartridge receptacle configured to insertably receive the cartridge;.....	48
e.	[27.E] a pressure sensor configured to output sensor readings,.....	48
f.	[27.F] wherein a first side of the pressure sensor is exposed to a sealed air flow path and a second side of the pressure sensor is exposed to a device air path open to ambient pressure, ...	48
g.	[27.G] the sealed air flow path comprising a channel formed between an interior surface of the cartridge receptacle and an exterior surface of the cartridge,.....	48
h.	[27.H] the sealed air flow path passing from an air inlet, through the channel and to the heater and an outlet in the mouthpiece of the cartridge; and.....	48
i.	[27.I] a gasket around the pressure sensor, the gasket configured to seal the device air path from the sealed air flow path.	48
3.	Claim 32: The vaporizer device of claim 27, wherein the cartridge comprises the vaporizable material, and wherein the vaporizable material comprises a nicotine formulation.	49
B.	Ground 2: Worm and the Knowledge of a POSA Renders Obvious Claims 14, 27 and 32 of the '123 Patent	50

Petition for *Inter Partes* Review of U.S. Patent No. 10,130,123

C.	Ground 3: Worm in view of Levitz Renders Obvious Claims 14, 27, and 32 of the '123 Patent.....	52
1.	Sealed air flow path (limitations [14.E], [14.F], [27.G], and [27.H]).....	52
D.	Ground 4: Thorens and Weigensberg in view of the Knowledge of a POSA Renders Obvious Claims 14, 27, and 32 of the '123 Patent	63
1.	Motivation to combine Thorens and Weigensberg.....	63
2.	Claim 14.....	70
a.	[14.A] A vaporizer device body comprising:	70
b.	[14.B] a cartridge receptacle configured to insertably receive a cartridge containing a vaporizable material;	71
c.	[14.C] a pressure sensor configured to output sensor readings,.....	73
d.	[14.D] wherein a first side of the pressure sensor is exposed to a sealed air flow path and a second side of the pressure sensor is exposed to a device air path open to ambient pressure, ...	75
e.	[14.E] the sealed air flow path comprising a channel formed between an interior surface of the cartridge receptacle and an exterior surface of the cartridge, ...	78
f.	[14.F] the sealed air flow path passing from an air inlet, through the channel and to a heater and an outlet of a mouthpiece within the cartridge; and.....	80
g.	[14.G] a gasket around the pressure sensor, the gasket configured to seal the device air path from the sealed air flow path.	81

3.	Claim 27.....	83
a.	[27.A] A vaporizer device comprising:	84
b.	[27.B] a cartridge comprising a reservoir configured to hold a vaporizable material, a heater configured to heat the vaporizable material, and a mouthpiece in fluid communication with the heater; and.....	84
c.	[27.C] a device body comprising:	85
d.	[27.D] a cartridge receptacle configured to insertably receive the cartridge;.....	85
e.	[27.E] a pressure sensor configured to output sensor readings,.....	85
f.	[27.F] wherein a first side of the pressure sensor is exposed to a sealed air flow path and a second side of the pressure sensor is exposed to a device air path open to ambient pressure, ...	85
g.	[27.G] the sealed air flow path comprising a channel formed between an interior surface of the cartridge receptacle and an exterior surface of the cartridge,.....	85
h.	[27.H] the sealed air flow path passing from an air inlet, through the channel and to the heater and an outlet in the mouthpiece of the cartridge; and.....	86
i.	[27.I] a gasket around the pressure sensor, the gasket configured to seal the device air path from the sealed air flow path.	86
4.	Claim 32: The vaporizer device of claim 27, wherein the cartridge comprises the vaporizable material, and wherein the vaporizable material comprises a nicotine formulation.	86

Petition for *Inter Partes* Review of U.S. Patent No. 10,130,123

E.	Grounds 5-8: Grounds 1-4, further in view of Lamb, Render Obvious Claims 14, 15, 16, 18, 27, 28, 29, 31, and 32 of the '123 Patent	87
1.	Motivation to Combine each of Grounds 1-4 with Lamb.....	90
2.	Claims 14 and 27: a pressure sensor configured to output sensor readings;.....	94
3.	Claims 14 and 27: a gasket around the pressure sensor, the gasket configured to seal the device air path from the sealed air flow path.	95
4.	Claims 15 and 28: The vaporizer device [body] of claim [14] / [27], wherein the pressure sensor comprises a capacitive membrane.	97
5.	Claims 16 and 29: The vaporizer device [body] of claim [14] / [27], wherein the pressure sensor comprises a MEMS pressure sensor.	98
6.	Claims 18 and 31: The vaporizer device [body] of claim [14] / [27], wherein the sensor readings output by the pressure sensor comprise pressure values.....	98
7.	Claim 32: The vaporizer device of claim 27, wherein the cartridge comprises the vaporizable material, and wherein the vaporizable material comprises a nicotine formulation.	99
X.	DISCRETIONARY DENIAL IS NOT WARRANTED.....	99
A.	35 U.S.C. § 314(a) Denial Not Warranted	99
B.	35 U.S.C. § 325(d) Denial Not Warranted.....	100
XI.	NO SECONDARY CONSIDERATIONS APPLY	101
XII.	CONCLUSION.....	102

PETITIONERS' EXHIBIT LIST

EX1001	U.S. Patent No. 10,130,123 (“’123 Patent”)
EX1002	’123 Patent File History
EX1003	Expert Declaration of Joseph C. M ^c Alexander ^{III}
EX1004	U.S. Patent Publication No. 2015/0245658 (“Worm”)
EX1005	U.S. Patent Publication No. 2016/0128389 (“Lamb”)
EX1006	U.S. Patent Publication No. 2015/0020831 (“Weigensberg”)
EX1007	U.S. Patent No. 8,528,569 (“Newton569”)
EX1008	U.S. Patent Publication No. 2014/0000638 (“Sebastian”)
EX1009	U.S. Patent No. 8,499,766 (“Newton766”)
EX1010	WO 2012/142293 (“Levitz”)
EX1011	U.S. Patent No. 8,375,957 (“Hon957”)
EX1012	U.S. Patent Publication No. 2014/0174458 (“Katz”)
EX1013	U.S. Patent Publication No. 2014/0261495 (“Novak”)
EX1014	U.S. Patent Publication No. 2017/0318861 (“Thorens II”)
EX1015	U.S. Patent No. 9,801,415 (“Tu”)
EX1016	U.S. Patent Publication No. 2014/0318559 (“Thorens”)
EX1017	EP0277519 (“Roberts”)
EX1018	EP2110034 (“Fernando”)
EX1019	U.S.I.T.C. Investigation No. 337-TA-1368, Joint Claim Construction Chart
EX1020	MS5637-02BA03 Data Sheet
EX1021	WO 2015/153443 (“Henry”)
EX1022	U.S. Patent Publication No. 2016/0374397 (“Jordan”)
EX1023	U.S. Provisional Pat. No. 62/184,569
EX1024	EP1736065 (“Hon065”)
EX1025	<i>Reserved</i>
EX1026	Honeywell 160PC Low Pressure Datasheet
EX1027	Curriculum Vitae of Joseph C. M ^c Alexander ^{III}
EX1028	U.S. Patent Publication No. 2014/0150810 (“Hon810”)

Petition for *Inter Partes* Review of U.S. Patent No. 10,130,123

EX1029	Screen shots of Internet Archives webpages for Honeywell website on November 27, 2004 with Model 163PC01D36 datasheet
EX1030	Screen shots of Internet Archives webpages for Measurement Specialties website on August 12, 2013 with MS5637-02BA03 datasheet, dated May 22, 2013
EX1031	<i>JUUL Labs, Inc. v. NJOY, LLC</i> , No. 23-cv-01204 (D. Ariz.) Docket (retrieved Nov. 13, 2023)

I. MANDATORY NOTICES

A. Real Party-in-Interest

NJOY, LLC and NJOY Holdings, Inc (collectively, “Petitioners”), Altria Group, Inc., Altria Group Distribution Company, Altria Client Services LLC, and Shenzhen Smoore Technology Limited are the real parties-in-interest.

B. Related Matters

U.S. Patent No. 10,130,123 (“’123 Patent”), along with U.S. Patent Nos. RE49,114 (“’114 Patent”), 10,709,173 (“’173 Patent”), 11,134,722 (“’722 Patent”), and 11,606,981 (“’981 Patent”), are all subject to a Section 337 Investigation before the International Trade Commission, *Certain Vaporizer Devices, Cartridges Used Therewith, and Components Thereof*, 337-TA-1368 (“ITC Investigation”), initiated by Patent Owner and co-Complainant VMR Products LLC. The ’123 Patent, the ’173 Patent, the ’114 Patent, the ’722 Patent, and the ’981 Patent are also part of the civil litigation matter filed by Patent Owner and VMR Products LLC against Petitioners, *JUUL Labs, Inc. v. NJOY, LLC*, Case No. 23-cv-01204 (D. Ariz.). Both matters were filed on June 30, 2023.

Petitions for *inter partes* review for the ’173 Patent, the ’114 Patent, the ’722 Patent, and the ’981 Patent are being concurrently filed with this Petition or shortly thereafter.

C. Lead and Back-up Counsel and Service Information

Anish R. Desai (lead counsel) Reg. No. 73,760 Elizabeth S. Weiswasser (backup counsel) Reg. No. 55,721 Weil, Gotshal & Manges LLP 767 Fifth Ave. New York, NY 10153 T: 212-310-8000 F: 212-310-8007 elizabeth.weiswasser@weil.com anish.desai@weil.com Adrian C. Percer (backup counsel) Reg. No. 46,986 Anne M. Cappella (backup counsel) Reg. No. 43,217 Weil, Gotshal & Manges LLP 201 Redwood Shores Parkway Redwood Shores, CA 94065 T: 650-802-3000 F: 650-802-3100 adrian.percer@weil.com anne.cappella@weil.com	W. Sutton Ansley (backup counsel) Reg. No. 67,828 Matthew Sieger (backup counsel) Reg. No. 76,051 Taylor J. Lawrence (backup counsel) Reg. No. 79,817 Weil, Gotshal & Manges LLP 2001 M Street NW, Suite 600 Washington, DC 20036 T: 202-682-7000 F: 202-857-0940 sutton.ansley@weil.com matthew.sieger@weil.com taylor.lawrence@weil.com
---	--

II. GROUNDS FOR STANDING

Petitioner certifies that the '123 Patent is available for *inter partes* review and that Petitioner is not barred or estopped from requesting *inter partes* review challenging the patent claims on the grounds identified in this Petition.

III. BACKGROUND AND OVERVIEW OF THE '123 PATENT

The '123 Patent was filed on February 10, 2017, and claims a vaporizer device comprising device body 20, pod or cartridge 30a, and cartridge receptacle 21

(configured to receive the cartridge), an embodiment is depicted below.

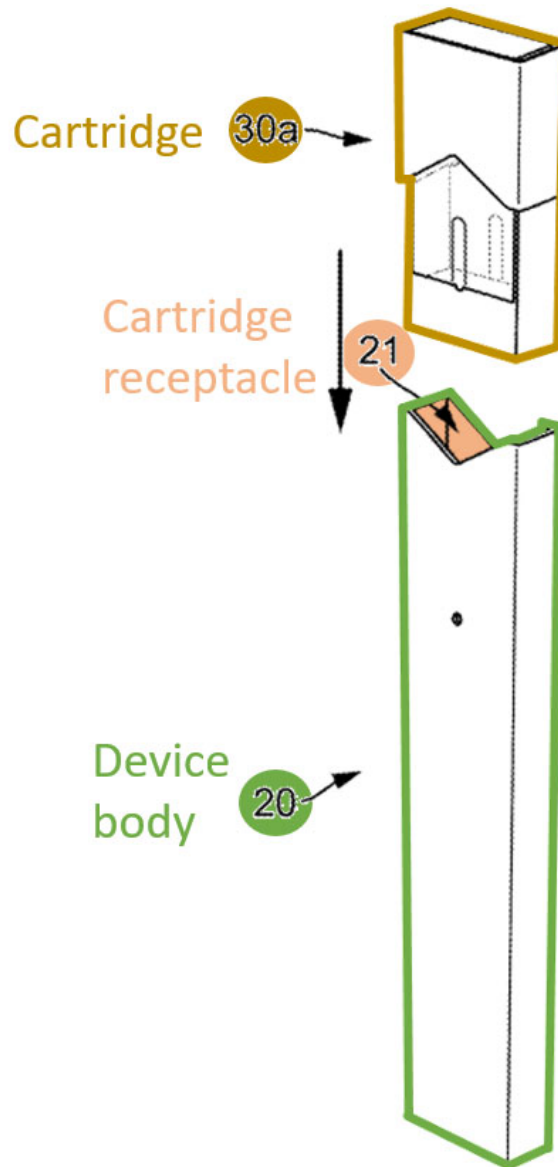


FIG. 12

EX1001, Fig. 12¹

The device body further comprises a pressure sensor that, when the device is

¹ Colored annotations and highlighting added to figures unless otherwise indicated.

in use, is exposed on one side to ambient pressure and on the second side to a negative pressure. Figure 25 depicts pressure sensor 2509. EX1003, ¶¶67-68.

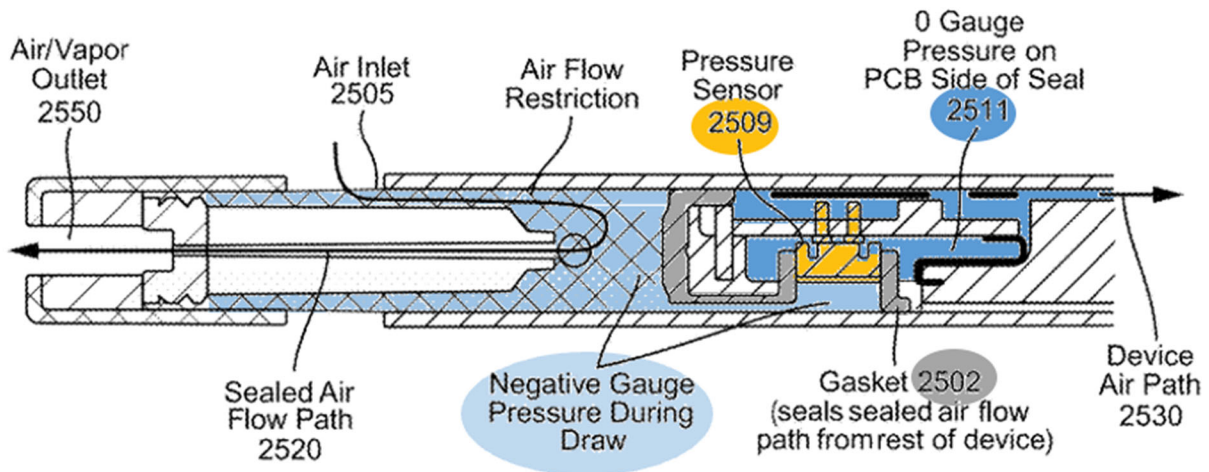


FIG. 25

EX1001, Figure 25

On one side (dark blue) pressure sensor 2509 is exposed to ambient pressure as device air path 2530 is open to the environment. EX1001, 42:25-39. On the second side (light blue) pressure sensor 2509 is exposed to negative pressure when the smoker inhales at outlet 2550. The '123 Patent refers to an airflow path created by inhalation as “sealed air path 2520” because the airflow path is not in fluid communication with device air path 2530 due to sealing gasket 2502 (grey). EX1001, 42:14-46. EX1003, ¶69.

Each challenged claim recites, in various permutations, a pressure sensor having a side exposed to ambient pressure and a side exposed to negative pressure,

where the negative pressure side is sealed from the ambient pressure side by a gasket.

As demonstrated in this Petition, the prior art anticipates and/or renders obvious claims 14, 15, 16, 18, 27, 28, 29, 31, and 32 of the '123 Patent.

IV. STATUTORY GROUNDS FOR THE CHALLENGES²

Ground 1	Claims 14, 27 and 32 of the '123 Patent are unpatentable under 35 U.S.C. § 102 on the ground that they are anticipated by U.S. Patent Publication No. 2015/0245658 (“Worm”; EX1004). Worm is prior art under at least under 35 U.S.C. § 102(a)(1).
Ground 2	Claims 14, 27 and 32 of the '123 Patent are unpatentable under 35 U.S.C. § 103 on the ground that they are rendered obvious by Worm in view of the knowledge of a POSA.
Ground 3	Claims 14, 27 and 32 of the '123 Patent are unpatentable under 35 U.S.C. § 103 on the ground that they are rendered obvious by Worm in light of WO 2012/142293 (“Levitz”; EX1010). Levitz is prior art under at least under 35 U.S.C. § 102(a)(1).

² The '123 Patent claims priority to Provisional application No. 62/294,271, filed on February 11, 2016. Petitioner takes no position on the '123 Patent's priority date. The prior art set forth below predates February 11, 2016 and therefore predates any possible priority date of the '123 Patent.

Ground 4	Claims 14, 27, and 32 of the '123 Patent are unpatentable under 35 U.S.C. § 103 on the ground that they are rendered obvious by Thorens and Weigensberg in view of the knowledge of a POSA. Thorens and Weigensberg are prior art under at least 35 U.S.C. § 102(a)(1).
Ground 5	Claims 14, 15, 16, 18, 27, 28, 29, and 31 of the '123 Patent are unpatentable under 35 U.S.C. § 103 on the ground that they are rendered obvious by Worm further in view of U.S. Patent Publication 2016/0128389 (“Lamb”; EX1005). Lamb is prior art under at least 35 U.S.C. § 102(a)(2).
Ground 6	Claims 14, 15, 16, 18, 27, 28, 29, and 31 of the '123 Patent are unpatentable under 35 U.S.C. § 103 on the ground that they are rendered obvious by Worm and the knowledge of a POSA further in view of Lamb.
Ground 7	Claims 14, 15, 16, 18, 27, 28, 29, and 31 of the '123 Patent are unpatentable under 35 U.S.C. § 103 on the ground that they are rendered obvious by Worm and Levitz in view of Lamb.

Ground 8	Claims 14, 15, 16, 18, 27, 28, 29, and 31 of the '123 Patent are unpatentable under 35 U.S.C. § 103 on the ground that they are rendered obvious by Thorens and Weigensberg further in view of Lamb.
----------	--

V. LEVEL OF ORDINARY SKILL IN THE ART

A person of ordinary skill in the art (“POSA”) would have at least a B.S. degree in Mechanical Engineering, Electrical Engineering, Industrial Design, Product Design, or similar field, with at least two years of industry experience in one of these fields, and such POSA would have been familiar with electrically powered vaporizing articles, their components or the underlying technologies.

VI. CLAIM CONSTRUCTION

The parties construed a claim term in the ITC Investigation for the '123 Patent. EX1019. The parties proposed a construction for “pressure values,” which appears in dependent claims 18 and 31:

- **Petitioner:** “a numerical amount of pressure (in mmHg, atm, or other units)” (citing EX1001, 41:58-65 (“In such cases the output of the sensor (which may be converted by the sensor and/or associated circuitry into a pressure value (e.g., in mmHg, atm, etc.)”); and
- **Patent Owner:** “Plain and ordinary meaning, *e.g.*, a numeral value indicative of pressure”.

The Grounds herein show that each challenged claim is disclosed by one or more grounds under either construction.

VII. PROSECUTION HISTORY OF THE '123 PATENT

The '123 Patent was filed as Application No. 15/430,317 on February 10, 2017, claiming priority to Provisional Application No. 62/294,271, filed on February 11, 2016.

On November 27, 2017, the examiner issued a non-final office action, rejecting claims 1, 3-6, 13-19, 21, 24, and 25 under 35 U.S.C. § 103 as obvious in view of Thorens (U.S. Patent Publication No. 2017/0318861) (“Thorens II”) and stating that claims 2, 8, 11, 12, 22, and 23 were objected to as dependent upon a rejected base claim, but would be allowable if rewritten in independent form. EX1002, 126-131. Claim 2 was directed to a sensor exposed to sealed and ambient air flow paths on different sides and a gasket surrounding the pressure sensor. Claim 8 required a MEMs sensor. Claims 11, 12, 22, and 23 were directed to use of instantaneous sensor readings. EX1002, 35. EX1003, ¶¶81-85.

Applicant responded on May 30, 2018, amending claims 1 and 3-25 by incorporating aspects of dependent claim 2, and adding claims 26-32. EX1002, 168. In drafting new claims 29 and 31, Applicant stated that they incorporated elements from allowed dependent claim 2, but omitted features from independent claim 1. EX1002, 176-177. The new claims omitted limitations directed to use of

instantaneous sensor readings and added limitations to the cartridge receptacle and characteristics of a sealed air path. EX1002, 319-320; *compare* 34 to 166-167. EX1003, ¶¶86-89.

The examiner then issued a notice of allowance. EX1002, 507-523. In the Reasons for Allowance for claims 1, 15, 29 and 31, the examiner specifically identified a sensor with sealed and ambient air flow paths on different sides and a gasket surrounding the pressure sensor that seals the device air path from the sealed air flow path.³ EX1002, 522. On the same day, Applicant cancelled claims 1-28 and added claim 55.⁴ EX1002, 599-606. The '123 Patent issued on November 20, 2018. A certificate of correction later removed claims 1-13 and 41-53, which had been cancelled in Applicant's last amendment. EX1002, 631. EX1003, ¶¶90-93.

VIII. INTRODUCTION TO THE PRIOR ART

A. Differential Pressure Sensors

Differential pressure sensors measure air pressure fluctuations relative to a reference pressure, such as ambient. EX1003, ¶29; EX1023, [0083]; EX1022, [0101].

Differential pressure sensors were used in e-cigarettes before the filing of the

³ Claim 29 and 31 issued as claims 14 and 27, respectively.

⁴ Claim 55 issued as claim 32.

'123 Patent. *See* EX1022 (claiming priority to June 25, 2015; EX1023). E-cigarettes conventionally used a differential pressure sensor that “is generally set on an end of the device and put into a gasket that seals one side of the sensor from another side of the sensor.”). EX1023, [0083]; EX1022, [0101]. Inhaling on an e-cigarette creates a negative pressure and “the sealed side of the differential pressure sensor detects a pressure drop (vacuum), while the ambient side detects less of a drop due to the exposure by not being sealed. The differential pressure sensor then provides a differential signal.” EX1023, [0083]; EX1022, [0101]. A differential sensor can output sensor readings that correspond to pressure values. EX1003, ¶¶29-33.

The '123 Patent does not allege that its sensors are novel, instead disclosing that any differential pressure sensor that measures the pressure on different sides of the sensor could be used, including those open to ambient air. EX1003, ¶¶34-35; EX1001, 4:49-60 (“In general, the pressure sensors described herein may be *any differential pressure sensor*....Differential pressure sensors may measure the distance between two pressures, one connected on different sides of the sensor. This includes pressure sensors in which one side is open/connected to ambient atmosphere (pressure)"); 41:56-58.

B. MEMS Sensor

Using a MEMS sensor in an e-cigarette was known no later than 2008. *See* EX1018 (filed April 17, 2008), [0039] (“...the sensor may be any of: a mechanical

device, an optical device, an opto-mechanical device and a micro electro-mechanical-systems (MEMS) based sensor.”). As noted above, the ’123 Patent admits that any differential pressure sensor could be used, including a MEMS sensor. EX1001, 4:49-56 (“In general, the pressure sensors described herein may be ***any differential pressure sensor, such as MEMS***, capacitive pressures sensors (e.g., including a capacitive membrane), or any force collector type pressure sensors that use a transducer to measure pressure or pressure differences (e.g., diaphragm, piston, etc.), piezoresistive, electromagnetic, piezoelectric, optical, potentiometric, resonant (including MEMS), etc.”). EX1003, ¶¶36-37.

A MEMS pressure sensor can output pressure data in pressure units. For example, MEMS pressure sensor MS5637-02BA03 datasheet, dated May 22, 2013.⁵ EX1020 (showing mbar pressure units with a 24-bit digital output); EX1003, ¶38.

⁵ See EX1030 (Internet Archives webpages from August 12, 2013 for this datasheet).

TECHNICAL DATA

Sensor Performances ($V_{DD} = 3\text{ V}$)				
Pressure	Min	Typ	Max	Unit
Maximum Range	10		2000	mbar
ADC	24			bit
Resolution (1)	0.11 / 0.062 / 0.039 / 0.028 / 0.021 / 0.016			mbar
Error band at 25°C, 300 to 1200 mbar	-2		+2	mbar
Error band, -20°C to + 85°C 300 to 1200 mbar (2)	-4		+4	mbar
Response time (1)	0.5 / 1.1 / 2.1 / 4.1 / 8.22 / 16.44			ms
Long term stability		±1		mbar/yr
Temperature	Min	Typ	Max	Unit
Range	-40		+85	°C
Resolution		<0.01		°C
Accuracy at 25°C	-1		+1	°C
Notes: (1) Oversampling Ratio: 256 / 512 / 1024 / 2048 / 4096 / 8192 (2) With auto-zero at one pressure point				

EX1020.001 (MS5637-02BA03 Datasheet) (excerpt)

C. Worm (EX1004) (Base Reference)

U.S. Patent Publication No. 2015/0245658 (“Worm”) published on September 3, 2015. Because Worm was published before the ’123 Patent’s earliest possible priority date, Worm is prior art under 35 U.S.C. § 102(a)(2).

Worm discloses an electronic smoking article 200 comprising control body 202, cartridge 204, and coupler 224 with cavity 225 for mechanically engaging the

two, as depicted in Figure 2⁶:

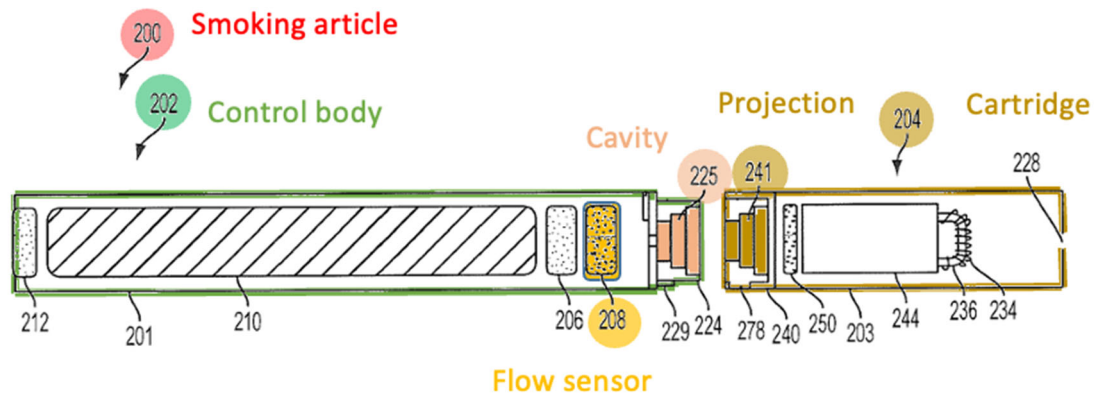
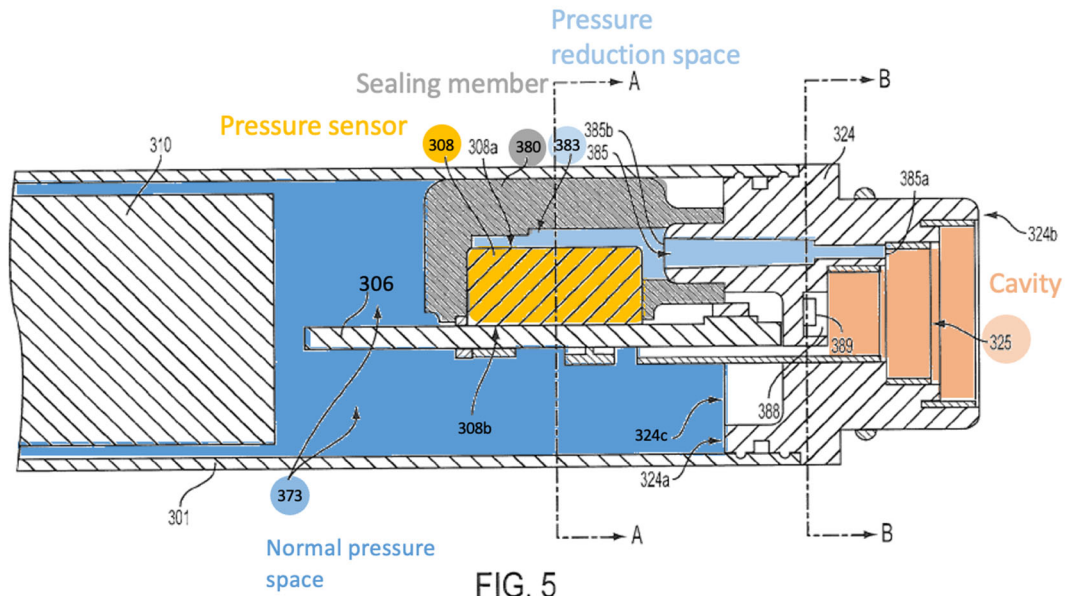


FIG. 2

EX1004, Fig. 2

Within control body 202, Worm discloses pressure sensor 308, normal pressure space 373, pressure reduction space 383, sealing member 380 surrounding pressure sensor 308, as depicted in Figure 5:

⁶ Note that Worm uses the same trailing digits across its figures to indicate the same component – *e.g.*, the control body is 202 in Fig. 2, 702 in Fig. 7, 802 in Fig. 8, etc.



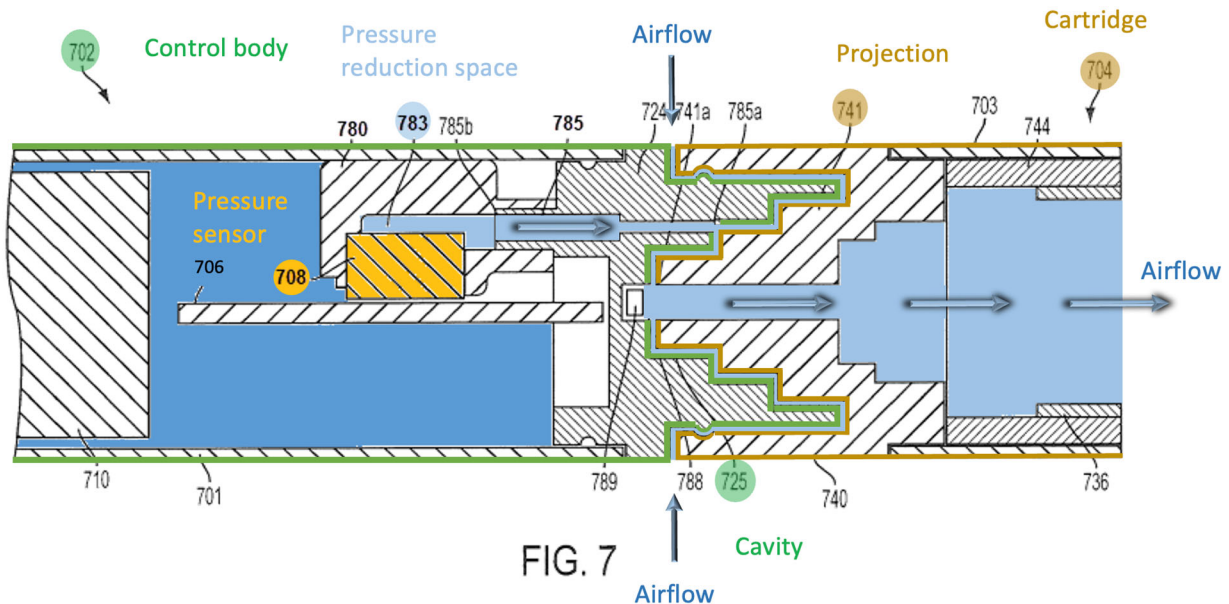
EX1004, Fig. 5

Like the '123 Patent, Worm explains that one side of pressure sensor 308 is exposed to normal (ambient) pressure (dark blue) because the normal pressure space 373 is open to ambient air. EX1004, [0063]-[0064]. EX1003, ¶¶39-41.

Also, like the '123 Patent, the second side of Worm's pressure sensor 308 is exposed to a negative pressure (pressure reduction space 383) (light blue) during use. EX1004, [0064]. And further like the '123 Patent, during use this pressure reduction space 383 is isolated by sealing member 380 (grey) from normal pressure space 373 so that the pressure in pressure reduction space 383 is reduced. EX1004, [0063] ("The pressure reduction space can be isolated from the normal pressure space, and the pressure within the pressure reduction space can be reduced below the pressure in the normal pressure space during use of the article (i.e., during draw

on the article).”). EX1003, ¶42.

When a smoker draws on the device, air enters cavity 725 through air inlets including the connection interface of cavity 725 and projection 741 as depicted below. EX1004, [0076] (“The matched configuration of the cavity 725 and the projection 741 preferably does not substantially form an air tight connection therebetween.”).



EX1004, Fig. 7

This non-airtight connection exposes pressure reduction space 783 to the pressure drop in the channel formed between control body 702 and cartridge 704. EX1004, [0076] (“Thus, the pressure drop in the cavity 725 is likewise communicated to the pressure channel 785 from the first end 785a to the second end 785b and thus the pressure reduction space 783.”). EX1003, ¶43.

Note that, in some embodiments, Worm also discloses air entering the device through air inlet aperture 389/789 as illustrated in Figs. 5, 6B, and 7. EX1004, [0069]; [0075] (“[A]ir draw on the mouthend of the cartridge (see element 130 in FIG. 1) causes air to enter the air inlet channel 788 of the coupler 724 through one or more air inlet apertures 789.”). EX1003, ¶45.

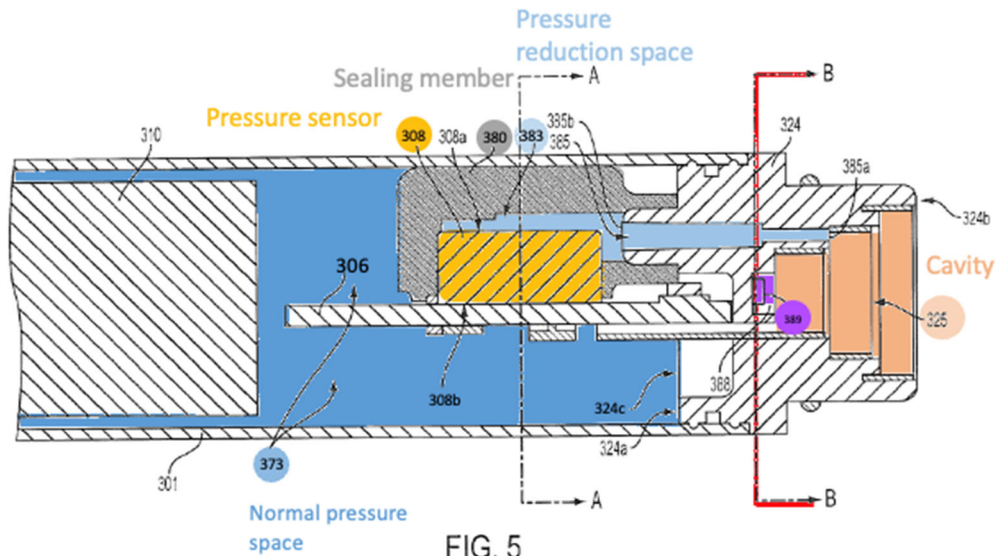


FIG. 5

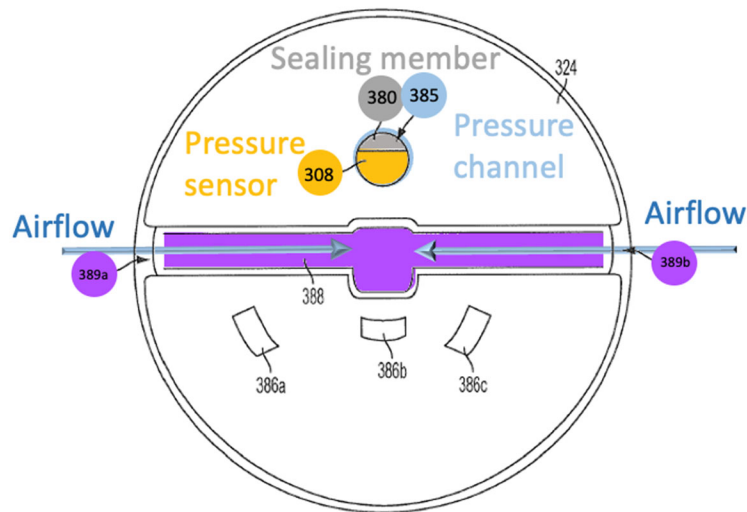
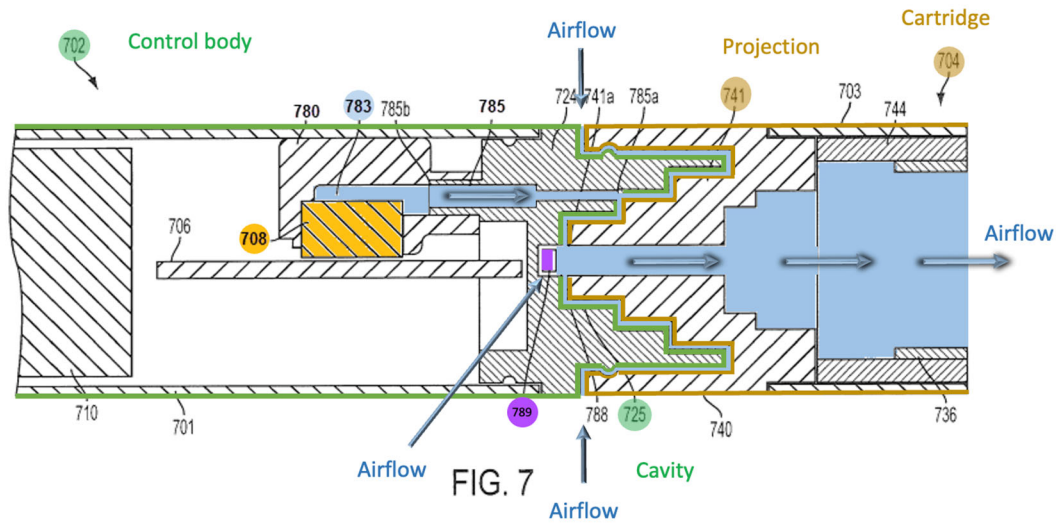


FIG. 6B



EX1004, Figs. 5, 6B, 7

Nonetheless, even with air inlet aperture/channel 389/789, the non-airtight connection between control body 702 and cartridge 704 communicates the pressure drop to pressure reduction space 783. EX1004, [0076] (“When draw on the device causing air to enter the air inlet channel 788 through the air inlet aperture 789 causes a pressure drop, such pressure drop is communicated to the cavity 725.”). EX1003, ¶46.

Notably, Worm depicts the non-airtight interface (channel) as a uniform gap between cartridge 704 and control body 702. EX1003, ¶44.

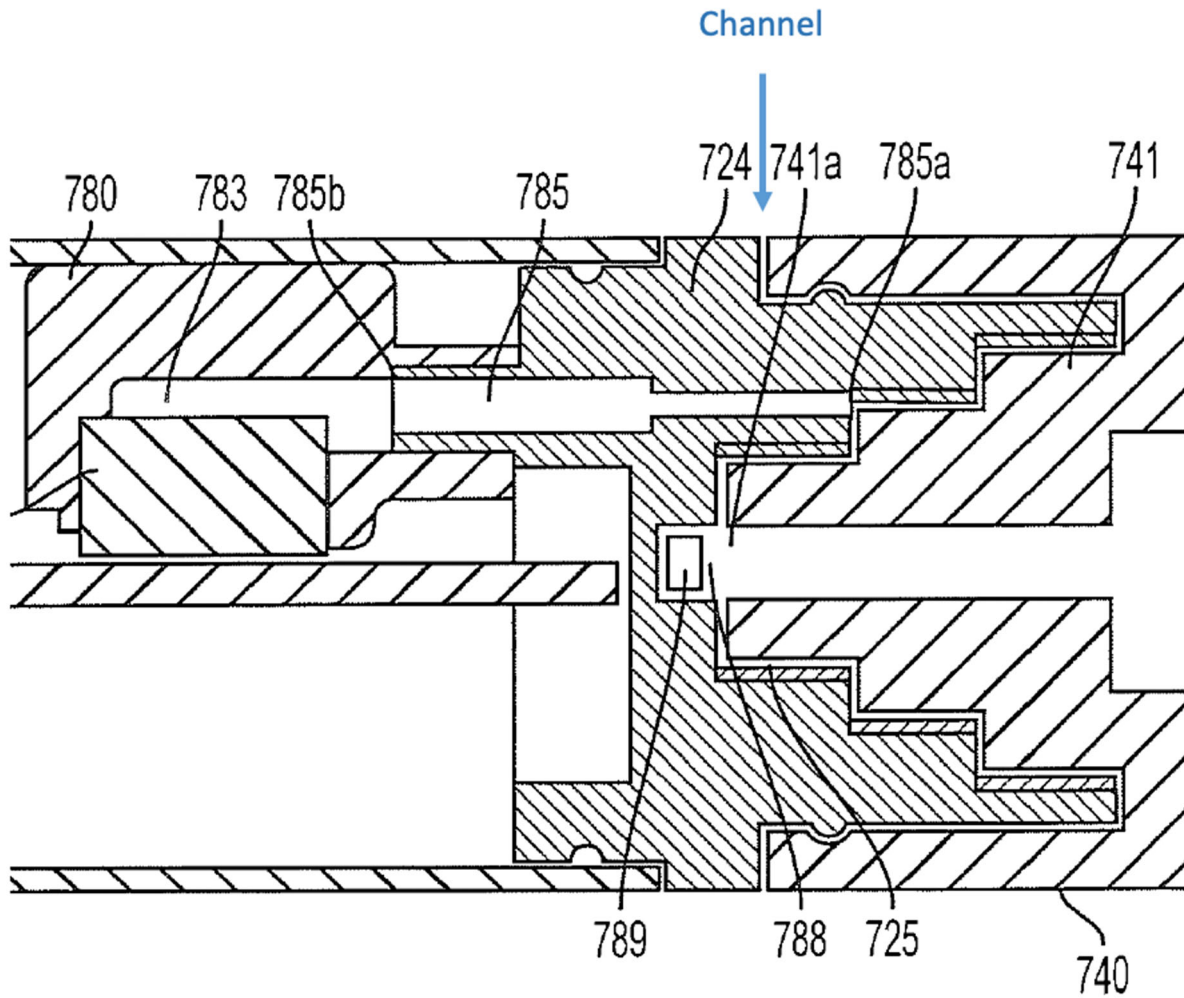


FIG. 7

EX1004, Fig. 7 (excerpt)

When a pressure differential between pressure reduction space and normal pressure space is detected by the pressure sensor, the control circuit activates the device. EX1004, [0008]; [0077]. Worm identifies an exemplary pressure sensor—Model 163PC01D36 manufactured by Honeywell—that provides puff-actuation

(draw detection). EX1004, [0046]. The identified “[d]ifferential pressure sensor[.]” outputs “voltage proportional to applied pressure.” See EX1026.001 (160PC Low Pressure Sensors Datasheet⁷ for differential pressure sensor model 163PC01D36). EX1003, ¶47.

Installation Instructions for 160PC Low Pressure Sensors

PK 87724

GENERAL INFORMATION

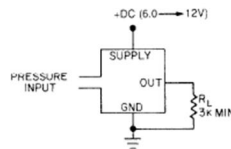
160PC sensors provide an output voltage proportional to applied pressure. They operate from a single, positive supply voltage ranging from 6.0 to 12 VDC. Signal conditioning results in directly usable outputs. Temperature compensation provides predictable performance over specified temperature ranges.

MEASURAND COMPATIBILITY

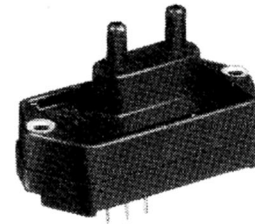
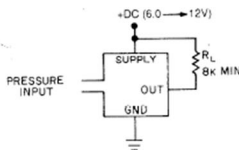
P2 Wetted materials: polyester housing, epoxy adhesive, silicon, borosilicate-glass, silicon-to-glass bond (passive side of IC)*

ELECTRICAL AND PRESSURE CONNECTIONS

Current Source



Current Sink



PRESSURE REFERENCE

Differential pressure sensors apply P1 to the active (connection) side of the chip and P2 to the passive side.

Gage pressure is measured with respect to atmospheric (room) pressure reference.

⁷ See EX1029 (Internet Archives webpages for this datasheet, dated November 27, 2004).

160PC SPECIFICATIONS at 8.0 ± 0.01 VDC, 25°C

Parameter	Min.	Typ.	Max.	Units
F.S.O. (Full Scale Output)*	4.85	5.00	5.15	Volts
Null Offset	0.95	1.00	1.05	Volts
Excitation	6.00	8.00	12.0	VDC
Overpressure	---	---	5	psi
Operating Temperature	-40° to +85°C (-40° to +185°F)			
Storage Temperature	-55° to +125°C (-65° to +257°F)			

*F.S.O. is the algebraic difference between end points (null and full scale pressure outputs). Output voltage at full pressure equals 6.0 ± 0.20 volts at 8.0 VDC.

TYPICAL OUTPUT VOLTAGES for 163PC01D36 and 164PC01D37 Listings @ 8.0 ± 0.1 VDC, 25°C

Listing	Pressure Range	Vo (volts)
163PC01D36	-5" H ₂ O	1.0
	0	3.5
	+5" H ₂ O	6.0
	F.S.O.	5.0
164PC01D37	0	1.0
	10" H ₂ O	6.0
	F.S.O.	5.0

EX1026.001 (160PC Low Pressure Sensors) (excerpts)

D. Levitz (EX1010) (Secondary Reference)

WO 2012/142293 (“Levitz”) published on October 18, 2012. Because Levitz published before the ’123 Patent’s earliest possible priority date, Levitz is prior art under 35 U.S.C. § 102(a)(1).

Levitz discloses a two-piece e-cigarette. EX1010, [0006]. Levitz is relied upon as a secondary reference for disclosing an air flow path where air enters the side of the device (air inlet) at the connection interface between the battery and cartomizer sections, travels through a channel between the battery part and cartomizer connection, enters the cartomizer (cartridge), and exits the cartomizer

through an opening into the smoker's mouth. EX1010, [0017] ("During inhalation, air enters from the side of the Battery and enters the post of the Battery via a groove in the battery post. It then enters into the Cartomizer through the axial opening in the Cartomizer post and exits the Cartomizer into the smoker's mouth."). EX1003, ¶¶55-56.

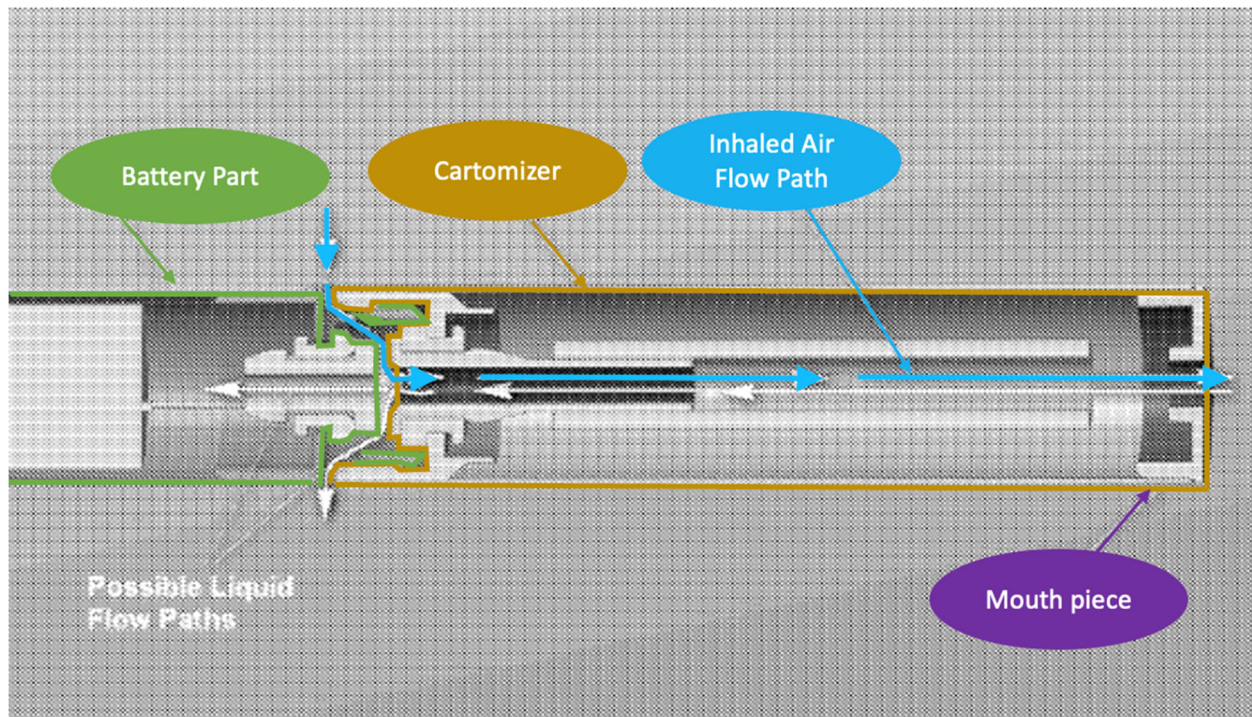


Figure 16

EX1010, Fig. 16

E. Thorens (EX1016) (Base Reference)

U.S. Patent Publication No. 2014/0318559 ("Thorens") published on October 30, 2014. Because Thorens published before the '123 Patent's earliest possible priority date, Thorens is prior art under 35 U.S.C. § 102(a)(1). Thorens is not the same reference cited during prosecution of the '123 Patent.

Thorens discloses electrically heated smoking system 301 comprising (1) a battery portion having exterior shell 101 with a cartridge receptacle and (2) a portion termed mouthpiece 201, which includes cartridge 203 with vaporizable liquid 205 (EX1003, ¶50):

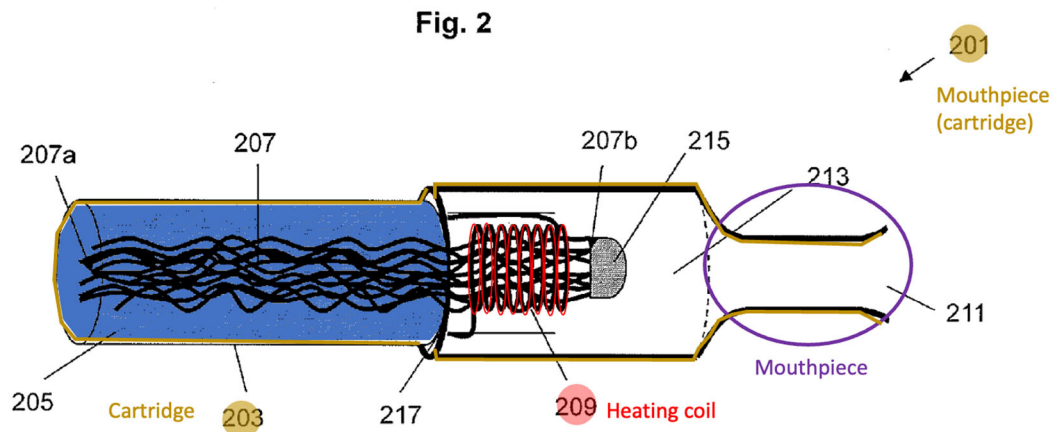
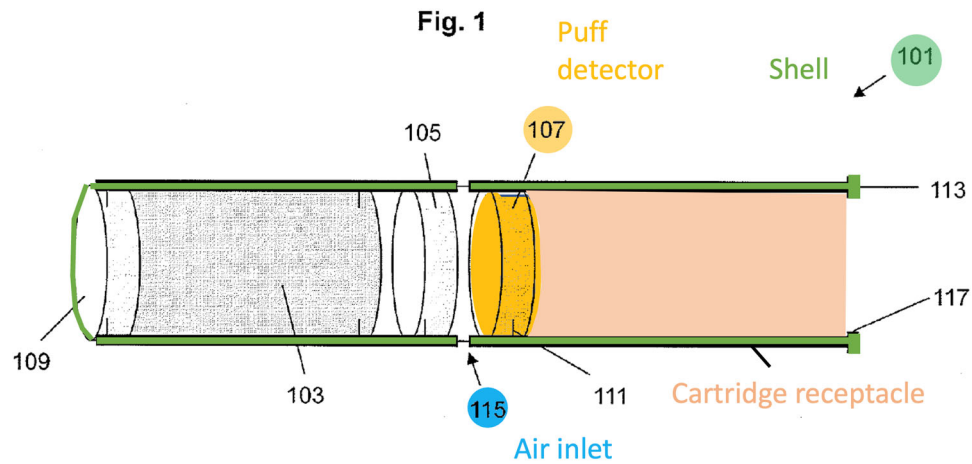
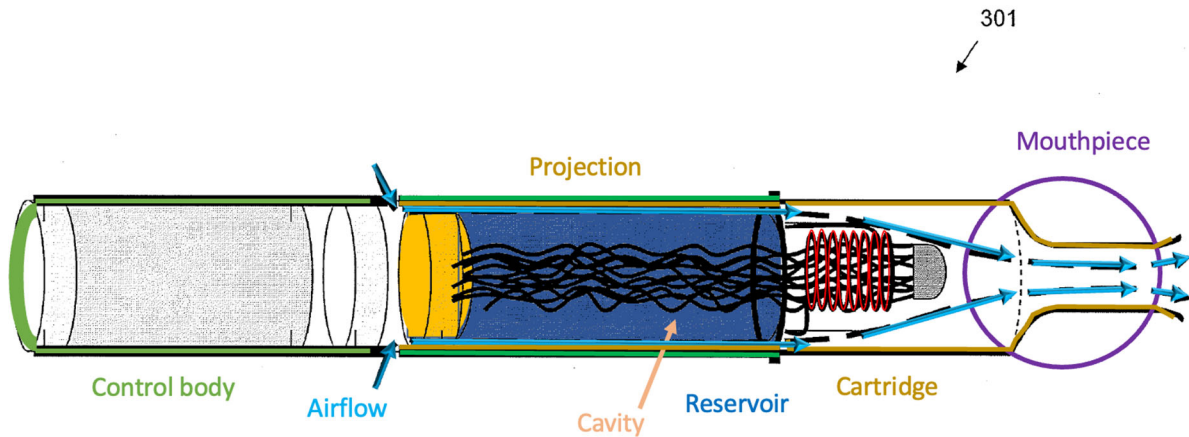


Fig. 3



EX1016, Figs. 1-3

When a smoker draws on the device, air enters air inlets 115, travels past the heating coil 209 and exits the mouthend of mouthpiece 201 EX1016, [0045] (“When the user draws on the device at the air outlet 211, ambient air is drawn through air inlets 115. In this embodiment, the puff detection system 107 senses the puff and activates the heating coil 209 and switches on the puff indicator 109.”); [0007]. EX1003, ¶51.

Thorens’ puff detector (pressure sensor) detects when a smoker draws on the device and that detection is used to manage the device. EX1016, [0046] (“The circuitry 105 and puff detection system 107 can be used to manage the device operation.”). EX1003, ¶52.

F. Weigensberg (EX1006) (Secondary Reference)

U.S. Patent Publication No. 2015/0020831 (“Weigensberg”) published on

January 22, 2015. Because Weigensberg published before the '123 Patent's earliest possible priority date, Weigensberg is prior art under 35 U.S.C. § 102(a)(1).

Weigensberg is relied on as a secondary reference for its disclosure of a differential pressure sensor in a tip for a two-piece e-cigarette and the outputting of pressure values by the differential pressure sensor. EX1003, ¶58.

Weigensberg's pressure sensor/LED tip replaces the tip of standard e-cigarettes. EX1006, [0058]; [0061] ("This assembly is compact, comprising a tip section 36 that replaces the tip 20 of the standard device 10 shown in FIG. 1."). The pressure sensor detects a pressure differential when a user draws on the device. EX1006, [0059] ("When smoke enters the device 10, an internal aperture (not shown) typically constricts the flow, thereby creating a pressure differential, which is sensed by a vacuum sensor 24 of known type.").

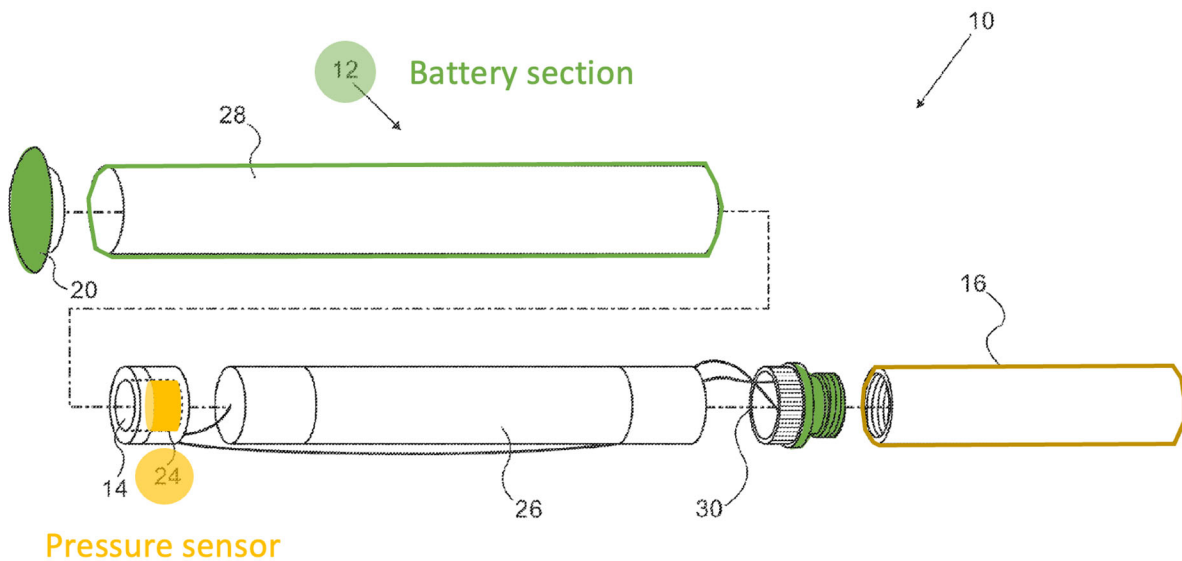
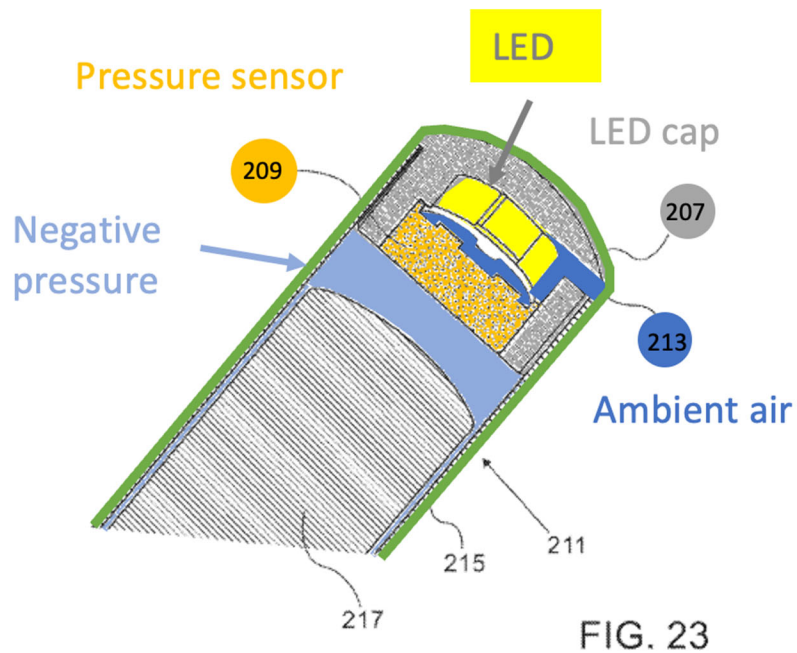


FIG. 1

EX1006, Fig. 1

Weigensberg's differential pressure sensor is exposed to negative pressure on one side and a second side exposed to ambient air. EX1006, [0059] (internal aperture creates a pressure differential); [0107] ("The LED cap 207 has a perforation 213 for communication between the sensor unit 209 and the ambient atmosphere.").

EX1003, ¶¶58-59.



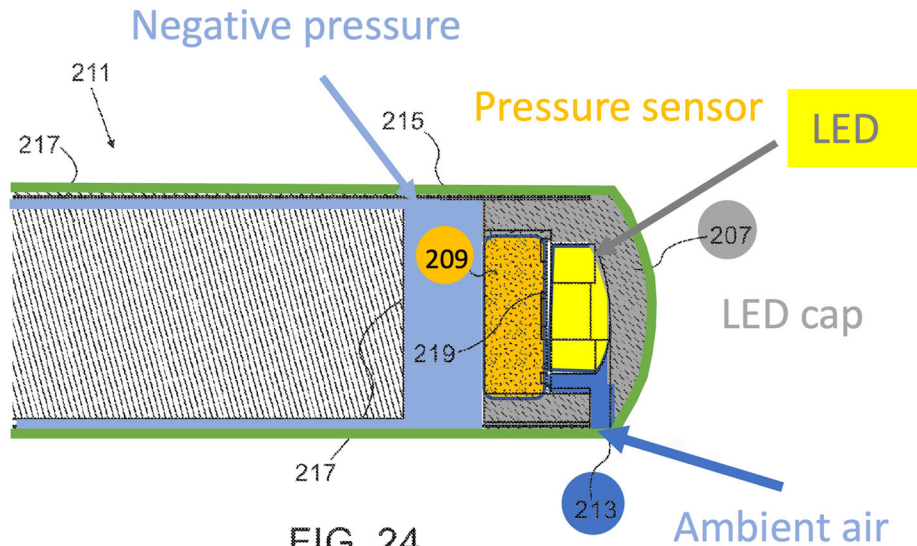


FIG. 24

EX1006, Figs. 23, 24

Weigensberg’s pressure sensor outputs sensor readings. EX1006, [0087] (“Alternatively, the sensor S 167 may be realized as an analog circuit...”). EX1003, ¶60.

G. Lamb (EX1005) (Secondary Reference)

U.S. Patent Publication No. 2016/0128389 (“Lamb”) was published on May 12, 2016. Because Lamb published before the ’123 Patent’s earliest possible priority date, Lamb is prior art under 35 U.S.C. § 102(a)(1).

Lamb is relied on as a secondary reference for its disclosure of MEMS-based pressure sensors that output sensor readings comprising pressure values and the use of a nicotine formulation. EX1003, ¶62.

Lamb depicts and describes the same device shown in Worm, *compare* EX1004, Fig. 2 *with* EX1005, Fig. 1; *compare* EX1004, [0053]-[0057] *with*

EX1005, [0026]-[0032].

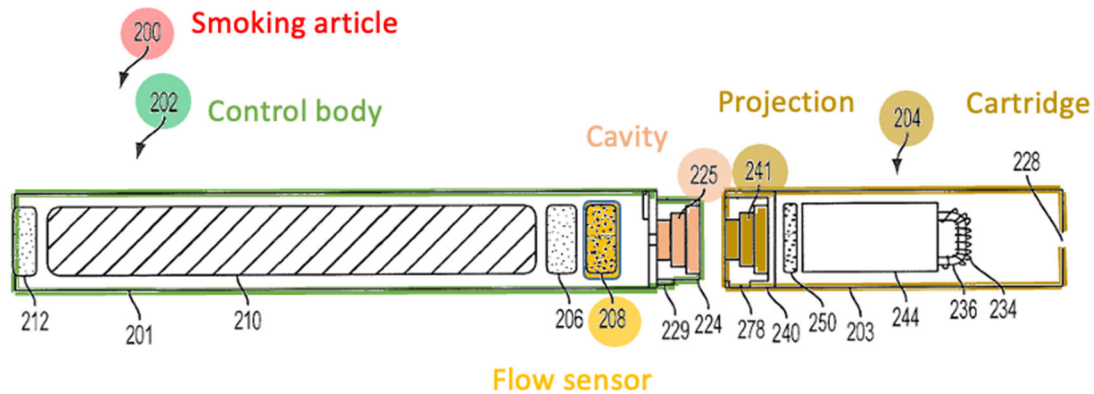


FIG. 2

EX1004 (Worm), Fig. 2

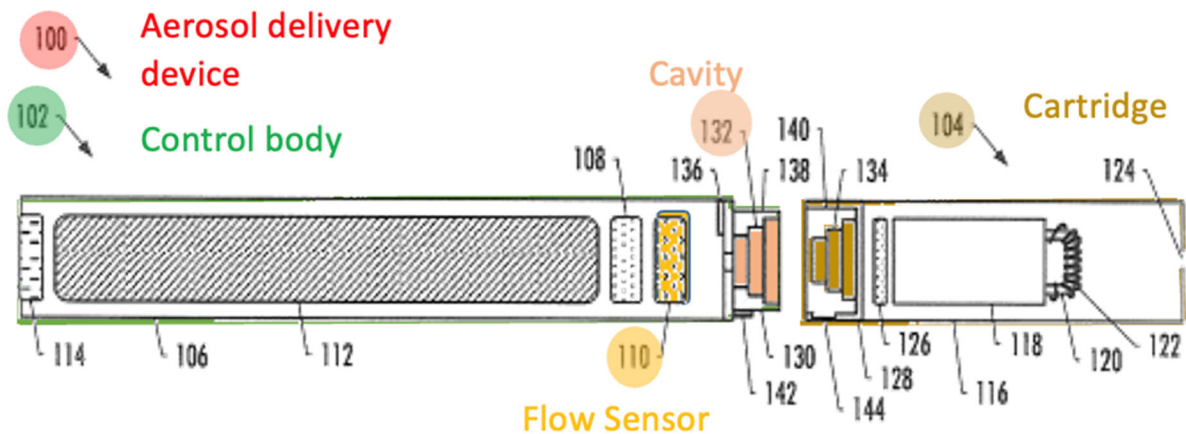


FIG. 1

EX1005 (Lamb), Fig. 1

Lamb discloses an aerosol delivery device 100 comprising control body 102 and cartridge 104, which are mechanically engaged via coupler 130 having cavity 132 for receiving cartridge 104. EX1005, [0031]. Control body includes a flow sensor

110, as shown in Figure 1 above. EX1004, [0026]; [0030]-[0032]. EX1003, ¶¶63-65.

Lamb's flow sensor is a microelectromechanical systems-based ("MEMS-based") sensor configured to "detect a pressure on the MEMS-based sensor caused by airflow through at least a portion of the housing." EX1005, [0004]. Lamb's differential pressure sensor "may be configured to convert the pressure to the electrical signal that varies with a corresponding variation in the pressure relative to an ambient pressure on the MEMS-based sensor." EX1005, [0045]. EX1003, ¶66.

IX. IDENTIFICATION OF HOW THE CHALLENGED CLAIMS ARE UNPATENTABLE

A. Ground 1: Worm Anticipates Claims 14, 27 and 32 of the '123 Patent

1. Claim 14

a. [14.A] A vaporizer device body comprising:

Worm discloses this limitation. EX1003, ¶¶99-102.

Worm discloses smoking article 200 comprising control body 202 and cartridge 204:

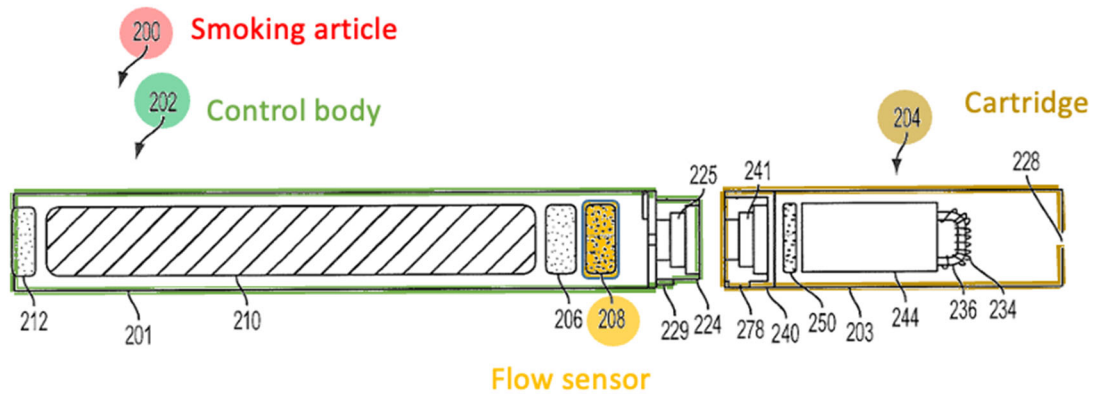


FIG. 2

EX1004, Fig. 2

Worm’s “control body includes a shell and a coupler that is adapted to connect the control body to a cartridge of an electronic smoking article.” EX1004, Abstract; *see also* EX1004, [0056] (“The control body 202 and the cartridge 204 may include components adapted to facilitate a fluid engagement therebetween.”). Worm discloses that its devices “...can be characterized as being vapor-producing articles, smoking articles, or medicament delivery articles.” EX1004, [0026]. EX1003, ¶¶100-101.

Note that Worm considers the coupler part of the control body (battery portion), not a separate, distinct component from the control body. *See, e.g.*, EX1004, Claim 1 (“the control body comprising:...a coupler”); [0005] (“This [the control body] can incorporate a coupler element”); [0010] (“The control body further can comprise a coupler formed of an elongated body...”). EX1003, ¶102.

b. [14.B] a cartridge receptacle configured to insertably receive a cartridge containing a vaporizable material;

Worm discloses this limitation. EX1003, ¶¶103-106.

Worm discloses smoking article 200 comprising (1) control body 202 (“vaporizer device body”) having cavity 225 and (2) cartridge 204 having projection 241 for insertion into cavity 225. EX1004, [0056] (“As illustrated in FIG. 2, the control body 202 can include a coupler 224 having a cavity 225 therein. The cartridge 204 can include a base 240 adapted to engage the coupler 224 and can include a *projection 241 adapted to fit within the cavity 225*. Such engagement can facilitate a stable connection...”).⁸

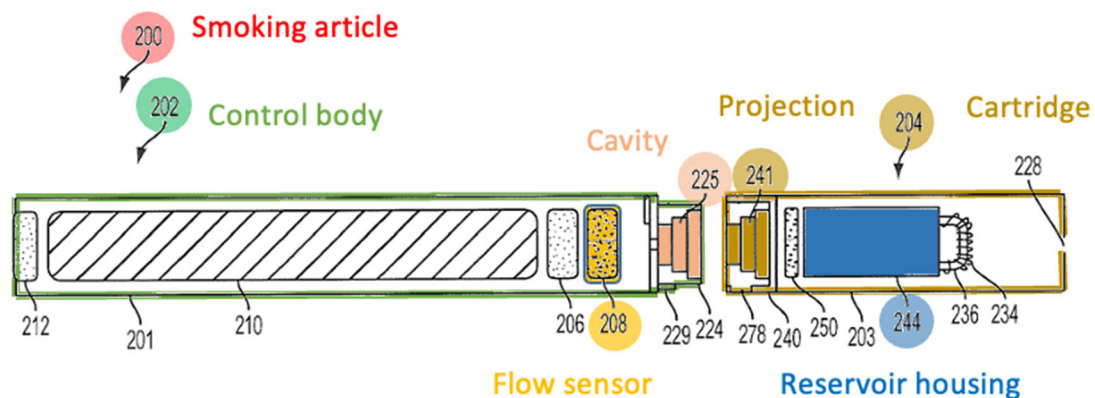


FIG. 2

EX1004, Fig. 2

Thus, cavity 225 (cartridge receptacle) of control body 202 is configured to

⁸ Emphasis added unless otherwise indicated.

insertably receive cartridge 204 (cartridge). EX1004, [0057]. EX1003, ¶¶104-105.

Worm further discloses that cartridge 204 contains vaporizable material in the form of liquid stored in a reservoir housing. EX1004, [0053] (“A cartridge 204 can be formed of a cartridge shell 203 enclosing the reservoir housing 244 that is in fluid communication with a liquid transport element 236 adapted to wick or otherwise transport an *aerosol precursor composition* stored in the reservoir housing to a heater 234.”). Worm discloses applying heat to convert the liquid to an aerosol. EX1004, [0077] (“Such electrical current flow can energize a heater in the cartridge to vaporize the aerosol precursor composition.”). EX1003, ¶106.

c. **[14.C] a pressure sensor configured to output sensor readings,**

Worm discloses this limitation. EX1003, ¶¶107-116.

Worm discloses a flow sensor 208. EX1004, [0053]; [0054] (“Although the control component 206 and the flow sensor 208 are illustrated separately....”).

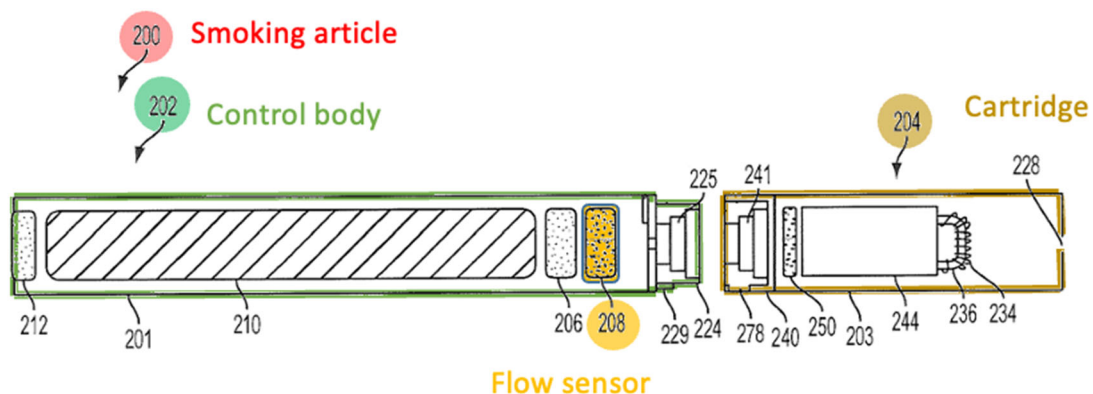


FIG. 2

EX1004, Fig. 2

Worm illustrates an embodiment with pressure sensor 308 in Fig. 5. EX1003, ¶¶108-109.

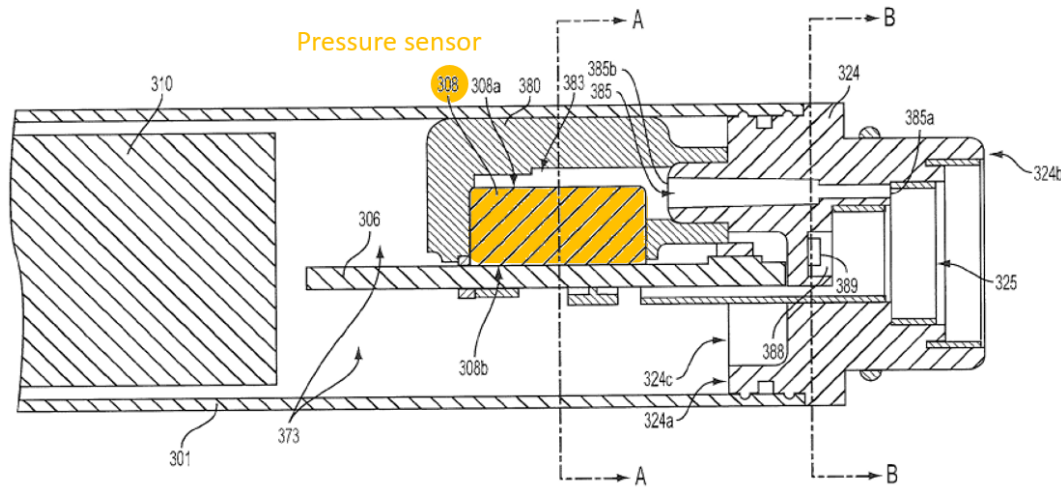


FIG. 5

EX1004, Fig. 5

Worm’s pressure sensor connects to circuit board and outputs pressure data via pins on the pressure sensor to the control circuit. EX1004, [0060] (“The direct attachment can mean that the electrical contacts or pins of the pressure sensor are in direct contact with the electronic circuit board although the body of the pressure sensor may be spaced apart from the electronic circuit board.”); EX1003, ¶¶110-111.

A POSA would have understood that the pressure sensor 308 detects reduced pressure and outputs a signal to the board in response to the signal from the pressure sensor. EX1004, [0008] (“The control circuit of the control body can be configured to establish electrical current flow from the electrical power source when the

pressure sensor detects a reduced pressure in the pressure reduction space relative to the pressure in the normal pressure space.”). Thus, the pressure sensor is configured to output sensor readings to the control circuit so that the control circuit can establish current flow based on reduced pressure detection. EX1003, ¶112.

In addition, Worm further discloses a Honeywell 163PC01D36 silicon sensor as an exemplary pressure sensor that can be used. EX1004, [0046]. The 2004 datasheet for this sensor (163PC) discloses variable voltage output. EX1026. The exemplary datasheet confirms that Worm contemplated outputting pressure sensor readings. EX1003, ¶¶113-115.

Installation Instructions for 160PC Low Pressure Sensors

PK 87724

GENERAL INFORMATION

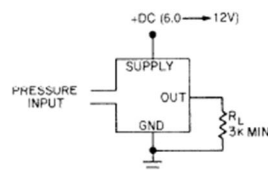
160PC sensors provide an output voltage proportional to applied pressure. They operate from a single, positive supply voltage ranging from 6.0 to 12 VDC. Signal conditioning results in directly usable outputs. Temperature compensation provides predictable performance over specified temperature ranges.

MEASURAND COMPATIBILITY

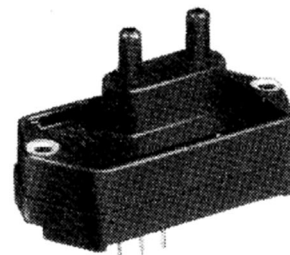
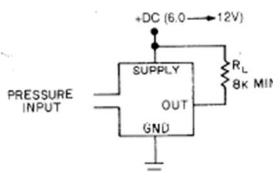
P2 Wetted materials: polyester housing, epoxy adhesive, silicon, borosilicate-glass, silicon-to-glass bond (passive side of IC)*

ELECTRICAL AND PRESSURE CONNECTIONS

Current Source



Current Sink



PRESSURE REFERENCE

Differential pressure sensors apply P1 to the active (connection) side of the chip and P2 to the passive side.

Gage pressure is measured with respect to atmospheric (room) pressure reference.

160PC SPECIFICATIONS at 8.0 ± 0.01 VDC, 25°C

Parameter	Min.	Typ.	Max.	Units
F.S.O. (Full Scale Output)*	4.85	5.00	5.15	Volts
Null Offset	0.95	1.00	1.05	Volts
Excitation	6.00	8.00	12.0	VDC
Overpressure	---	---	5	psi
Operating Temperature	-40° to +85°C (-40° to +185°F)			
Storage Temperature	-55° to +125°C (-65° to +257°F)			

*F.S.O. is the algebraic difference between end points (null and full scale pressure outputs). Output voltage at full pressure equals 6.0 ± 0.20 volts at 8.0 VDC.

TYPICAL OUTPUT VOLTAGES for 163PC01D36 and 164PC01D37 Listings @ 8.0 ± 0.1 VDC, 25°C

Listing	Pressure Range	Vo (volts)
163PC01D36	-5" H ₂ O	1.0
	0	3.5
	+5" H ₂ O	6.0
	F.S.O.	5.0
164PC01D37	0	1.0
	10" H ₂ O	6.0
	F.S.O.	5.0

EX1026 (160PC Low Pressure Sensors) (excerpts)

Accordingly, based on the identification of the exemplary Honeywell pressure sensor, a POSA would have understood Worm discloses a pressure sensor that outputs sensor readings. EX1003, ¶116.

- d. **[14.D] wherein a first side of the pressure sensor is exposed to a sealed air flow path and a second side of the pressure sensor is exposed to a device air path open to ambient pressure,**

Worm discloses this limitation. EX1003, ¶¶117-127.

As discussed in [14.C], Worm discloses a pressure sensor (308 in Figure 5).

Worm discloses that first side 308a of pressure sensor 308 is exposed to pressure reduction space 383 (light blue, below) while second side 308b of pressure sensor

308 is exposed to normal (*i.e.*, ambient) pressure space 373 (dark blue, below). EX1004, [0064] (“In the embodiment illustrated in FIG. 5, a first end 308a of the pressure sensor 308 can be positioned to be in fluid communication with the pressure reduction space 383, and a second end 308b of the pressure sensor can be positioned to be in fluid communication with the normal pressure space 373.”); [0077]. EX1003, ¶¶118-119.

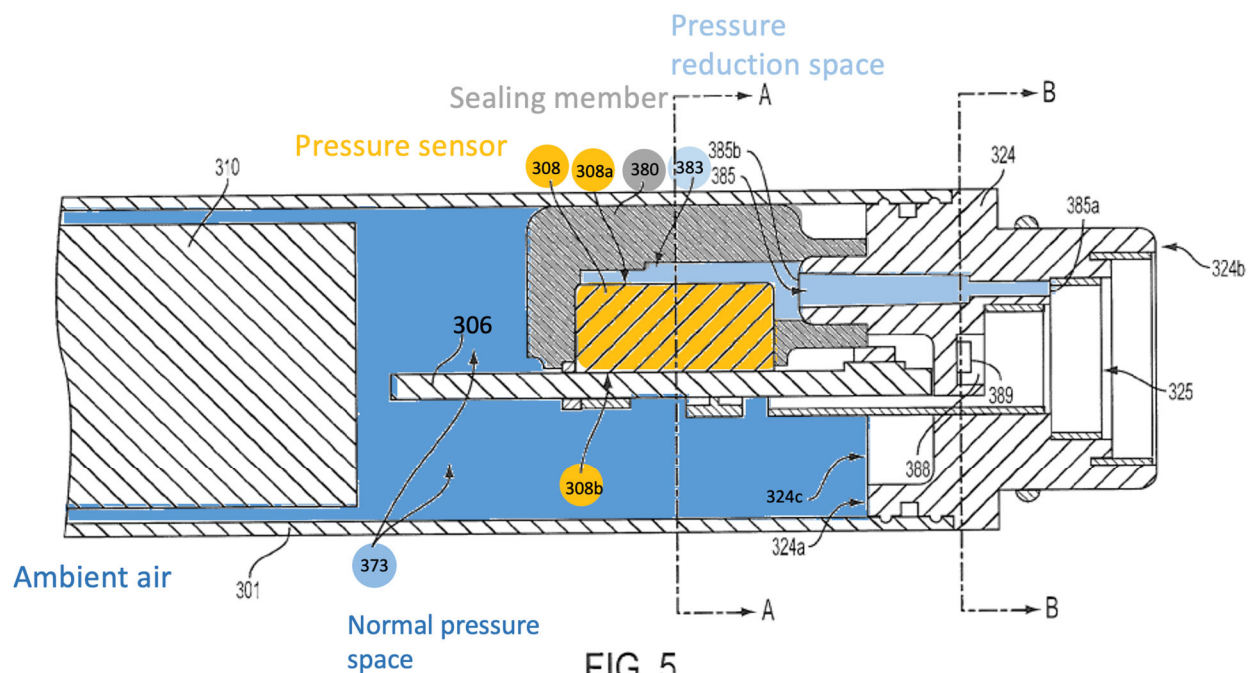


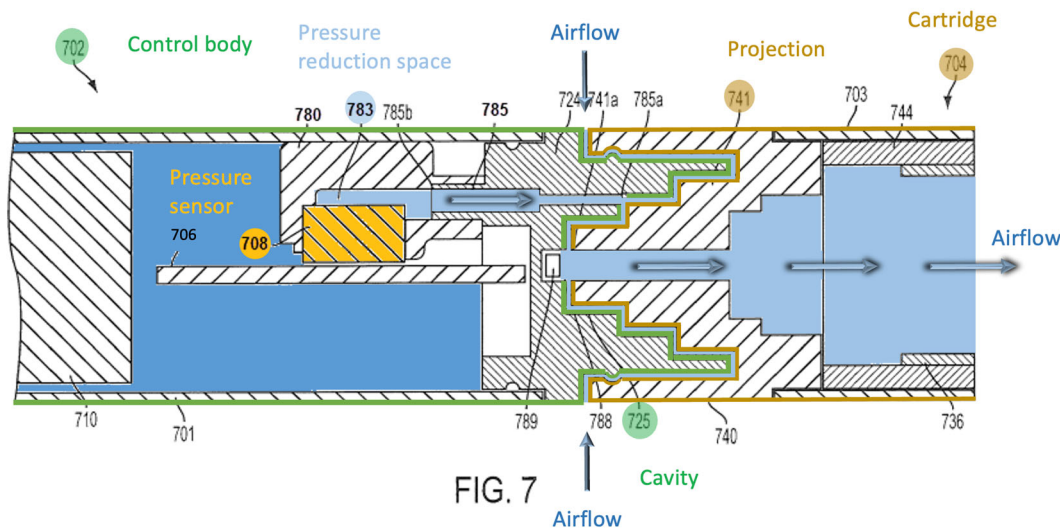
FIG. 5

EX1004, Fig. 5

The two sides of the pressure sensor are sealed from each other by sealing member 380 (grey). EX1004, [0007] (“The control body can comprise a sealing member configured to form an air tight seal around the pressure sensor and the second end of the pressure channel and thus define the pressure reduction space encompassing the opening at the second end of the pressure channel and the first end

of the pressure sensor.”); [0064] (“In some embodiments, the pressure reduction space can be defined by a sealing member 380.”). EX1003, ¶119.

Worm discloses that its normal pressure space 373 (side 308b) is open to ambient air and is the claimed “device air path.” EX1004, [0063] (“The normal pressure space can be maintained at ambient pressure....Normal pressure can be maintained with an opening in the shell 301 to the surrounding atmosphere.”). The “sealed air flow path” in Worm starts at the periphery of the interface of the control body 702 and cartridge 704 connection where an air flow channel is formed. EX1004, [0076] (“The matched configuration of the cavity 725 and the projection 741 preferably does not substantially form an air tight connection therebetween.”); *see also id.* [0063]. Air travels from the periphery to the center of the device, enters the main body of the cartridge, and then exits into the smoker’s mouth. The pressure reduction space is exposed to this channel. EX1003, ¶¶120-123.



EX1004, Fig. 7

The '123 Patent describes the sealed and device air paths the same way. *See* EX1001, 4:38-42 (“The first side of the pressure sensor may be exposed to a first air path through the mouthpiece and a second side of the pressure sensor is exposed to a second air path open to ambient pressure, and wherein the second air path is sealed from the first air path by a gasket around the pressure sensor.”). EX1003, ¶¶124-125.

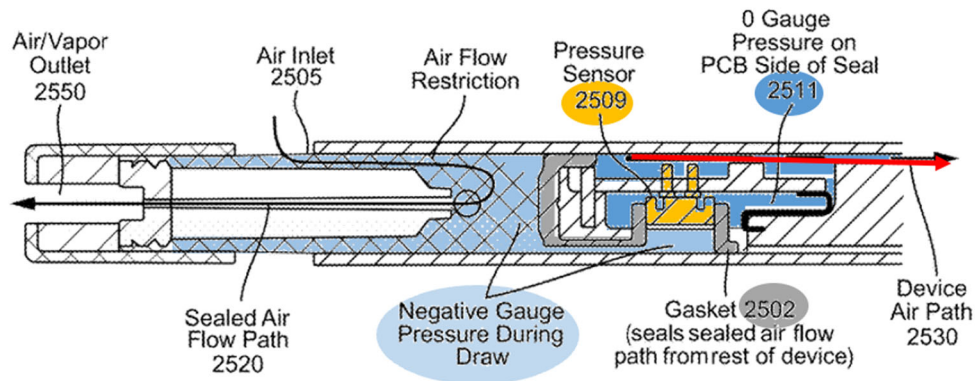


FIG. 25

EX1001, Fig. 25

Note Worm discloses optional air inlet aperture 389/789 and air inlet channel 388/788 (purple) that intersect with the sealed air flow path described above. EX1004, [0069] (“In *some* embodiments, the coupler 324 *can include* an air inlet channel 388 that can be adapted to distribute drawn, ambient air through an electronic smoking article including the coupler.”); [0075]; EX1003, ¶126. These are show in Figures 5, 6B and 7:

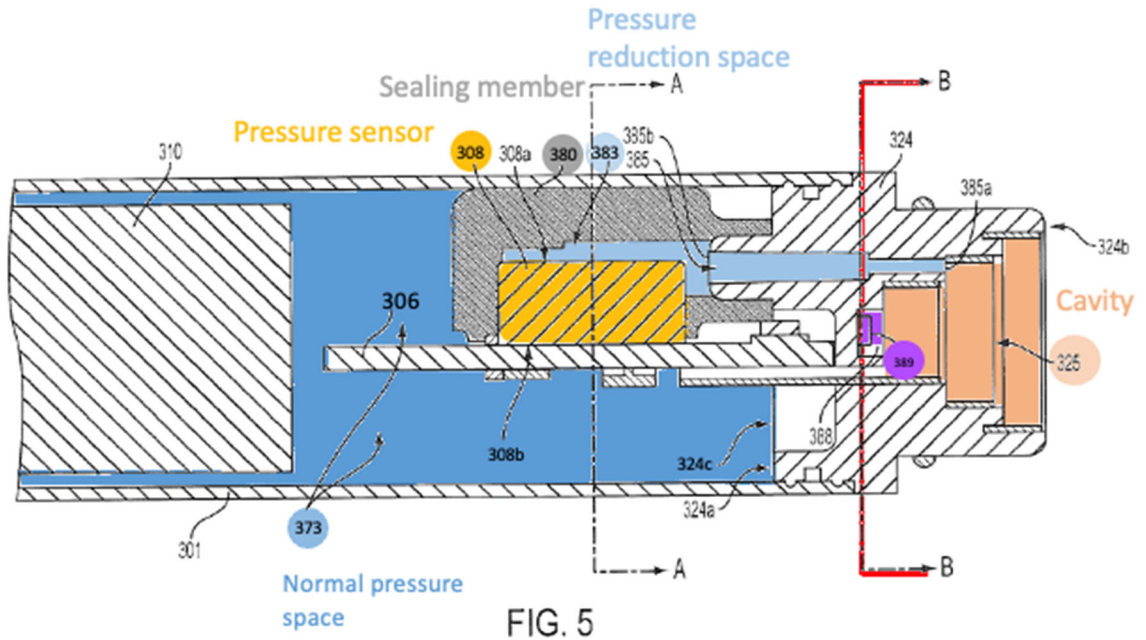


FIG. 5

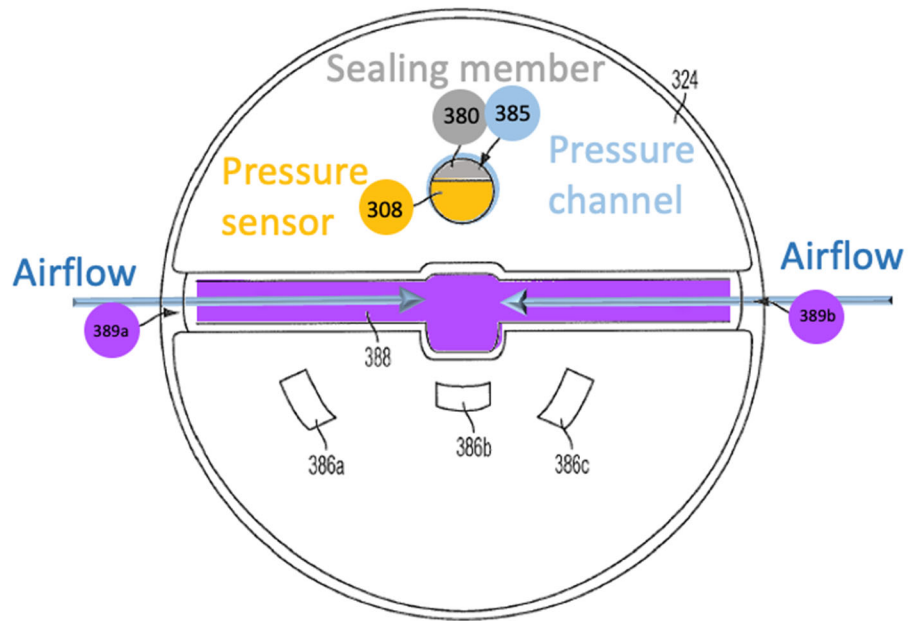
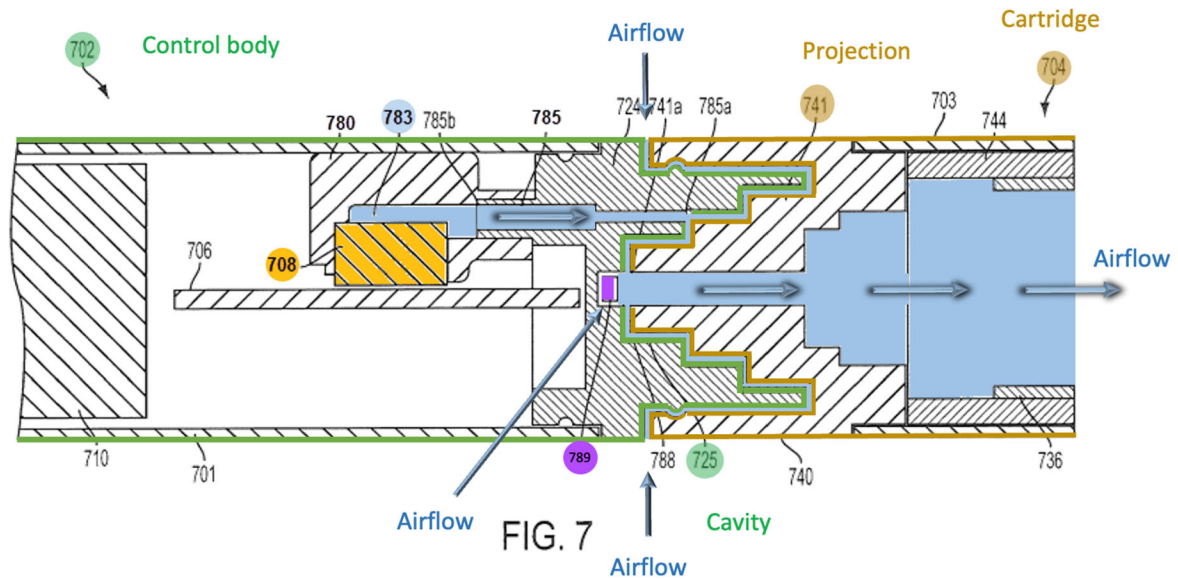


FIG. 6B



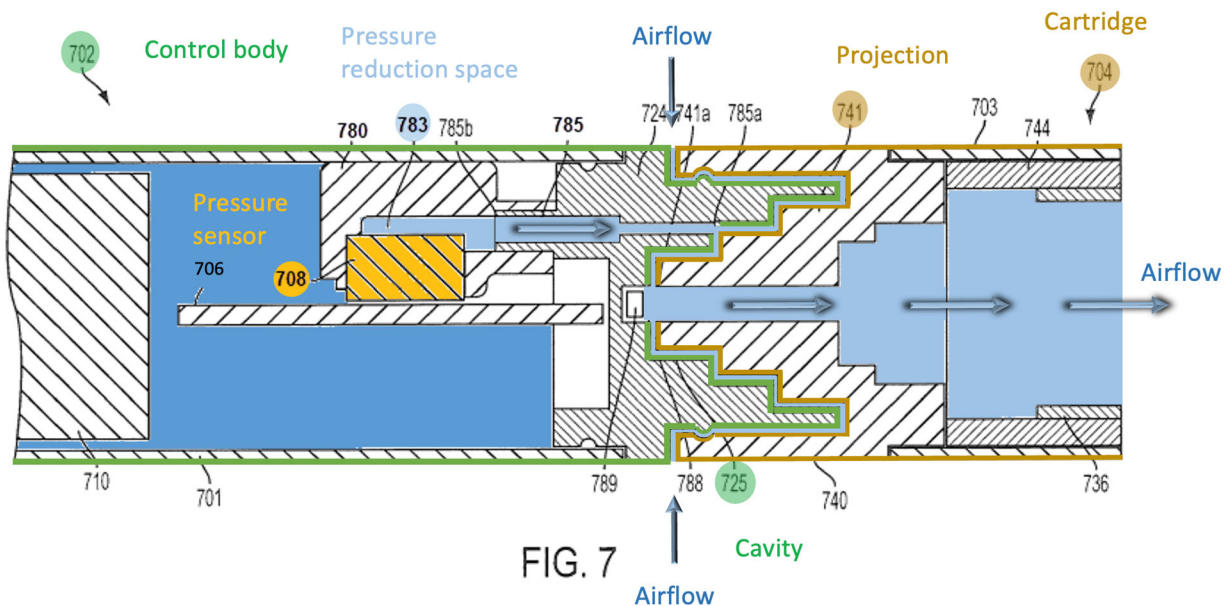
EX1004, Figs. 5, 6B, 7

If included, air inlet channel 388 is an additional portion of the sealed air flow path, but the air flow path between at control body 702 and cartridge 704 connection also communicates the negative pressure to the pressure sensor. EX1004, [0076]. (“The matched configuration of the cavity 725 and the projection 741 preferably does not substantially form an air tight connection therebetween. Thus, the pressure drop in the cavity 725 is likewise communicated to the pressure channel 785 from the first end 785a to the second end 785b and thus the pressure reduction space 783.”). As shown in Figure 7, pressure reduction space extends from cavity 725 to pressure channel 785 and is also in communication with air entering the periphery at the interface between the control body and cartridge. EX1003, ¶127.

- e. **[14.E] the sealed air flow path comprising a channel formed between an interior surface of the cartridge receptacle and an exterior surface of the cartridge,**

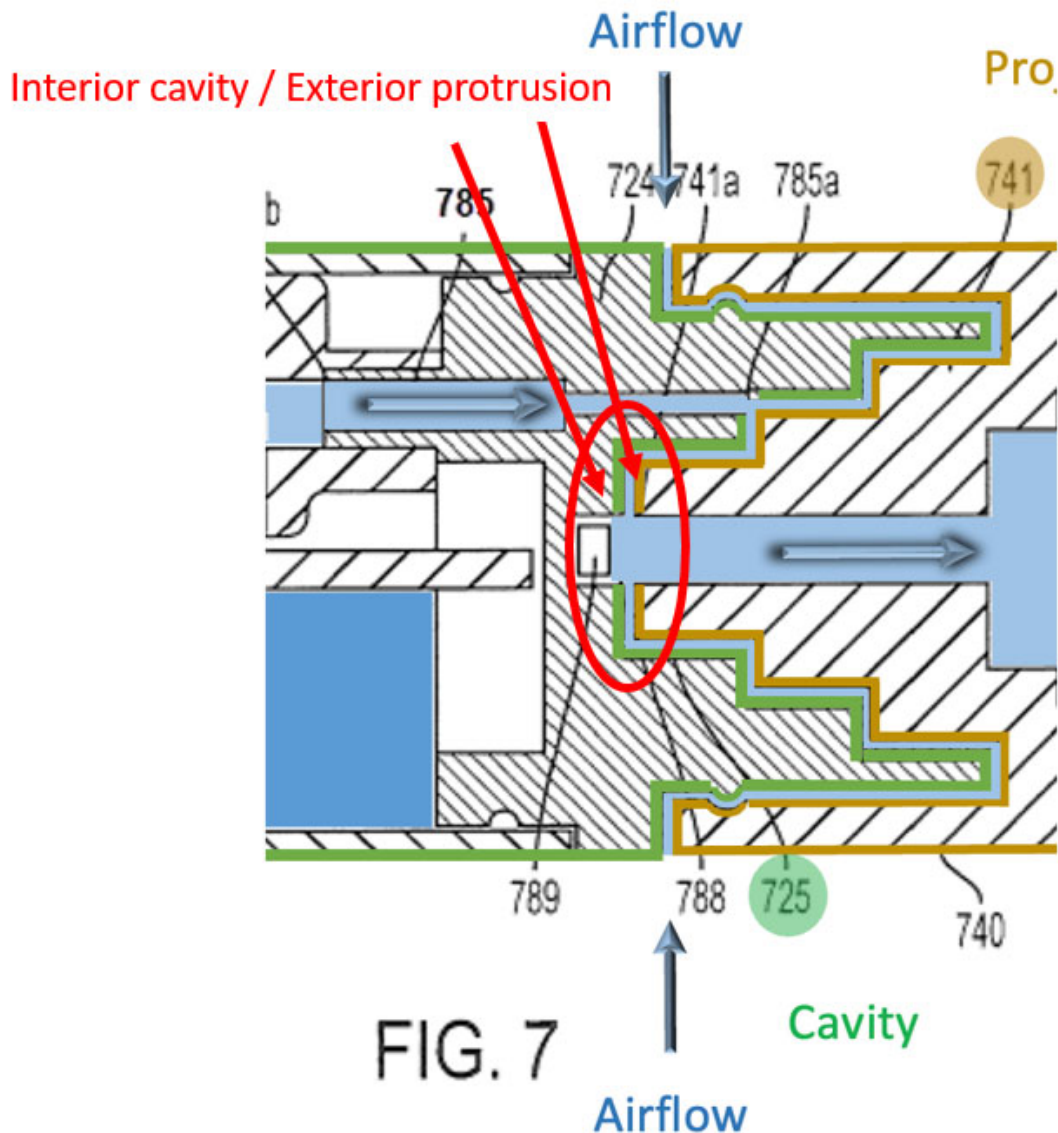
Worm discloses this limitation. EX1003, ¶¶128-132.

As discussed in [14.D], Worm discloses a sealed airflow path (light blue, below). Worm discloses the sealed air flow path includes the channel formed by the gap between cavity 725 and cartridge projection 741, which extends to the periphery of the device. This gap allows pressure sensor 708 to register a pressure drop when a smoker draws on the device and permits air in from the periphery. EX1004, [0076] (“Thus, the pressure drop in the cavity 725 is likewise communicated to the pressure channel 785 from the first end 785a to the second end 785b and thus the pressure reduction space 783.”). EX1003, ¶¶129-130.



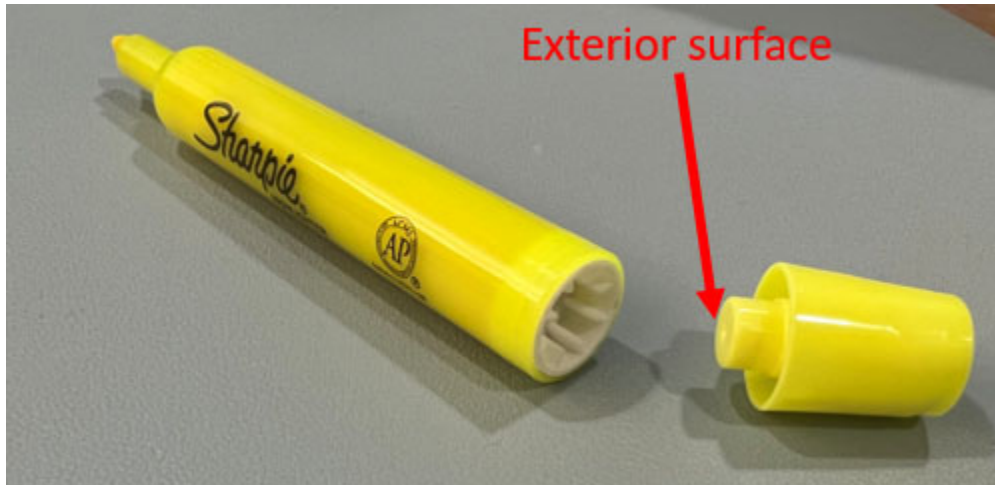
EX1004, Fig. 7

As seen a close-up excerpt of Figure 7, the channel is defined by the surface of the cavity 725 (green) and the surface of the cartridge projection 741 (brown). The red circle identifies that at least a portion of the cavity surface (green) is an interior surface of the cavity and at least a portion of the cartridge projection surface 741 (brown) is an exterior surface of the cartridge projection. EX1003, ¶131.



EX1004, Fig. 7 (excerpt)

Note, the protrusion is shaped like the cap of a Sharpie, with a center part that juts outward. At a minimum the center part of the projection is an exterior surface of the projection. EX1003, ¶131.



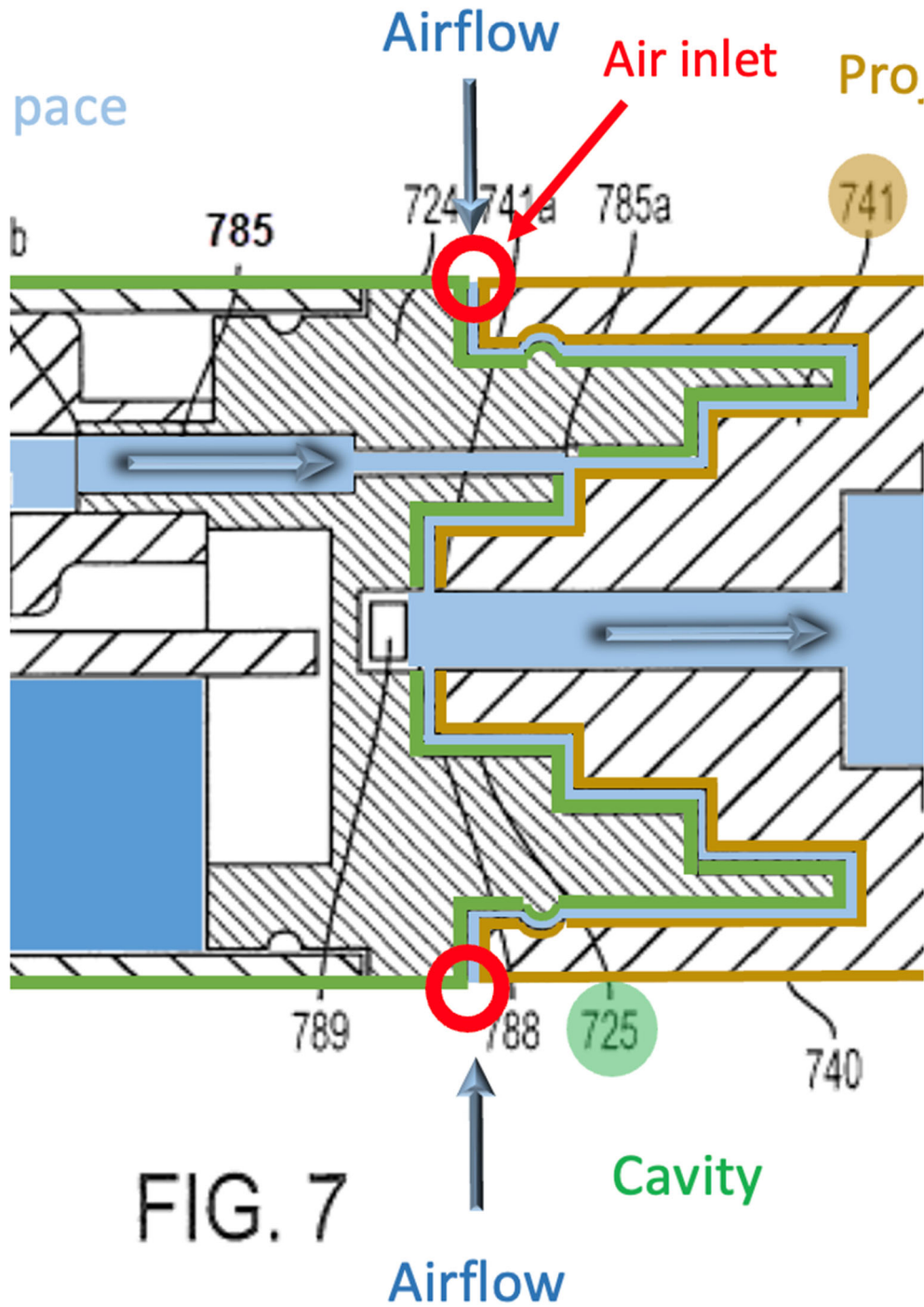
Accordingly, Worm discloses, as shown in the annotated figures above, the sealed airflow path comprises a channel that is formed between an interior surface of the cartridge receptacle and an exterior surface of the cartridge. EX1003, ¶132.

- f. **[14.F] the sealed air flow path passing from an air inlet, through the channel and to a heater and an outlet of a mouthpiece within the cartridge; and**

Worm discloses this limitation. EX1003, ¶¶133-136.

Worm discloses a sealed air flow path comprising a channel formed between the cavity 725 (cartridge receptacle) and the cartridge 704. *See* [14.D] and [14.E]. As seen in the excerpt below, Worm has an inlet along the periphery of the channel because the connection between cavity and cartridge is not airtight. Air passes from the air inlet shown below, through the channel at the connection interface between

the cartridge receptacle and the cartridge, and enters the cartridge through air flow entry 741a. EX1003, ¶134.



EX1004, Fig. 7 (excerpt)

Air then travels through the cartridge to Worm's heater and then exits an opening in the mouth end of the cartridge. *See* EX1004, Figs. 1, 2; [0053] (“A cartridge 204 can be formed of a cartridge shell 203 enclosing the reservoir housing 244 that is in fluid communication with a liquid transport element 236 adapted to wick or otherwise transport an aerosol precursor composition stored in the reservoir housing to a heater 234. An opening 228 may be present in the cartridge shell 203 to allow for egress of formed aerosol from the cartridge 204.”); [0044]; EX1003, ¶135.

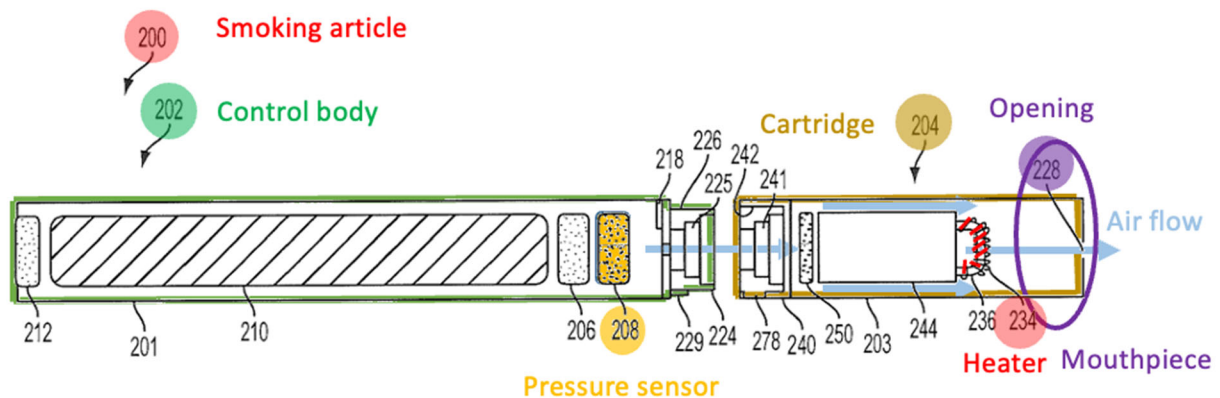


FIG. 2

EX1004, Fig. 2

The portion at the end of the device with opening 228 is a mouthpiece as Patent Owner has applied that term in the ITC Investigation. Specifically, with respect to other asserted patents in the ITC Investigation, Patent Owner has taken the position that the term mouthpiece means a portion used by a mouth. EX1019.

Petitioner has applied that meaning for purposes of this Petition.⁹ EX1003, ¶136.

- g. **[14.G] a gasket around the pressure sensor, the gasket configured to seal the device air path from the sealed air flow path.**

Worm discloses this limitation. EX1003, ¶¶137-139.

Worm discloses a device air path and a sealed air flow path. *See* [14.D]. Worm discloses that “[i]n some embodiments, the pressure reduction space can be defined by a sealing member 380. For example, the sealing member can comprise a silicone rubber or like material.” EX1004, [0064]. *See, e.g.*, EX1004, [0007] (“...control body can comprise a sealing member configured to form an air tight seal around the pressure sensor and the second end of the pressure channel and thus define the pressure reduction space encompassing the opening at the second end of the pressure channel and the first end of the pressure sensor.”). The sealing member is a gasket. EX1003, ¶138.

⁹ Petitioner applies that meaning for this Petition without conceding that Patent Owner’s construction is appropriate for any other patent. Petitioner notes that other patents can require a mouthpiece that is a separate component from the other components of the cartridge, such as a storage compartment. However, in the ’123 Patent, the claim language and intrinsic evidence does not warrant such an interpretation of mouthpiece.

As shown in Figure 5, sealing member 380 surrounds the pressure sensor and seals the device air path in the normal pressure space 373 from the pressure reduction space 383 and the downstream portions of the sealed air flow path. EX1004, [0063] (“The pressure reduction space can be isolated from the normal pressure space, and the pressure within the pressure reduction space can be reduced below the pressure in the normal pressure space during use of the article (i.e., during draw on the article).”); EX1004, [0064] (“The sealing member 380 can substantially surround the perimeter of the pressure sensor 308....”). EX1003, ¶139.

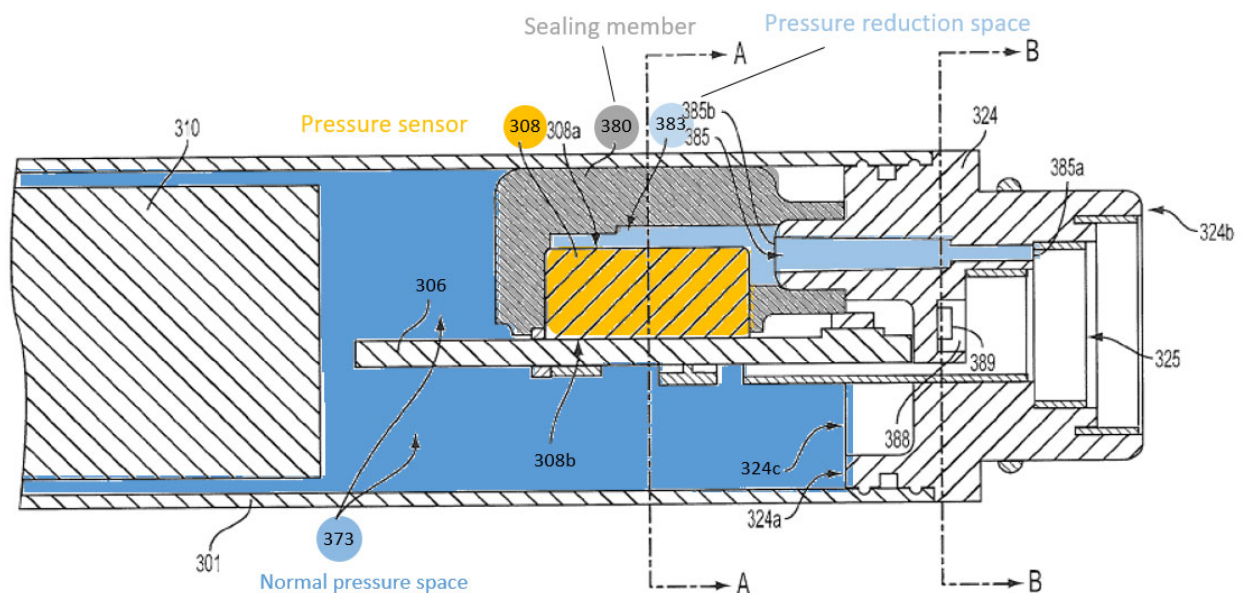


FIG. 5

EX1004, Fig. 5

2. Claim 27

a. [27.A] A vaporizer device comprising:

Disclosed. [14.A]. EX1003, ¶140.

- b. [27.B] a cartridge comprising a reservoir configured to hold a vaporizable material, a heater configured to heat the vaporizable material, and a mouthpiece in fluid communication with the heater; and

Worm discloses this limitation. EX1003, ¶¶141-142.

Worm discloses cartridge 204 containing reservoir housing 244 (reservoir) and heater 234. Reservoir housing stores an aerosol precursor composition (vaporizable material) that heater heats into an aerosol, which exits through the mouthpiece. EX1004, [0053] (“A cartridge 204 can be formed of a cartridge shell 203 enclosing the reservoir housing 244 that is in fluid communication with a liquid transport element 236 adapted to wick or otherwise transport an aerosol precursor composition stored in the reservoir housing to a heater 234. An opening 228 may be present in the cartridge shell 203 to allow for egress of formed aerosol from the cartridge 204.”); *see also id.*, [0077] (“In use, an individual may draw on the mouthend of a cartridge (which may include a mouthpiece)....”). EX1003, ¶142.

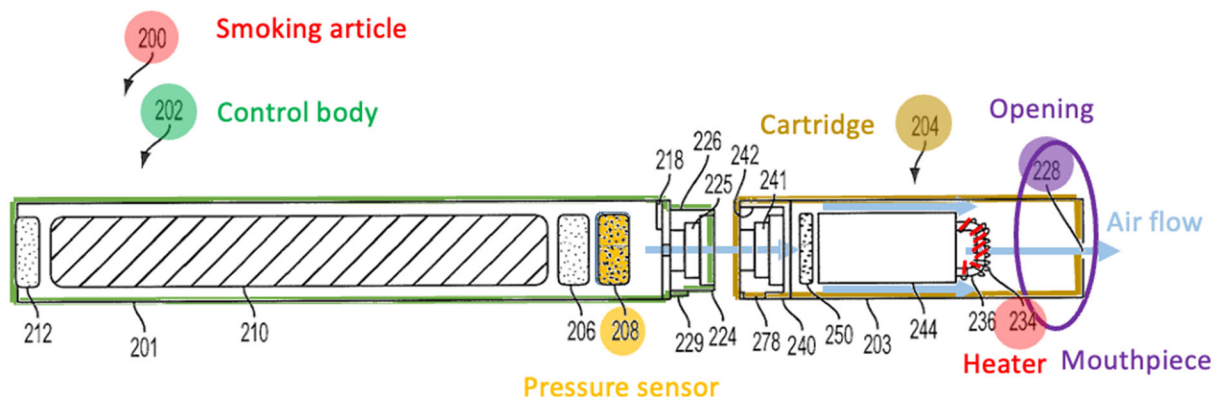


FIG. 2

EX1004, Fig. 2

c. **[27.C] a device body comprising:**

Disclosed. [14.A]. EX1003, ¶143.

d. **[27.D] a cartridge receptacle configured to insertably receive the cartridge;**

Disclosed. [14.B]. EX1003, ¶144.

e. **[27.E] a pressure sensor configured to output sensor readings,**

Disclosed. [14.C]. EX1003, ¶145.

f. **[27.F] wherein a first side of the pressure sensor is exposed to a sealed air flow path and a second side of the pressure sensor is exposed to a device air path open to ambient pressure,**

Disclosed. [14.D]. EX1003, ¶146.

g. **[27.G] the sealed air flow path comprising a channel formed between an interior surface of the cartridge receptacle and an exterior surface of the cartridge,**

Disclosed. [14.E]. EX1003, ¶147.

h. **[27.H] the sealed air flow path passing from an air inlet, through the channel and to the heater and an outlet in the mouthpiece of the cartridge; and**

Disclosed. [14.F]. EX1003, ¶148.

i. **[27.I] a gasket around the pressure sensor, the gasket configured to seal the device air path from the sealed air flow path.**

Disclosed. [14.G]. EX1003, ¶149.

3. **Claim 32: The vaporizer device of claim 27, wherein the cartridge comprises the vaporizable material, and wherein the vaporizable material comprises a nicotine formulation.**

Worm discloses this limitation. EX1003, ¶¶150-155.

Worm discloses claim 27 and a cartridge containing a vaporizable material. EX1004, [0053]. *See* claim 27 and [14.B]. Worm further discloses that aerosol precursor ingredients are “commonly referred to as ‘smokejuice,’ ‘e-liquid’ and ‘e-juice’” and incorporates by reference Sebastian¹⁰ as disclosing exemplary formulations for aerosol precursor materials. EX1004, [0029]. Sebastian discloses exemplary tobacco extracts with liquid nicotine that introduce a desirable characteristic to an aerosol precursor. EX1008, [0056] (“As such, exemplary preferred tobacco extracts possess less than 45 percent *nicotine*....highly preferred tobacco extracts are highly aromatic and flavorful, and hence introduce desirable sensory characteristics to the aerosol produced by the smoking articles incorporating those extracts.”). EX1003, ¶¶151-155.

In summary, Worm anticipates claims 14, 27, and 32 of the ’123 Patent. EX1003, ¶155.

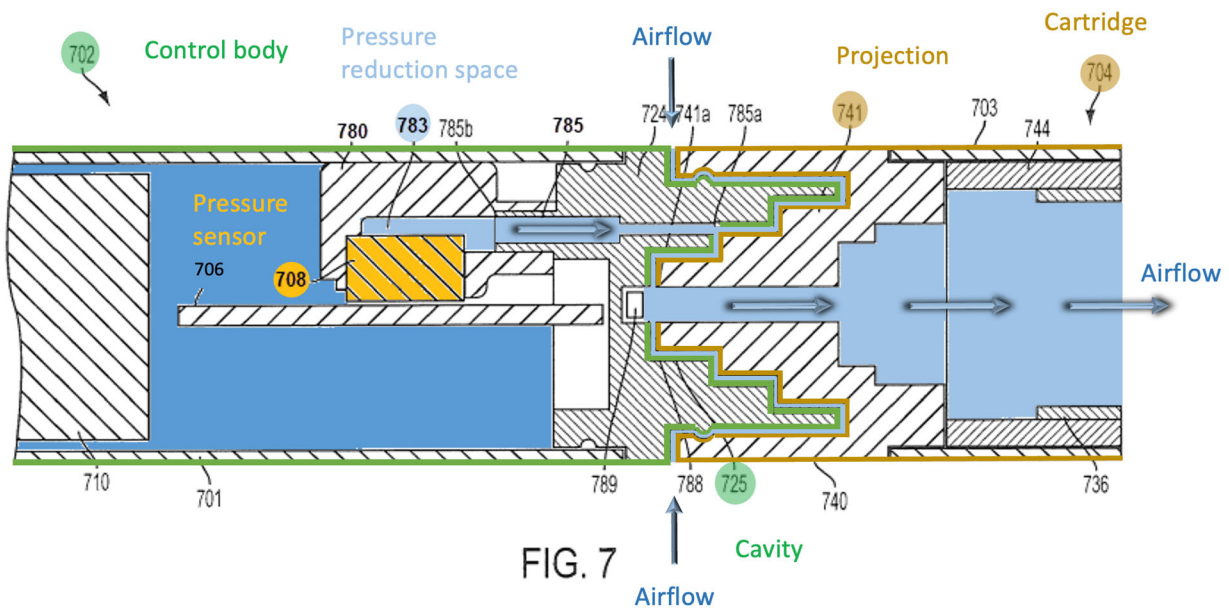
¹⁰ Citing U.S. Patent Application Ser. No. 13/536,438 (U.S. Pat. Pub. No. 2014/0000638; EX1008 “Sebastian”)).

B. Ground 2: Worm and the Knowledge of a POSA Renders Obvious Claims 14, 27 and 32 of the '123 Patent

As described in Ground 1, Petitioner contends that Worm discloses the limitations [14.E], [14.F], [27.G] and [27.H] in claims 1 and 27 that require “the sealed air flow path comprising a channel formed between an interior of the cartridge receptacle and an exterior surface of the cartridge, the sealed air flow path passing from an air inlet, through the channel and to a heater and an outlet of a mouthpiece within the cartridge.” To the extent it is argued that Worm does not disclose a sealed air flow path at the cartridge receptacle and cartridge connection, as recited in limitations [14.E], [14.F], [27.G] and [27.H], it would have been obvious to a POSA that the channel formed between the cartridge receptacle and cartridge of Worm permits air to enter the cavity. EX1003, ¶156.

Worm discloses a non-airtight channel formed at the interface between the cartridge receptacle and cartridge for communication of air pressure along that channel. EX1004, [0076] (“The matched configuration of the cavity 725 and the projection 741 preferably does not substantially form an air tight connection therebetween.”). Because this channel is depicted as a uniform gap that continues to the periphery of the device, it would have been obvious to a POSA that, when a smoker draws on the device, negative pressure would cause air to enter at the periphery and into the gap. Air entering at the periphery would join the air evacuated from the pressure reduction space and enters into the cartridge to pass by the heater

and into the smoker's mouth. EX1003, ¶157.



EX1004, Fig. 7

In some embodiments, Worm discloses that air also enters through air inlet aperture 389/789. EX1004, [0069]; [0075]. However, a POSA would have recognized that air would still enter the device through the air inlet at the periphery between the cartridge receptacle and the cartridge as the negative pressure increased. Furthermore, for embodiments where air inlet aperture 389/789 is not used, the only access to ambient air in Worm is the interface between the cartridge and cartridge receptacle, as shown above. Without access to ambient air from the periphery, a vacuum would be created in the device and the device would become nonfunctional. EX1003, ¶158.

Thus, at a minimum, Worm in view of the knowledge of a POSA renders

obvious the “sealed air flow path” required by limitations [14.E], [14.F], [27.G] and [27.H] in claims 14 and 27 (and claim 32 through dependency). EX1003, ¶159. Accordingly, Worm in view of the knowledge of a POSA renders obvious claims 14, 27 and 32 of the ’123 Patent. EX1003, ¶159.

C. Ground 3: Worm in view of Levitz Renders Obvious Claims 14, 27, and 32 of the ’123 Patent

Worm in view of Levitz renders obvious claims 14, 27, and 32 of the ’123 Patent. EX1003, ¶¶160-178.

1. Sealed air flow path (limitations [14.E], [14.F], [27.G], and [27.H])

As described in Ground 1, Petitioner contends that Worm anticipates claims 14, 27, and 32 because it discloses every limitation in those claims. To the extent it is argued that Worm does not disclose (Ground 1) or render obvious (Ground 2) the “sealed air flow path” required by limitations [14.E], [14.F], [27.G] and [27.H], it would have been obvious based on the combination of Worm in view of Levitz, which teaches providing an airflow path at the interface between a cartridge receptacle and a cartridge. EX1003, ¶161.

Levitz discloses a two-piece e-cigarette. EX1010, [0006] (“One example of an electronic cigarette...is a ‘two-piece’ device having a first battery section and a second atomizer section...”). Levitz discloses an air flow path that enters the side of the device (air inlet) at the connection between the battery and cartomizer sections,

travels through a channel between the battery part and cartomizer connection, enters into the cartomizer (cartridge), and exits through an opening into the smoker's mouth. EX1010, [0017] ("During inhalation, air enters from the side of the Battery and enters the post of the Battery via a groove in the battery post. It then enters into the Cartomizer through the axial opening in the Cartomizer post and exits the Cartomizer into the smoker's mouth."). One side of a pressure sensor is exposed to this path through a pressure differential channel. EX1010, [0017] ("...the sensor can detect a pressure differential via said pressure differential channel."). EX1003, ¶162.

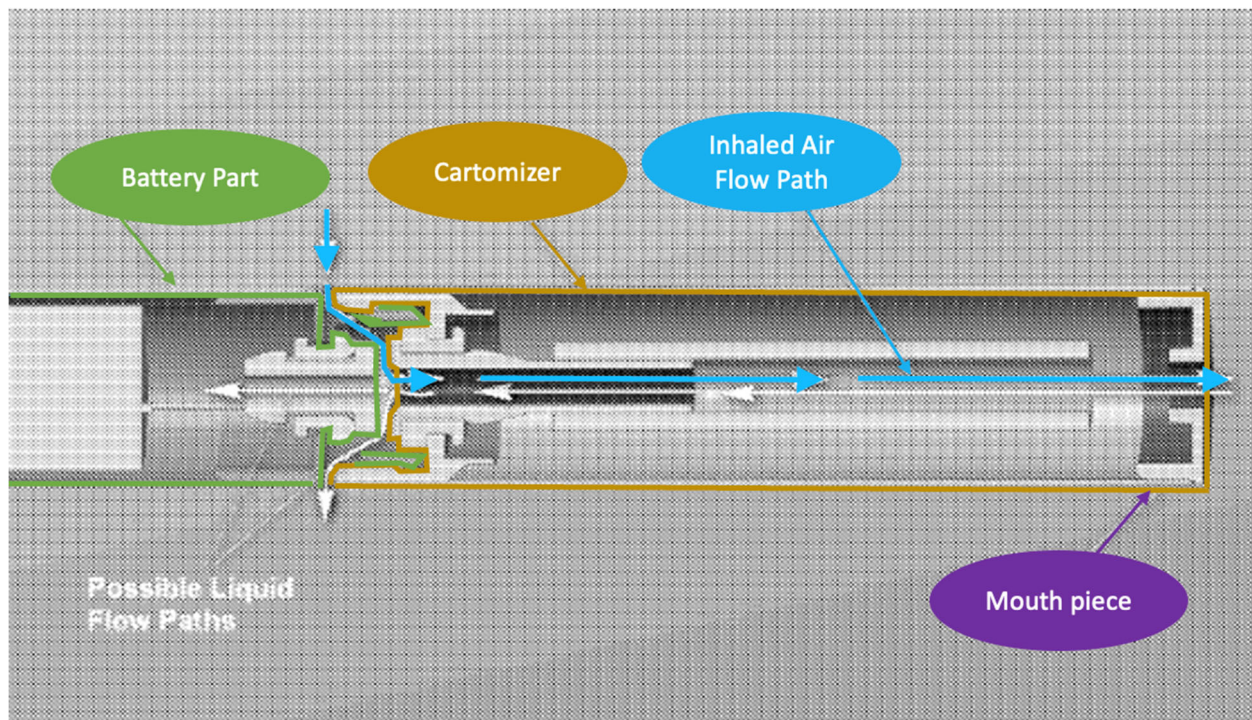


Figure 16

EX1010, Fig. 16

Note that Figure 16 depicts a male battery connector and a female cartridge

(receptacle), but Levitz discloses the reverse configuration as well. EX1010, [0048] (“...the reverse configuration may be equally suitable, depending on design requirements....[T]he Cartomizer may comprise the ‘male’ connection and the Battery may comprise the ‘female’ connection.”). In one embodiment (below), Levitz discloses a battery section with a connector. EX1010, [0042]:

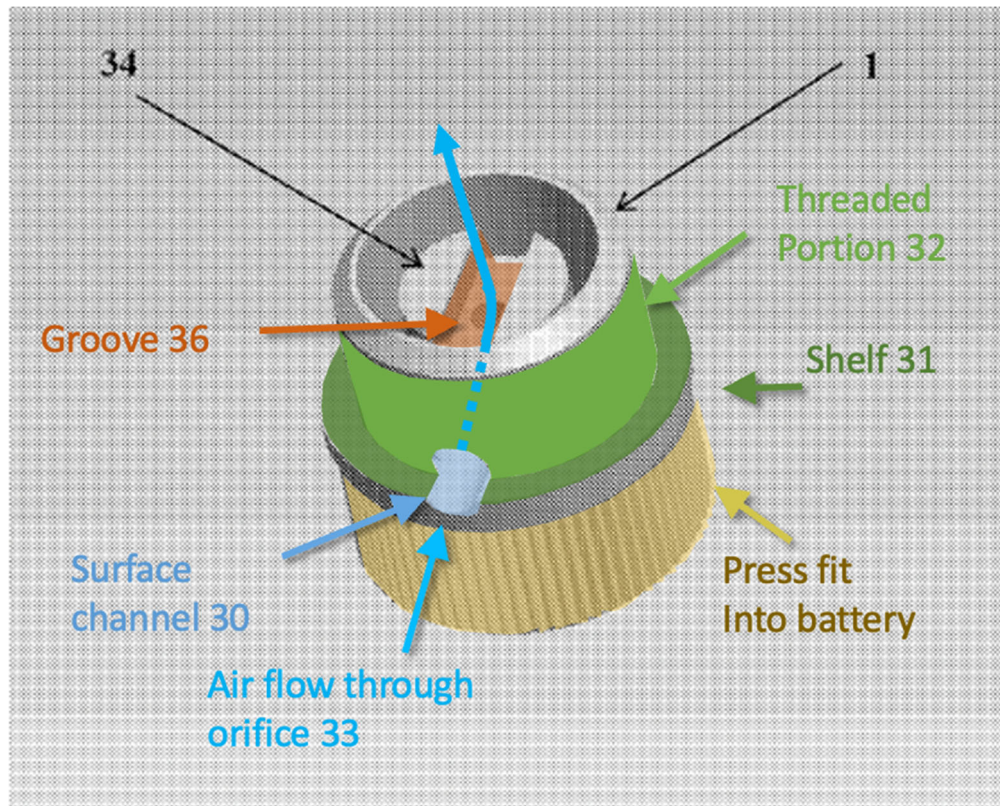


Figure 15

EX1010, Fig. 15

The connector bottom (vertical lines) is press fit into the battery section. The top of the connector is threaded (32) and mates with corresponding threads on the cartomizer by screwing the cartomizer down to shelf 31. Perpendicular surface

channels 30 provide an air path between the connector and the cartomizer. EX1010, [0042] (“...groove 36 which assists in guiding air inhaled or exhaled through perpendicular surface channel 30 and orifice 33.”). EX1003, ¶¶163-165. As with Figure 16, Figure 15 depicts a connector for a male battery portion and a female cartomizer, but Levitz notes that this configuration can be reversed. EX1010, [0048].

“The airflow through the connector and battery post combination shown in Figures 13-15 is illustrated in Figure 16.” EX1010, [0044].

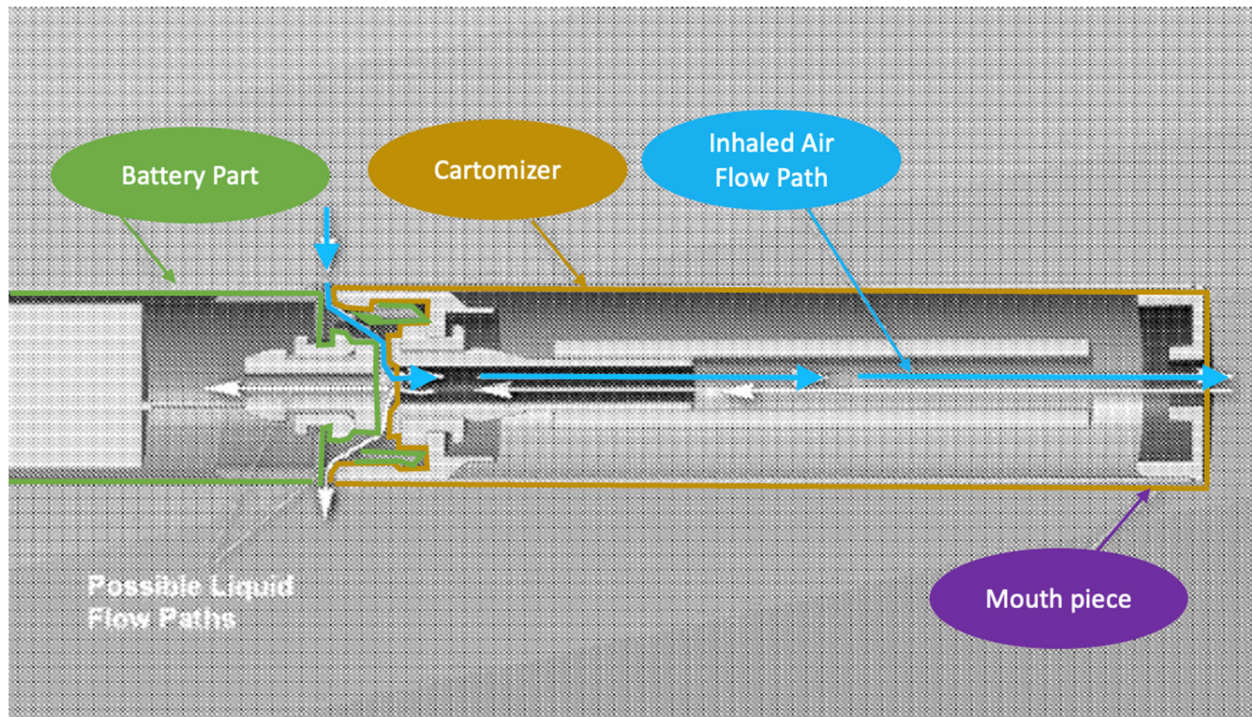


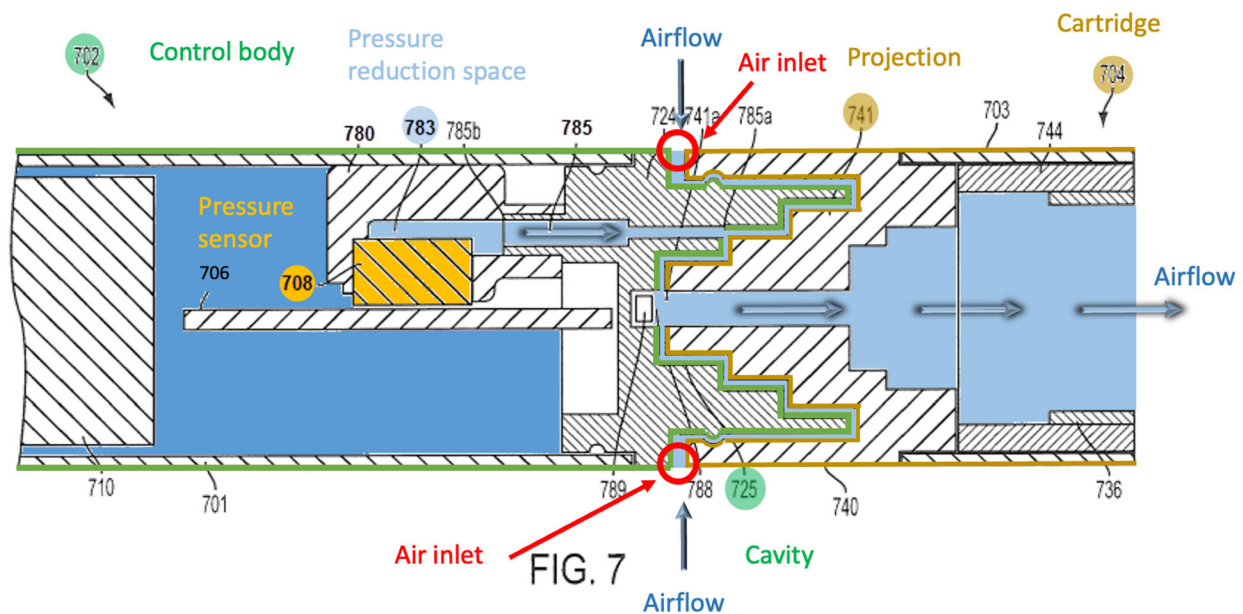
Figure 16

EX1010, Fig. 16

Clear from these images is that Levitz teaches an air flow path that enters at the interface between the battery portion and the cartridge. EX1010, [0042]-[0044];

EX1003, ¶¶166-167.

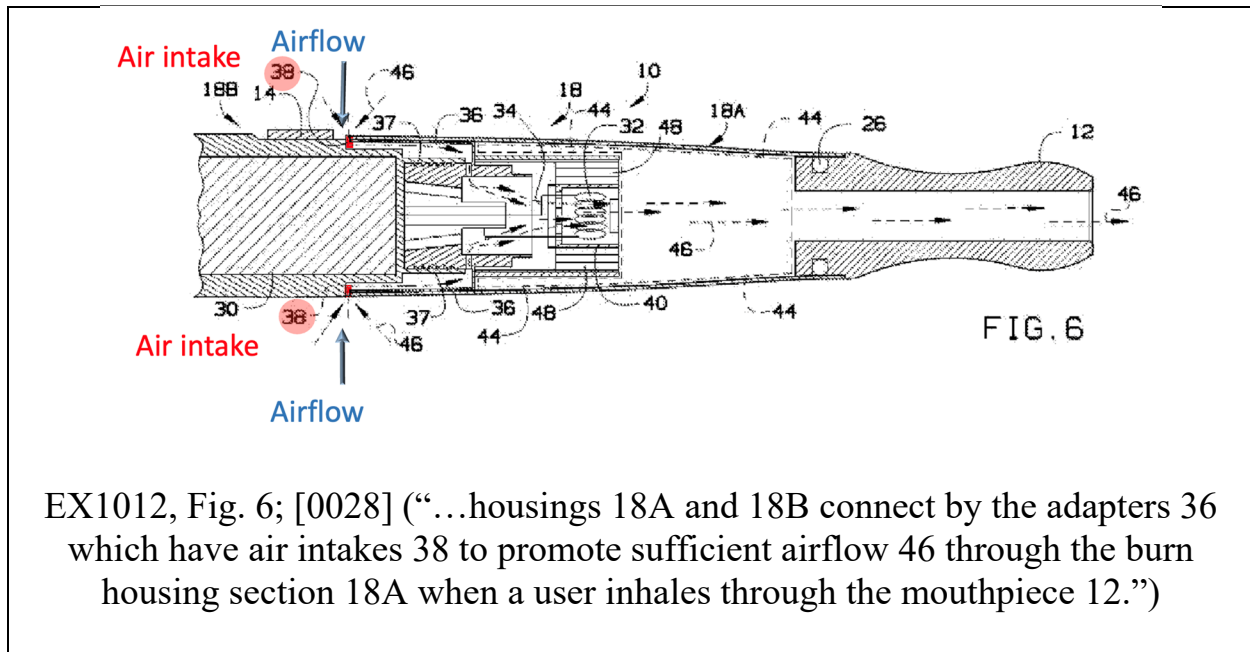
To the extent there is any argument that Worm does not disclose air entering at the interface between control body 702 and cartridge 704, it would have been obvious to a POSA to modify Worm in view of Levitz. Specifically, a POSA would have modified Worm so that outside air enters at the interface between the battery and cartridge connection.¹¹ Note, a POSA would have understood that the air inlet can be anywhere along the connection interface. *See* EX1007, 4:41-43 (“The air inlet openings 16 can be located elsewhere on the electronic cigarette 2, and is a matter of design choice.”). EX1003, ¶¶168-169.

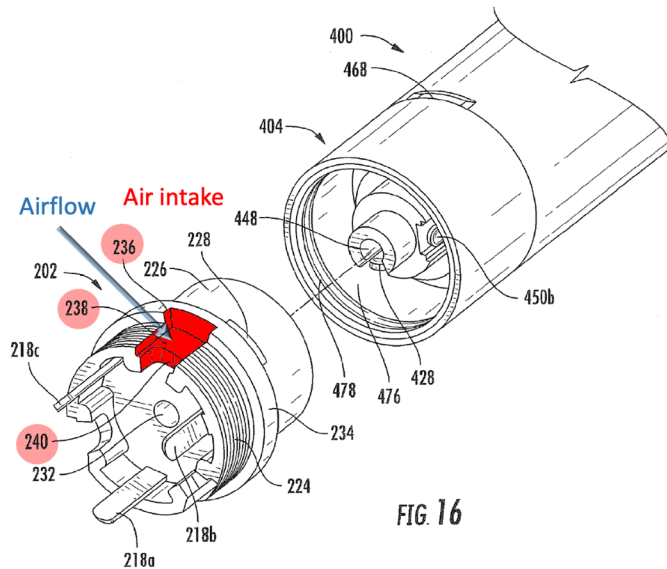


Modified Worm

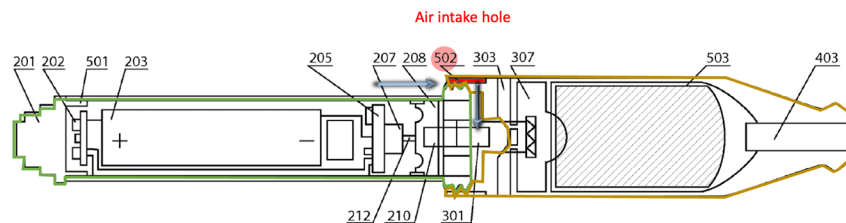
¹¹ Whether air inlet aperture 789 is also included would not matter.

First, a POSA would have knowledge that the placement of air inlets is a design choice. EX1007, 4:41-43 (“The air inlet openings 16 can be located elsewhere on the electronic cigarette 2, and is a matter of design choice.”). Furthermore, a POSA would have known that air inlets at the interface between the battery portion and the cartridge is one such location. As shown below in the table below, having an air enter at the connection interface was well known in the art. EX1003, ¶¶170-171.

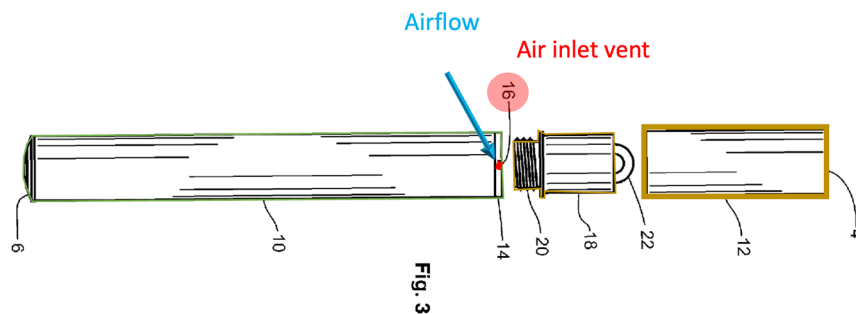




EX1013, Fig.16; [0097] (“...the coupler 202 may define a fluid pathway configured to receive air from an ambient environment and direct the air to the cartridge 400 when a user draws thereon.”)

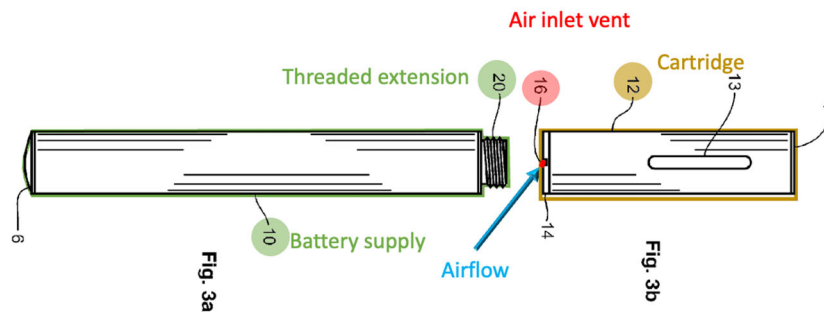


EX1011, Fig. 5A; 4:9-12 (“The air enters through the air intake hole (502), passes through the run-through hole on the air-liquid separator (303)...”)



EX1009, Fig. 3; 4:45-48 (“One or more air inlet vents 16 are provided about the

coupler 14 for allowing airflow into the cartridge 12 when the user draws air through the electronic cigarette 2.”).



EX1007, Figs. 3a, 3b; 1:64-2:1 (“...an inlet vent formed on the exterior of the elongated housing that is coupled to deliver air to the atomizing chamber air inlet. In a refinement to this embodiment, the inlet vent is coupled to the atomizing chamber air inlet by a conduit.”); 4:15-18.

Moreover, a POSA would have been motivated to include an air inlet at the connection interface because Worm teaches that it is disadvantageous to have the sealed air flow path extend into the battery compartment. EX1004, [0005] (“Such coupler can particularly be useful to reduce or prevent passage of liquid from an attached cartridge through the coupler and into the control body and thus reduce or prevent contamination of the sensor or other electronic elements present in the control body.”). Thus, Worm as modified in view of Levitz includes additional pathways for any vapor that backflows to exit the periphery of the connection rather than into the negative pressure space. EX1003, ¶172.

Moreover, as Worm itself discloses, it is not uncommon for vapor to backflow through the air inlet channel. EX1004, [0072]. A POSA would have recognized that

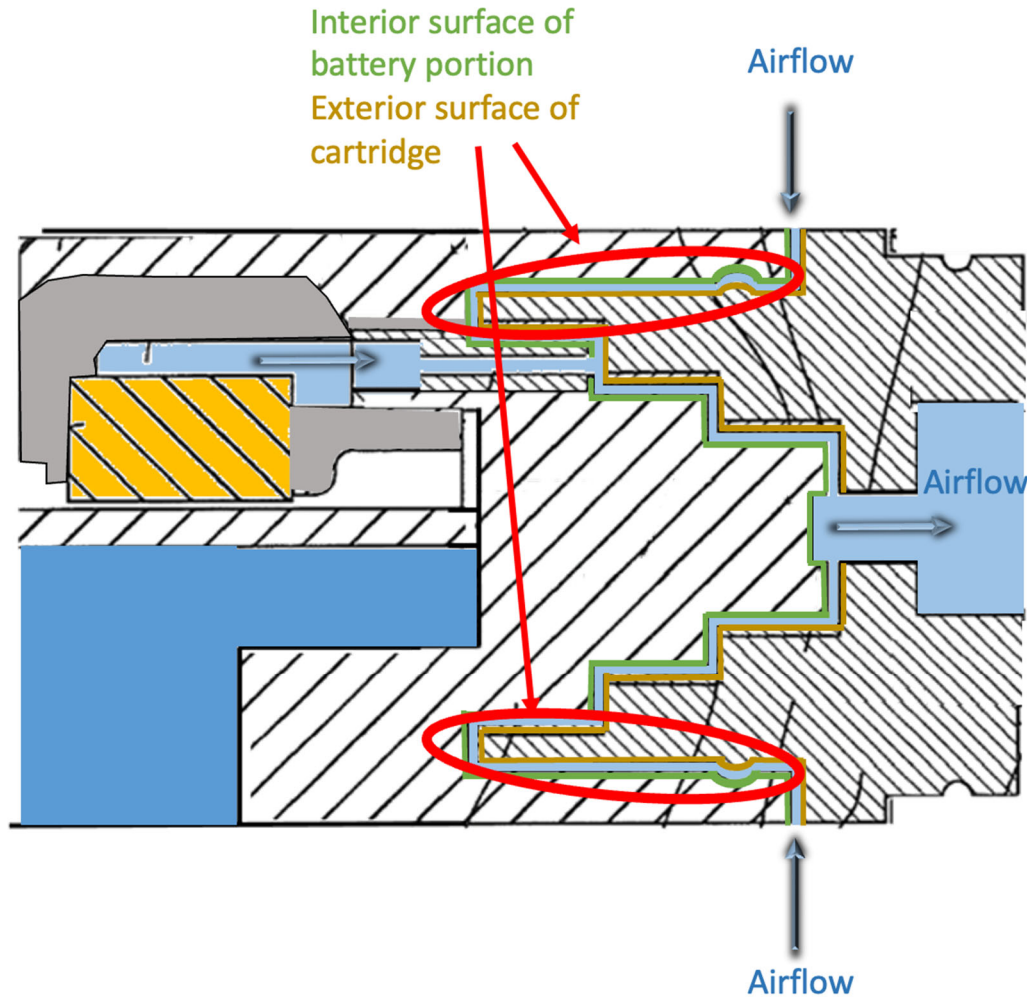
such backflow would result in the build-up of residue along the channel that would affect airflow through the channel. Thus, a POSA would have been motivated to use an inlet at the interface between the battery and cartridge section because it would enable the smoker to clean the channel simply by removing the cartridge and cleaning the exposed channel. EX1003, ¶173.

A POSA would have had a reasonable expectation of success in combining Worm with Levitz. As discussed above, Worm and Levitz both disclose two-piece e-cigarettes, mechanically engaged by a coupler, having an air flow inlet and a pressure sensor, whereby the device is activated when the pressure sensor detects a negative pressure air flow in a sealed portion of the device. EX1003, ¶174. The location of the air inlet location is a design choice and including the inlet at the interface between the battery and cartridge was common. A POSA would have understood placing the air inlet on the periphery of the device where the battery and cartridge connect would not disrupt the operation of Worm and would be within the ability of a POSA to implement. *Id.* Indeed, Worm discloses that the connection interface between the battery and cartridge is not an air-tight connection, and forms a channel for air to communicate with the negative pressure space as well as the outlet of the mouthpiece. EX1004, [0076] (“The matched configuration of the cavity 725 and the projection 741 preferably does not substantially form an air tight connection therebetween.”). Accordingly, a POSA would have understood that

Worm's configuration is compatible with an air inlet at the connection interface as disclosed in Levitz. EX1003, ¶174.

If there is any argument that the protrusion in Worm's cartridge lacks any exterior surfaces for forming a channel, Levitz discloses that the connection between the battery portion and cartridge may be either male-female or female-male. EX1010, [0048] ("...the reverse configuration may be equally suitable, depending on design requirements. Accordingly, the Cartomizer may comprise the 'male' connection and the Battery may comprise the 'female' connection.").

APOSA would have been motivated to modify Worm in view of Levitz to use either a male-female or female-male connection, which Levitz discloses is a known design choice. EX1010, [0048] ("...reverse configuration may be equally suitable, depending on design requirements."). EX1003, ¶¶175, 177. The figure below illustrates modified Worm in view of Levitz, where the battery portion has the male connector and the cartridge has the female connector, and has also been annotated to show the channel formed between the interior of the cartridge receptacle and the exterior of the cartridge. EX1003, ¶176.



Modified Worm

A POSA would have had a reasonable expectation of success in reversing the coupling in Worm since it is a design choice. The design would not have meaningfully impacted the rest of the device and it maintains the coupling stability. EX1003, ¶178.

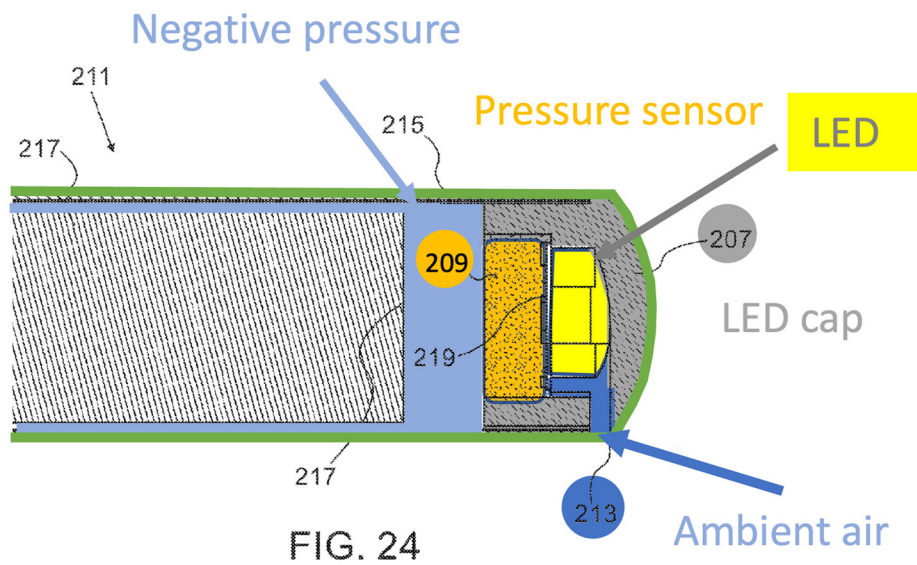
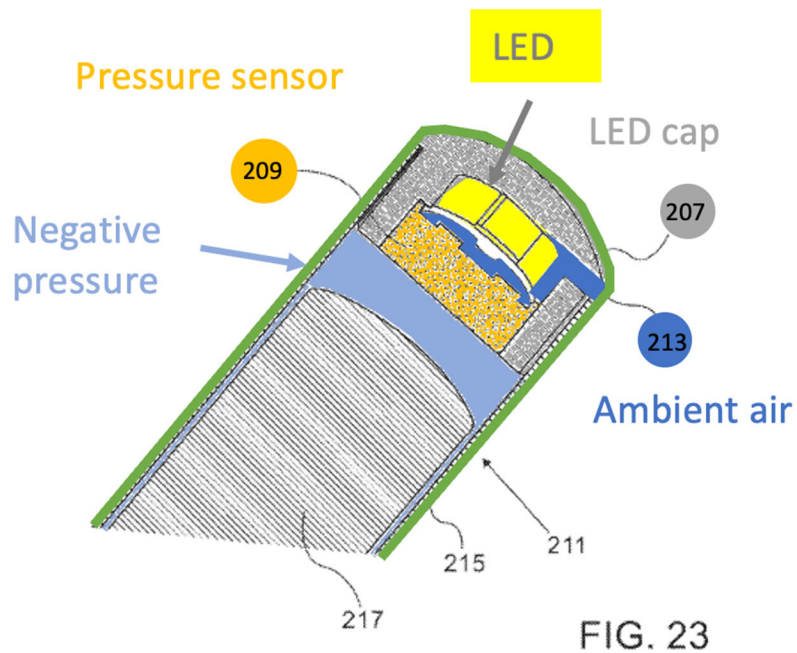
D. Ground 4: Thorens and Weigensberg in view of the Knowledge of a POSA Renders Obvious Claims 14, 27, and 32 of the '123 Patent

Thorens and Weigensberg alone or further in view of the knowledge of a POSA renders obvious claims 14, 27, and 32 of the '123 Patent. Thorens discloses all recited limitations except that it does not disclose a differential pressure sensor exposed to ambient air, a gasket, or a pressure sensor outputting pressure sensor values. EX1003, ¶179.

1. Motivation to combine Thorens and Weigensberg

It was well-known that pressure sensors, including differential pressure sensors, could be used in e-cigarette devices. EX1023, [0083] (“Conventionally, e-vaping devices use a differential pressure sensor.”); EX1022, [0101]. Indeed, the '123 Patent admits that differential pressure sensors were well known and any differential pressure sensor could be used. EX1001, 2:32-33 (“Many electronic cigarettes use a pressure sensor to determine when the device should be heating or not.”); 4:49-60 (“In general, the pressure sensors described herein may be *any differential pressure sensor*.”). EX1003, ¶180.

Weigensberg, for example, teaches a differential pressure sensor 209 in a replaceable tip of an e-cigarette:

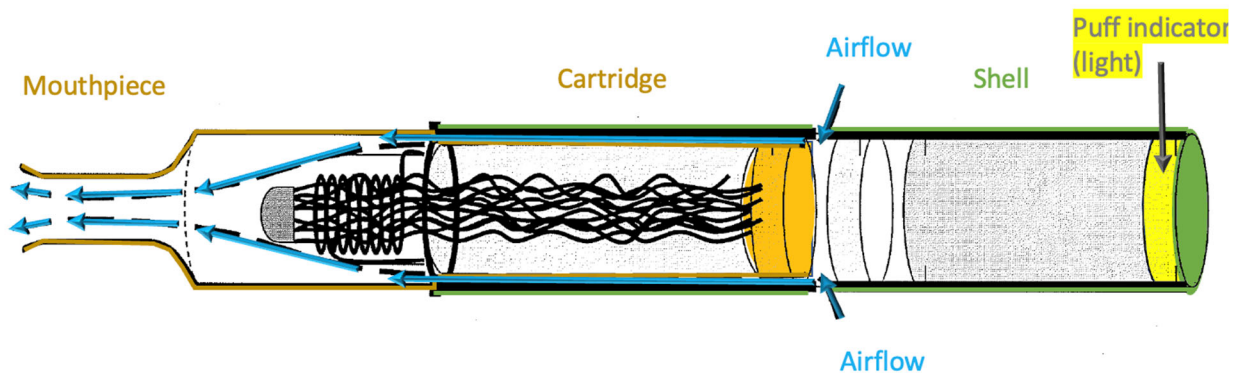


EX1006, Figs. 23, 24

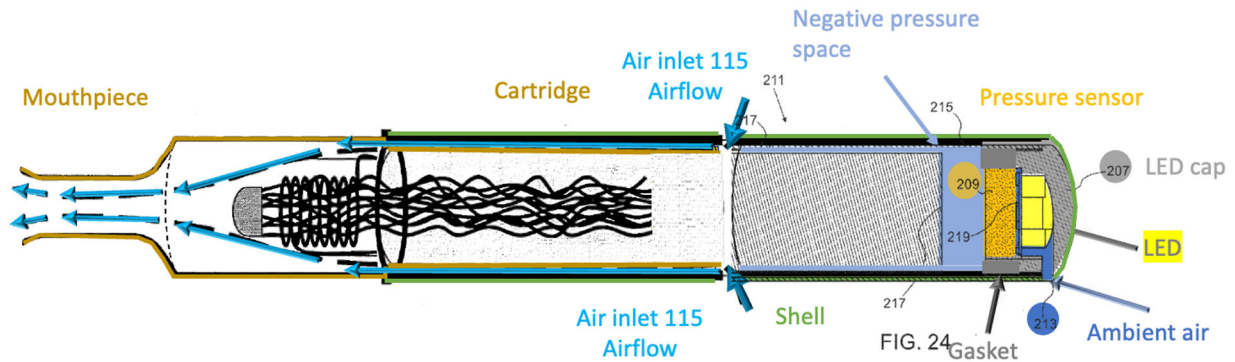
Weigensberg discloses a device air flow path open to ambient through perforation 213. EX1006, [0107] (“The LED cap 207 has a perforation 213 for communication between the sensor unit 209 and the ambient atmosphere.”). Weigensberg further

discloses a sealed air flow path on the opposite side of the pressure sensor. EX1006, [0059]. EX1003, ¶¶181-182.

A POSA would have been motivated to adapt Thorens to include a differential pressure sensor as known in the prior art. For example, Weigensberg's differential pressure sensor tip could replace Thorens' tip, as shown in the modified figure below. Thorens already includes a puff indicator (light) at its tip. Weigensberg's space-saving tip combines an LED and pressure sensor. EX1006, [0107] ("A sensor unit 209 occupies the interior of the LED cap 207, and is an embodiment of the sensor 24 (FIG. 1), but instead of being inside a plastic housing of its own, the sensor unit 209 is now disposed inside the LED cap 207 in order to save space."). EX1003, ¶¶183-184.



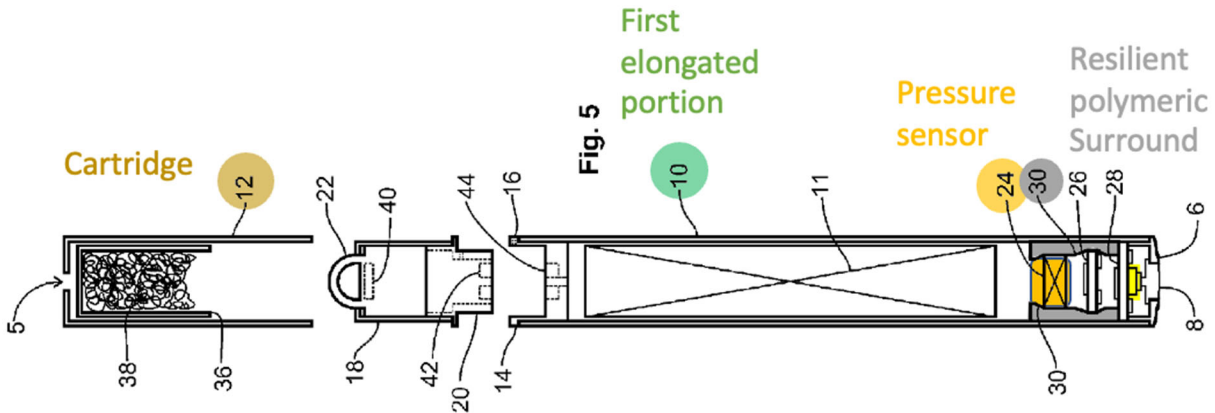
EX1016, Fig. 3



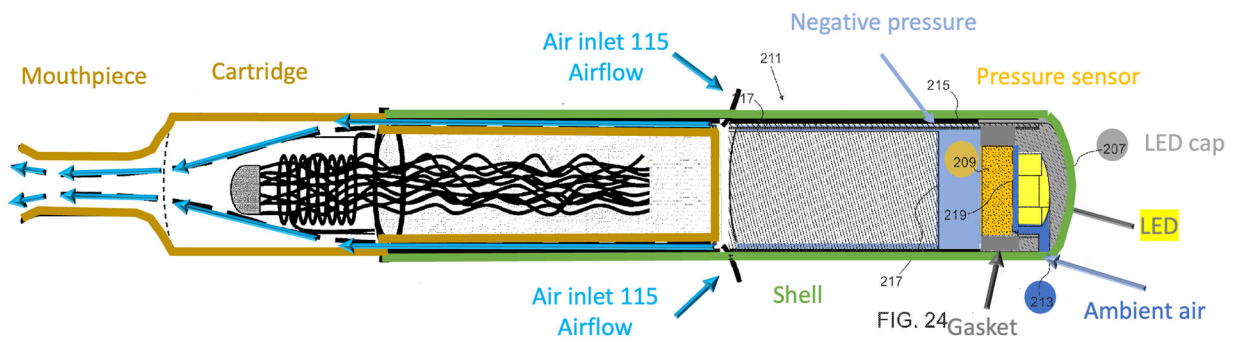
Modified Thorens

Weigensberg teaches a pressure sensor within an LED cap that a POSA would have understood is a gasket used to isolate ambient air pressure from the negative pressure in the device. EX1006, [0105] (“The member 193 has a second function: placing the interior of the body 195 into fluid communication with ambient air...”); [0107] (LED cap uses the same material as member 193); EX1003, ¶185.

To the extent it is argued that Weigensberg does not disclose a gasket, a POSA, consistent with conventional wisdom, would have included a gasket around Weigensberg’s pressure sensor to ensure the ambient side of the device remains sealed from the negative pressure of an inhalation. *See* EX1023, [0083] (“Conventionally, ... [t]he differential pressure sensor is generally set on an end of the device and put into a gasket that seals one side of the sensor from another side of the sensor.”); EX1022, [0101]. *See, e.g.,* EX1009, 6:6-9 (“The polymeric surround 30 also acts as a pressure seal to insure the draw pressure sensor 24 is properly coupled to detect the negative pressure of the draw.”). EX1003, ¶186.



EX1009, Fig. 5 (illustrating a gasket surrounding the pressure sensor)



Modified Thorens (illustrating a gasket)

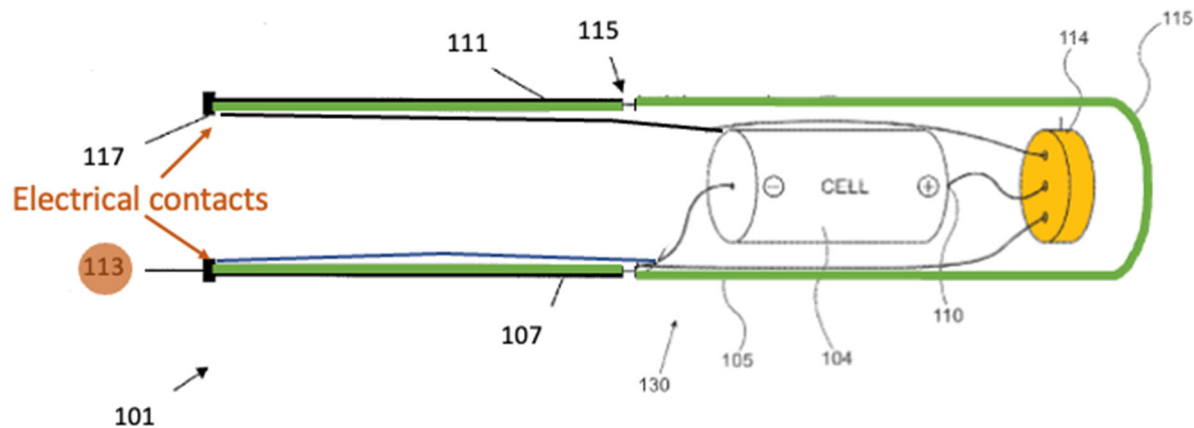
Weigensberg teaches the added benefit is that its sensor outputs a range of values corresponding to pressure values. EX1006, [0087] (“Alternatively, the sensor S 167 may be realized as an analog circuit, with appropriate modification of the microcontroller 159 to accommodate an analog device, for example, by including an analog-to-digital converter as is known in the art.”). A POSA would have recognized that analog output comprises a range of values corresponding to the pressure difference, which supports the ability to perform different functions. EX1003, ¶189; *see also* EX1021, Abstract. Weigensberg’s already contemplates circuitry

“associated with or incorporated in the sensor unit 209 may enable the aerosol generating device and perform various additional functions as may be required for the operation of the electronic cigarette 211.” EX1006, [0107].

A POSA would have been motivated to make such a modification for several reasons. First, a differential pressure sensor is simply a design choice that was conventionally used in e-cigarettes. EX1023, [0083] (“Conventionally, e-vaping devices use a differential pressure sensor.”); EX1022, [0101]. EX1003, ¶190. Second, a differential pressure sensor open to ambient air can better accommodate external pressure changes. For example, at ambient pressure, the device would not accidentally activate at high altitude due to the decrease in pressure. EX1003, ¶190. Third, because Weigensberg’s sensor outputs pressure values, that can be used to add features to the device – *e.g.*, changing heater parameters based on airflow rate. EX1021, 25:4-7 (“...microprocessor receives the variable signal and initiates an algorithm (operation 735) according to predefined programming to establish the predefined heater parameters relative to the airflow rate detected by the sensor.”). EX1003, ¶190. Fourth, a POSA would have recognized the advantage of combining Thorens’ puff detector (differential sensor)/circuitry combination and the puff indicator. EX1006, [0107] (“[T]he sensor unit 209 is now disposed inside the LED cap 207 in order to save space.”); EX1016, [0034]. For example, because these are integrated at the tip of the e-cigarette in a compact form, space where the puff sensor

was located is freed up. This permits, for example, a larger battery. EX1003, ¶190.

A POSA would have had a reasonable expectation of success modifying Thorens in view of Weigensberg alone or further in view of the knowledge of a POSA because the designs of the underlying two-piece systems are similar, making the relocation of Thorens' pressure sensor and control circuitry a simple task, especially because Weigensberg teaches a replacement tip comprising single-piece differential sensor. Extending the electrical lines from Weigensberg's sensor chip assembly 114 to the electrical contacts 113 would have been a trivial change. EX1003, ¶¶187-188, 191.



Modified Thorens

A POSA would have the skills necessary to make these minor adjustments and modified Thorens would continue to activate when the pressure sensor detects air flow that causes a negative pressure in a sealed portion of the device. EX1006, [0058] (“...FIG. 1, which is a semi-schematic exploded view of a smoking device

10 in accordance with an embodiment of the invention...The battery section 12 may include power control circuitry 14, which is typically encased as a unit with a vacuum sensor 24, and which may be enclosed in a plastic holder.”). EX1003, ¶191.

2. Claim 14

a. [14.A] A vaporizer device body comprising:

Thorens discloses this limitation. EX1003, ¶¶192-193.

Thorens discloses electrically heated smoking system 301 comprising a shell and mouthpiece 201. EX1016, [0044] (“FIG. 3 shows the shell 101 of FIG. 1 engaged with the mouthpiece 201 of FIG. 2 to form an electrically heated smoking system 301 arranged to supply aerosol to a user on demand.”). EX1003, ¶193.

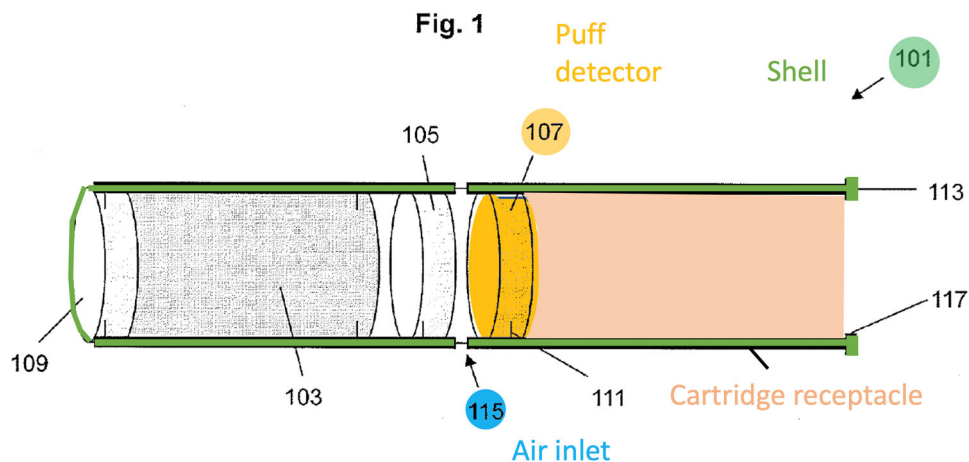


Fig. 2

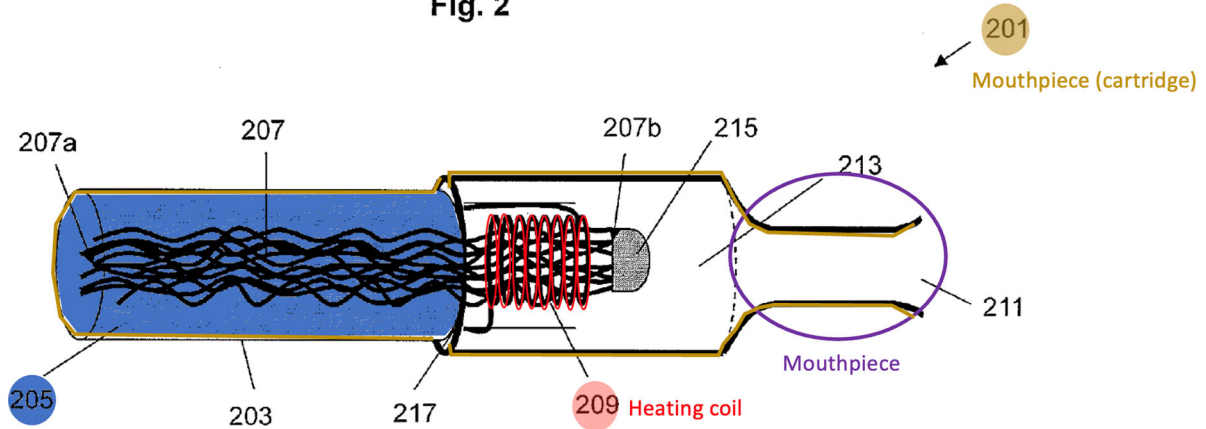
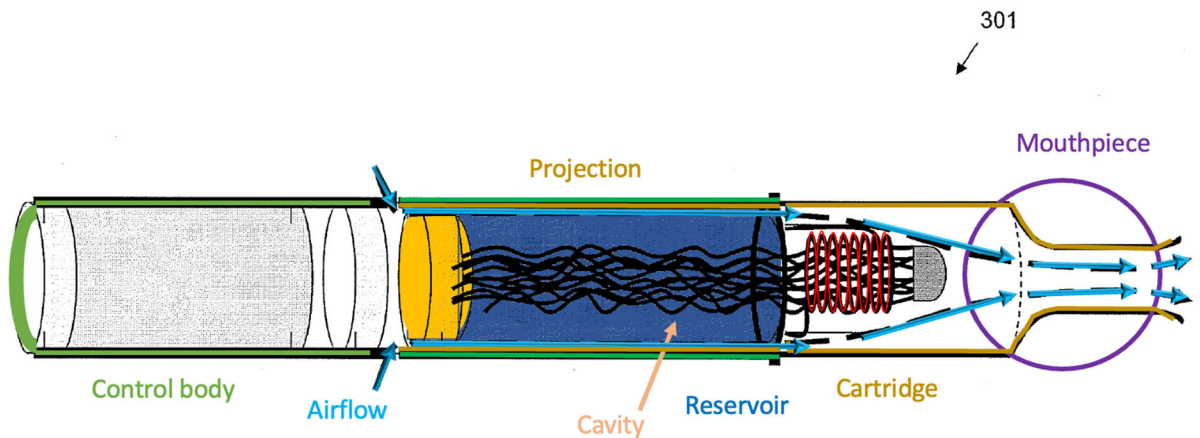


Fig. 3

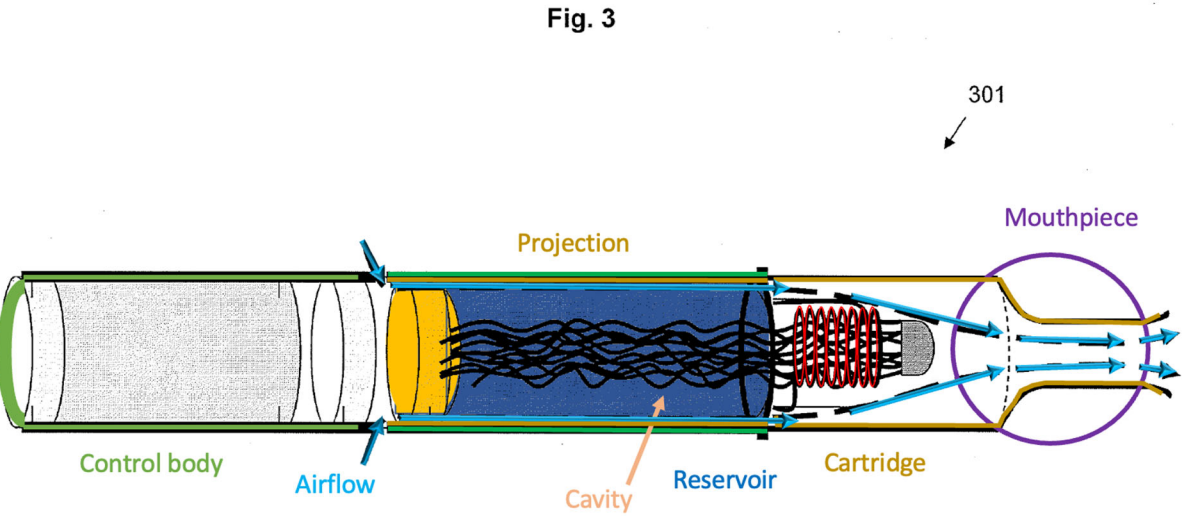
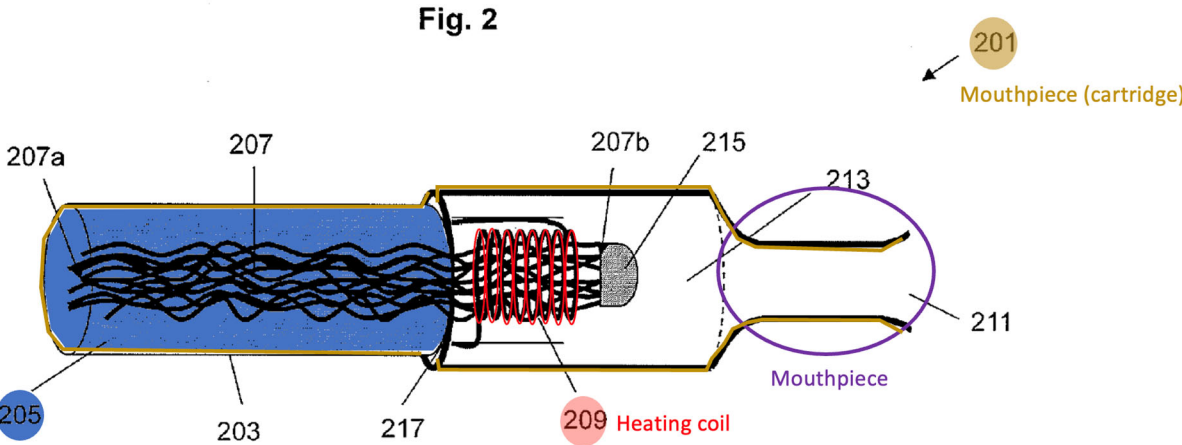
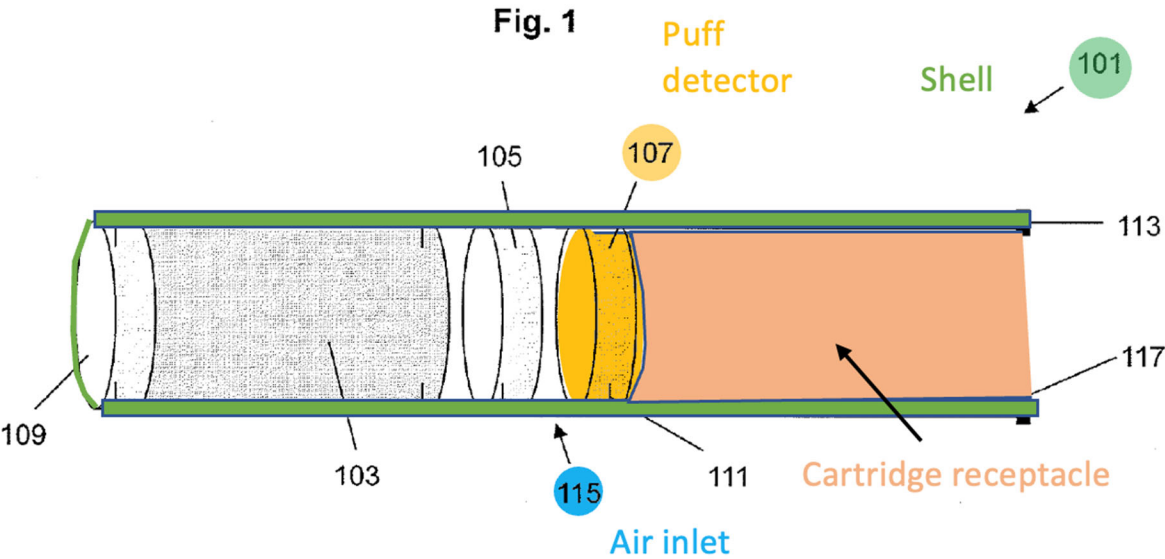


EX1016, Figs. 1-3

- b. [14.B] a cartridge receptacle configured to insertably receive a cartridge containing a vaporizable material;

Thorens discloses this limitation. EX1003, ¶¶194-196.

Thorens discloses shell 101 with a receptacle for receiving mouthpiece 201 (cartridge). EX1016, [0042] (“The shell 101 is designed to engage with the mouthpiece 201 of FIG. 2.”). EX1003, ¶195.



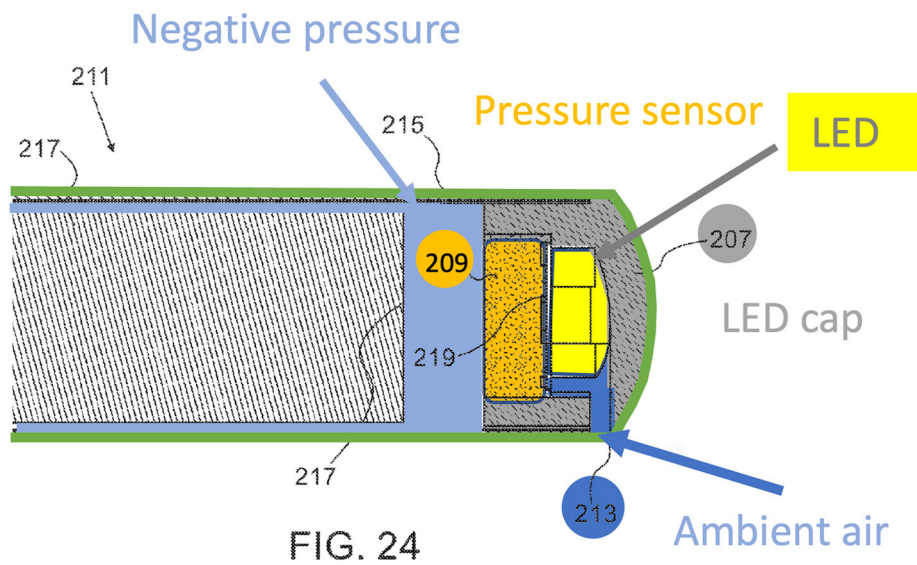
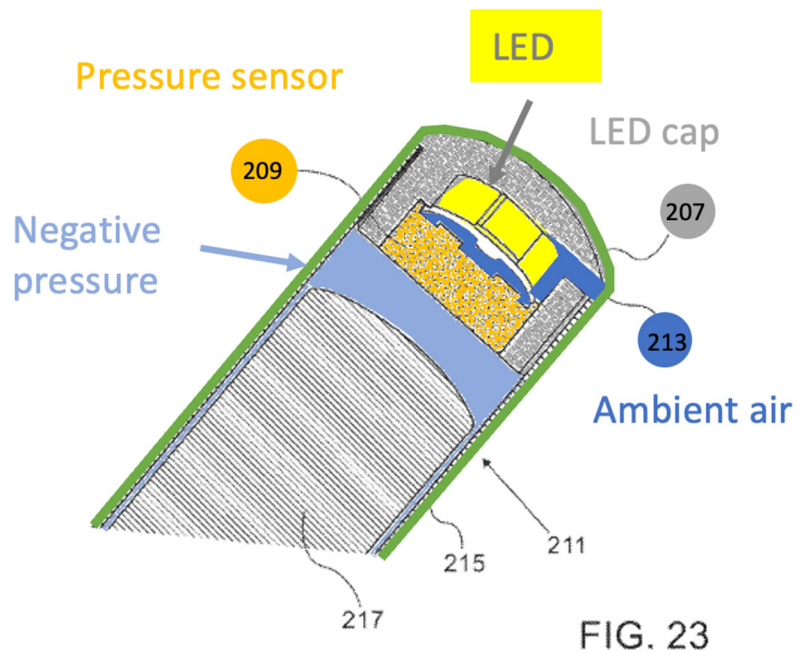
EX1016, Figs. 1-3

Mouthpiece 201 includes liquid 205 vaporized by heating coil 209. EX1016, [0043] (“The mouthpiece 201 comprises a liquid storage portion in the form of cartridge 203 containing liquid 205, a capillary wick 207, a heating element in the form of heating coil 209, an air outlet 211 and an aerosol forming chamber 213.”); Abstract (“Liquid at the second end of the capillary wick is vaporized by the heating element.”). EX1003, ¶196.

c. **[14.C] a pressure sensor configured to output sensor readings.**

Thorens in view of Weigensberg discloses this limitation. EX1003, ¶¶197-199.

Weigensberg discloses a sensor that outputs sensor readings corresponding to pressure values. EX1006, [0087] (“Alternatively, the sensor S 167 may be realized as an analog circuit, with appropriate modification of the microcontroller 159 to accommodate an analog device, for example, by including an analog-to-digital converter as is known in the art.”). A POSA would have understood that an analog output can include a range of values corresponding to the pressure difference. EX1003, ¶198.



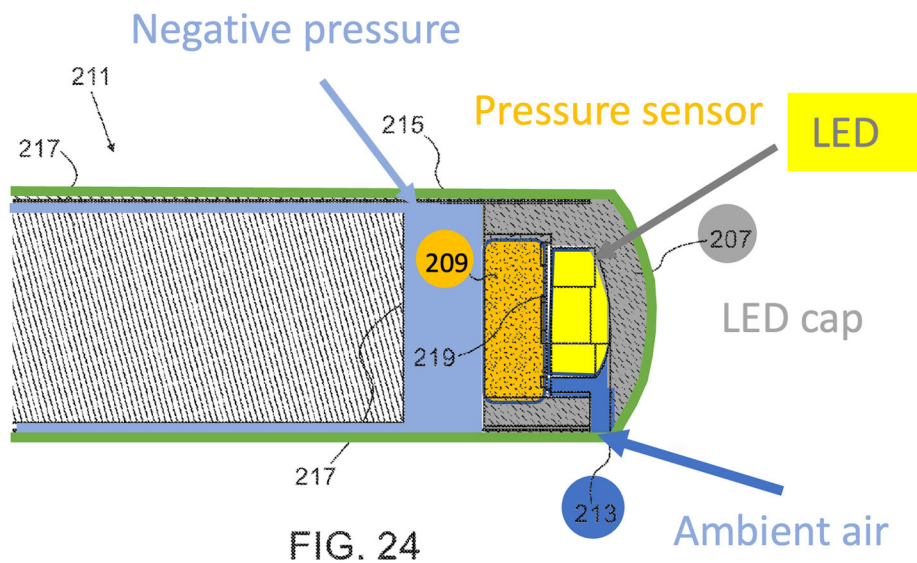
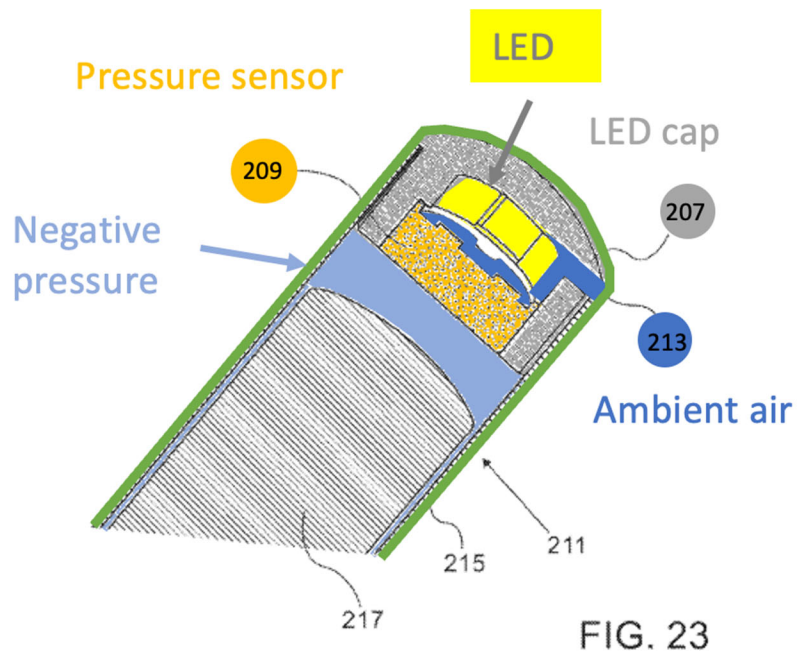
EX1006, Figs. 23, 24

A POSA would have been motivated to include Weigensberg's pressure sensor and LED for the reasons discussed in Section IX.D.1. EX1003, ¶199.

- d. **[14.D] wherein a first side of the pressure sensor is exposed to a sealed air flow path and a second side of the pressure sensor is exposed to a device air path open to ambient pressure,**

Thorens in view of Weigensberg discloses this limitation. EX1003, ¶¶200-204.

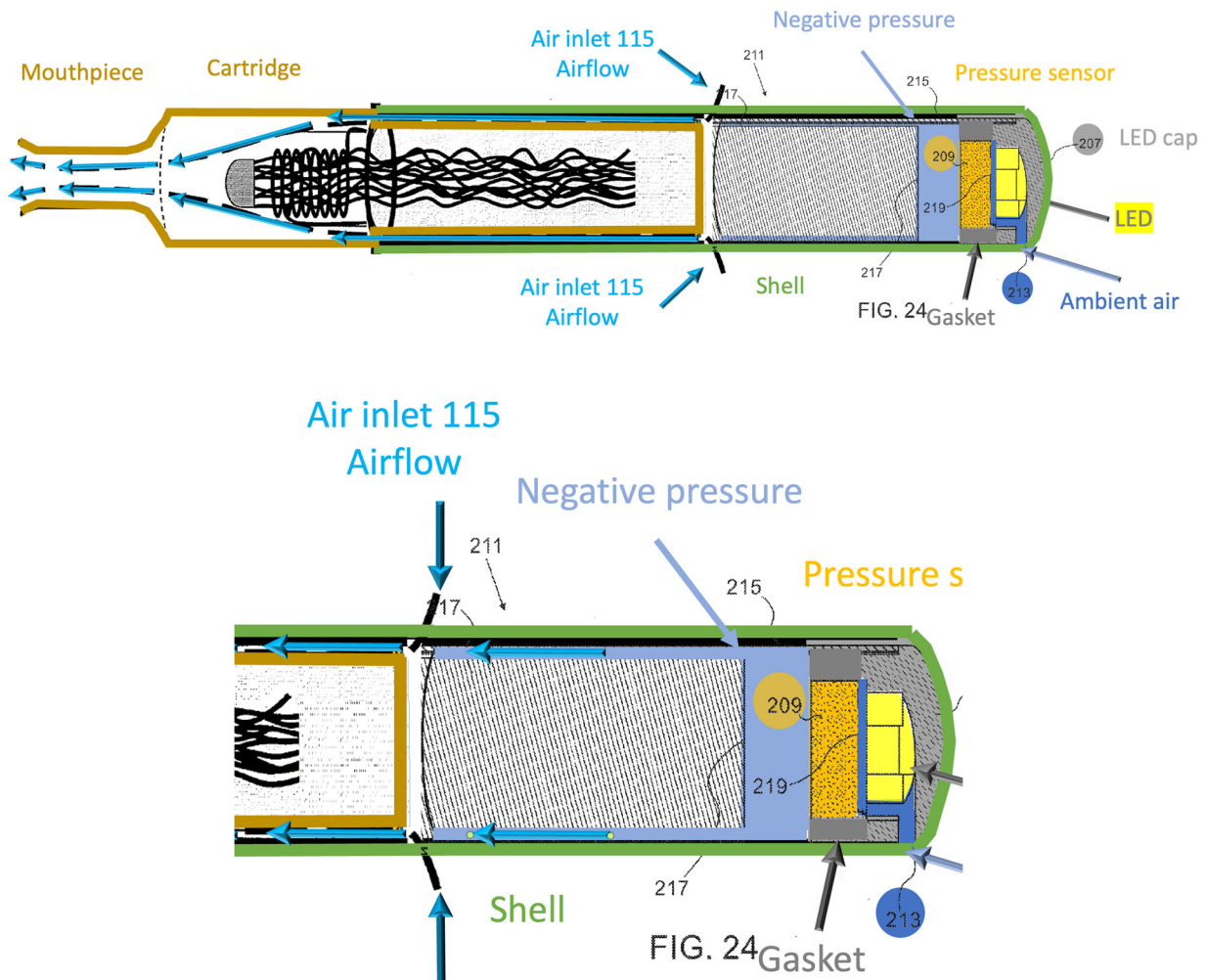
Weigensberg discloses a device air flow path open to ambient through perforation 213. EX1006, [0107] (“The LED cap 207 has a perforation 213 for communication between the sensor unit 209 and the ambient atmosphere.”). Weigensberg further discloses a sealed air flow path on the opposite side of the sensor. EX1006, [0059] (“When smoke enters the device 10, an internal aperture (not shown) typically constricts the flow, thereby creating a pressure differential, which is sensed by a vacuum sensor 24 of known type.”). *See also*, EX1023, [0083] (“Conventionally, e-vaping devices use a differential pressure sensor. Differential pressure sensors measure two air pressures, one ambient and one that changes.”); EX1022, [0101]. EX1003, ¶201.



EX1006, Figs. 23, 24

In modified Thorens, Thorens' tip portion, comprising an LED, is replaced by Weigensberg's tip portion, comprising a pressure sensor and an LED. The device air flow path in modified Thorens is provided through perforation 213, which exposes

one side of the pressure sensor to ambient pressure. EX1003, ¶1202.



Modified Thorens

The sealed air flow path (negative pressure path) in modified Thorens starts from air inlets 115, travels between shell 101 and cartridge 203, and then exits into the smoker's mouth. *See* EX1016, [0048] ("Thus, ambient air is drawn through air inlets 115 and passes around the cartridge 203 before reaching the second end 207b of the wick and the heating coil 209."). When a smoker draws on modified Thorens, one side of Weigensberg's pressure sensor experiences a negative pressure (*e.g.*, partial

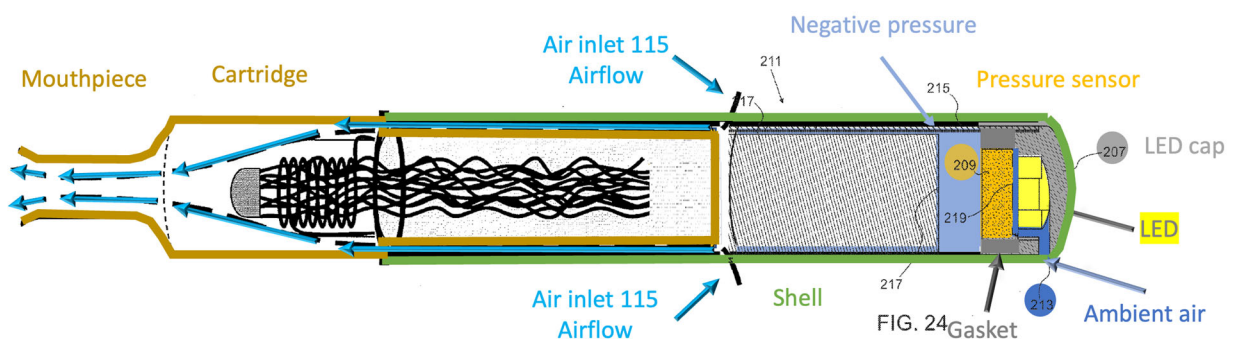
vacuum) as air is evacuated towards mouthpiece 201. EX1006, [0059] (“When smoke enters the device 10, an internal aperture (not shown) typically constricts the flow, thereby creating a pressure differential, which is sensed by a vacuum sensor 24 of known type.”); EX1023, [0083] (“Conventionally, e-vaping devices use a differential pressure sensor. Differential pressure sensors measure two air pressures, one ambient and one that changes.”); EX1022, [0101]; EX1003, ¶¶202-203.

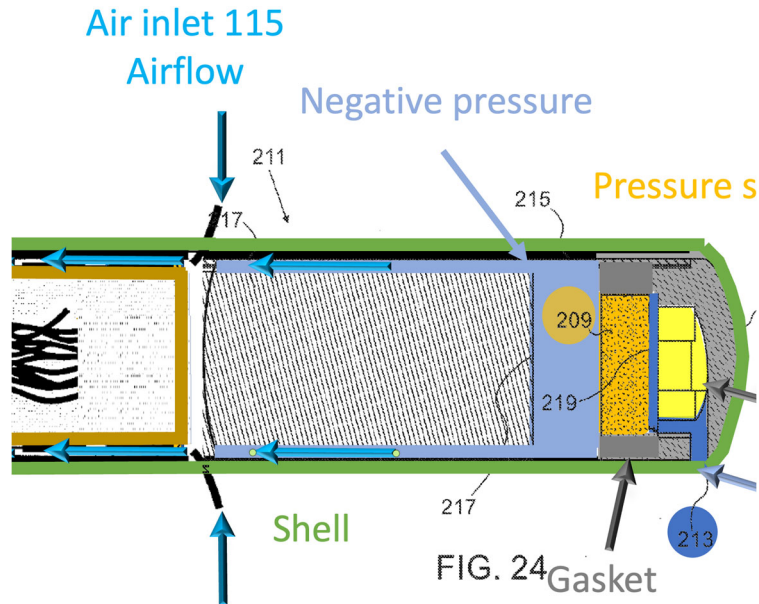
A POSA would have been motivated to include Weigensberg’s pressure sensor system as discussed in IX.D.1; EX1003, ¶204.

- e. **[14.E] the sealed air flow path comprising a channel formed between an interior surface of the cartridge receptacle and an exterior surface of the cartridge,**

Thorens discloses this limitation. EX1003, ¶¶205-208.

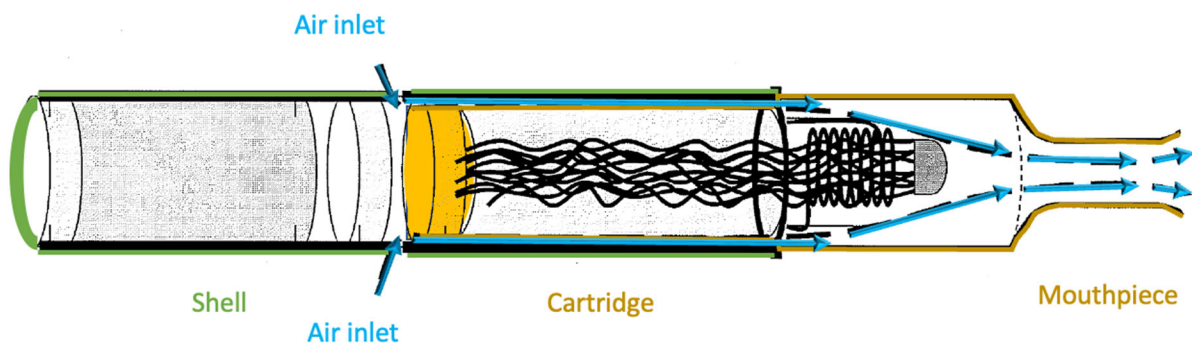
As discussed in [14.D], a sealed air flow path is disclosed (air inlets 115 to the opening 211 in mouthpiece 201).





Modified Thorens

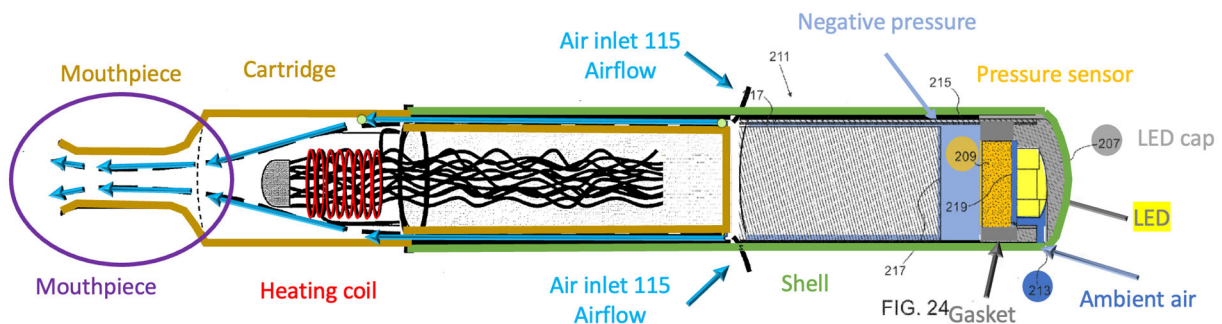
As shown in Figure 3 and above, Thorens discloses the sealed air flow path includes a channel formed between the interior surface of the receptacle in shell 101 (green) that receives cartridge 203 and the exterior surface of cartridge 203 (brown). EX1016, [0048]; [0045]. EX1003, ¶¶206-208.



- f. [14.F] the sealed air flow path passing from an air inlet, through the channel and to a heater and an outlet of a mouthpiece within the cartridge; and

Thorens discloses this limitation. EX1003, ¶¶209-211.

As discussed in [14.D] and [14.E] a sealed air flow path is disclosed. Thorens discloses the sealed air flow path goes to heating coil 209 and outlet 211 of mouthpiece 201 (cartridge). EX1016, [0045] (“When the user draws on the device at the air outlet 211, ambient air is drawn through air inlets 115....The liquid in the second end 207b of the wick 207 is vaporized by the heating coil 209 to create a supersaturated vapor....the vapor condenses to form an inhalable aerosol, which is carried towards the outlet 211 and into the mouth of a user.”). EX1003, ¶210.



Modified Thorens

Thorens’ mouthpiece 201 is the claimed cartridge in the ’123 Patent. Mouthpiece 201 (cartridge) includes a portion used by a mouth (mouthpiece) that includes air outlet 211. EX1016, [0043] (“The mouthpiece 201 comprises a liquid storage portion in the form of cartridge 203 containing liquid 205, a capillary wick 207, a heating element in the form of heating coil 209, an air outlet 211 and an

aerosol forming chamber 213.”); Abstract (“...a flowpath for air is defined from at least one air inlet to the air outlet via the aerosol forming chamber.”). EX1003, ¶211.

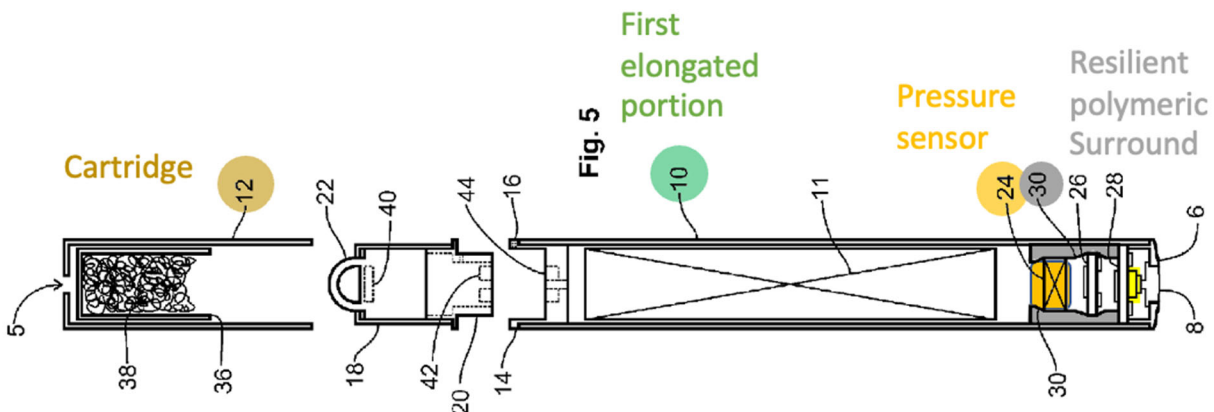
g. **[14.G] a gasket around the pressure sensor, the gasket configured to seal the device air path from the sealed air flow path.**

Thorens in view of Weigensberg alone or further in view of the knowledge of a POSA disclose this limitation. EX1003, ¶¶212-215.

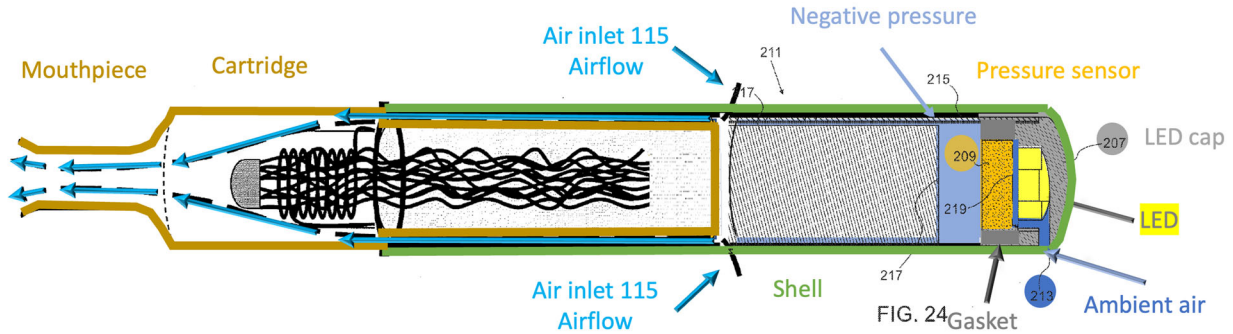
Weigensberg’s tip has a space-saving design, including control circuitry, LED, and pressure sensor 209. EX1006, [0107] (“A sensor unit 209 occupies the interior of the LED cap 207, and is an embodiment of the sensor 24 (FIG. 1), but instead of being inside a plastic housing of its own, the sensor unit 209 is now disposed inside the LED cap 207 in order to save space.”). Weigensberg’s plastic LED cap acts as a gasket that isolates the ambient air pressure path from the device path to allow the pressure sensor to detect differences from ambient air. *See* EX1006, [0107] (“The LED cap 207 is mostly inset into the end of the barrel 215....The LED cap 207 may be constructed of a plastic material as described for the member 193 (FIG. 20).”); [0105] (Member 193 places “the interior of the body 195 into fluid communication with ambient air as seen in FIG. 21, so as to facilitate operation of a pressure sensor, e.g., sensor 24 (FIG. 1).”). EX1003, ¶213.

To the extent it is argued that Weigensberg does not disclose the claimed gasket, a POSA would have recognized that, consistent with common practice,

Weigensberg's pressure sensor would have a surrounding gasket to isolate the ambient side of the pressure sensor from the other side that senses the negative pressure within a portion of the device. It was well known that a differential pressure sensor would have included a gasket around the pressure sensor to seal the different sensed paths from each other. EX1023, [0083] ("Conventionally...[t]he differential pressure sensor is generally set on an end of the device and ***put into a gasket that seals one side of the sensor from another side of the sensor.***"); EX1022, [0101]. See, e.g., EX1009, 6:6-9 ("The polymeric surround 30 also acts as a pressure seal to insure the draw pressure sensor 24 is properly coupled to detect the negative pressure of the draw."). EX1003, ¶214.

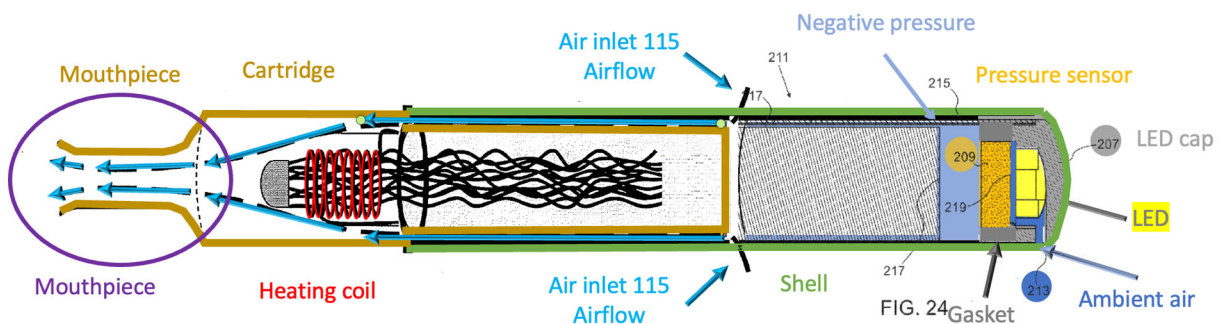


EX1009, Fig. 5 (illustrating a gasket around a differential pressure sensor)



Modified Thorens

Accordingly, a POSA would have included a gasket surrounding Weigensberg's differential pressure sensor when modifying Thorens to ensure that the two sides of the pressure sensor remain separated. For example, a compressible gasket will maintain a seal even when the device experiences thermal expansion due to the environment. Including a gasket around the sensor would have been trivial and require no substantial modification to the device. EX1003, ¶215.



Modified Thorens

A POSA would have been motivated to include Weigensberg's LED cap or another gasket for the reasons discussed in IX.D.1; EX1003, ¶216.

3. Claim 27

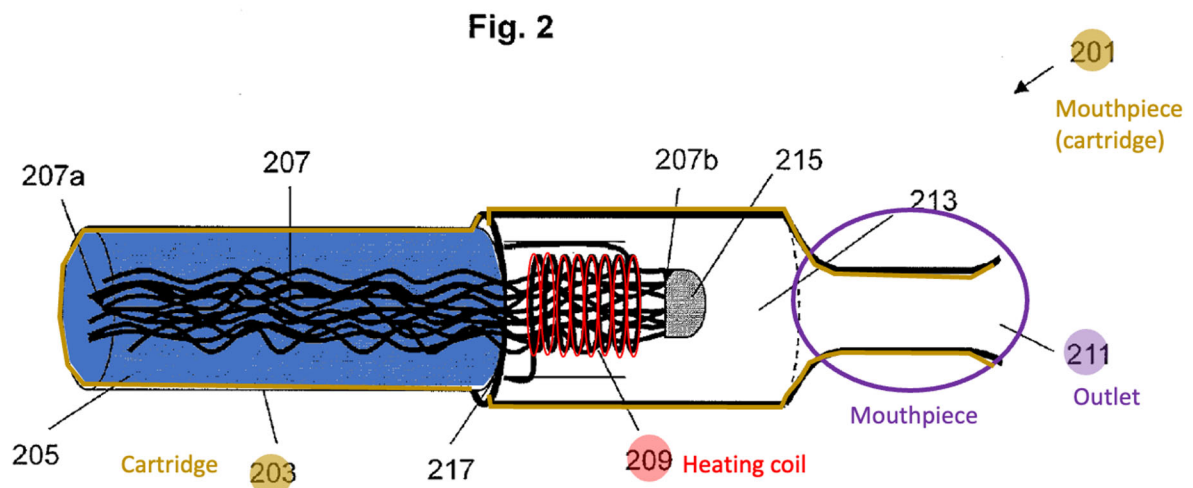
a. [27.A] A vaporizer device comprising:

Disclosed. [14.A].

b. [27.B] a cartridge comprising a reservoir configured to hold a vaporizable material, a heater configured to heat the vaporizable material, and a mouthpiece in fluid communication with the heater; and

Thorens discloses this limitation. EX1003, ¶¶218-220.

Thorens discloses mouthpiece 201, which is the cartridge in the '123 Patent. EX1003, ¶219. Mouthpiece 201 (cartridge) includes cartridge 203 (reservoir) containing vaporizable liquid 205, heater coil 209 that heats liquid 205 and an air outlet 211. EX1016, [0043] (“The mouthpiece 201 comprises a liquid storage portion in the form of cartridge 203 containing liquid 205, a capillary wick 207, a heating element in the form of heating coil 209, an air outlet 211 and an aerosol forming chamber 213.”). EX1003, ¶219.



EX1016, Fig. 2

The portion of mouthpiece 201 (cartridge) used by a mouth (mouthpiece) includes outlet 211, which receives (fluid communication with) the supersaturated vapor generated by heating coil 209. EX1016, [0045] (“The liquid in the second end 207b of the wick 207 is vaporized by the heating coil 209 to create a supersaturated vapor....The supersaturated vapor created is mixed with and carried in the air flow from the air inlets 115 towards the aerosol forming chamber 213...the vapor condenses to form an inhalable aerosol, which is carried towards the outlet 211 and into the mouth of a user.”); Abstract. EX1003, ¶220.

c. **[27.C] a device body comprising:**

Disclosed. [14.A]. EX1003, ¶221.

d. **[27.D] a cartridge receptacle configured to insertably receive the cartridge;**

Disclosed. [14.B]. EX1003, ¶222.

e. **[27.E] a pressure sensor configured to output sensor readings,**

Obvious. [14.C]. EX1003, ¶223.

f. **[27.F] wherein a first side of the pressure sensor is exposed to a sealed air flow path and a second side of the pressure sensor is exposed to a device air path open to ambient pressure,**

Obvious. [14.D]. EX1003, ¶224.

g. **[27.G] the sealed air flow path comprising a channel formed between an interior surface of the cartridge receptacle and an exterior surface of the cartridge,**

Disclosed. [14.E]. EX1003, ¶225.

- h. **[27.H] the sealed air flow path passing from an air inlet, through the channel and to the heater and an outlet in the mouthpiece of the cartridge; and**

Disclosed. [14.F]. EX1003, ¶226.

- i. **[27.I] a gasket around the pressure sensor, the gasket configured to seal the device air path from the sealed air flow path.**

Obvious. [14.G]. EX1003, ¶227.

- 4. **Claim 32: The vaporizer device of claim 27, wherein the cartridge comprises the vaporizable material, and wherein the vaporizable material comprises a nicotine formulation.**

Thorens and Weigensberg alone or further in view of the knowledge of a POSA disclose every limitation of claim 27. Thorens and Weigensberg disclose this limitation. EX1003, ¶¶228-231.

As discussed for [27.B], Thorens discloses a cartridge with liquid vaporizable material. Thorens discloses the liquid preferably includes “tobacco-containing material comprising volatile tobacco flavour compounds which are released from the liquid upon heating.” EX1016, [0023]. Thorens further discloses two examples of potentially suitable aerosol formers. *Id.* One example is EP0277519 (“Roberts”; EX1017), which discloses nicotine as a volatile flavoring agent in an aerosol generating substance. EX1017, [0100]. Thus, Thorens discloses this limitation. EX1003, ¶229.

To the extent it is argued that Thorens does not disclose a nicotine formulation for its vaporizable liquid, Weigensberg incorporates by reference ([EX1006], [0004]) EP1736065, which discloses an e-cigarette that uses a nicotine solution. EX1024, [0017] (“...the nicotine solution is subjected to the ultrasonic atomization by the first piezoelectric element 23 and is further atomized by the heating element 26.”). A POSA would have been motivated to include Weigensberg’s nicotine formulation as a tobacco flavor compound with a reasonable expectation of success because nicotine was a known and popular ingredient in precursor liquids in e-cigarettes. EX1003, ¶230.

Claims 14, 27, and 32 of the ’123 Patent are therefore rendered obvious over Thorens and Weigensberg alone or in view of the knowledge of a POSA. EX1003, ¶231.

E. Grounds 5-8: Grounds 1-4, further in view of Lamb, Render Obvious Claims 14, 15, 16, 18, 27, 28, 29, 31, and 32 of the ’123 Patent

Independent claims 14 and 27 require “pressure sensor configured to output sensor readings” and “gasket around the pressure sensor...to seal the device air path from the sealed air flow path.” Dependent claims 15 and 28 require a capacitive pressure sensor, claims 16 and 29 require a MEMS sensor, claims 18 and 31 require a pressure sensor that outputs pressure values, and claim 32 requires a nicotine formulation.

Lamb teaches a MEMS-based sensor that outputs sensor readings corresponding to pressure values. EX1005, [0006] (“In some examples, the MEMS-based sensor may be configured to convert the pressure to the *electrical signal that varies with a corresponding variation in the pressure* relative to an ambient pressure on the MEMS-based sensor.”); [0004] (“The MEMS-based sensor is within the housing and configured to detect a pressure on the MEMS-based sensor caused by airflow through at least a portion of the housing. The MEMS-based sensor is configured to *convert the pressure to an electrical signal*, and output the electrical signal.”); [0007]; [0008]; Abstract; Fig. 5. Therefore, Lamb discloses “a pressure sensor configured to output sensor readings” under either construction in the ITC Investigation. *See* EX1019; EX1003, ¶¶233-234.

Lamb discloses multiple types of sensors, including a MEMS pressure sensor with a “micromachined, pressure-sensitive diaphragm 306a and a backplate 306b that form a *variable capacitor 306*.” EX1005, [0047]. A POSA would have understood that this is a MEMS pressure sensor with a capacitive membrane. Lamb discloses that the diaphragm moves in response to pressure, which changes the capacitance. EX1005, [0047] (“...the pressure causes movement of the diaphragm and thereby a change in a capacitance of the variable capacitor.”). Lamb’s sensor senses the capacitance change to detect the pressure change. EX1003, ¶¶233-235.

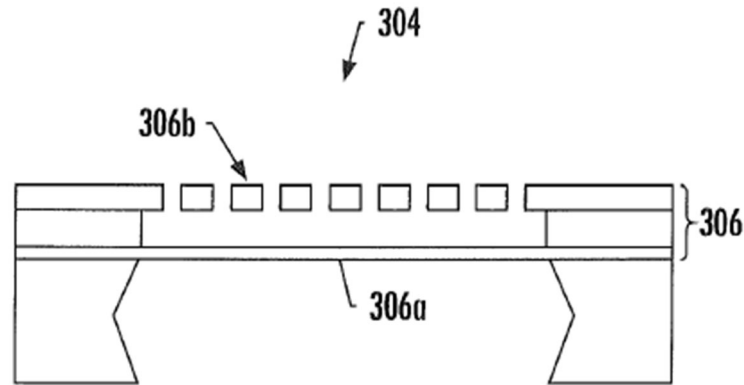


FIG. 3

EX1005, Fig. 3

Lamb further discloses reservoir 118 holds an aerosol precursor composition (vaporizable liquid) in cartridge 104. EX1005, [0026].

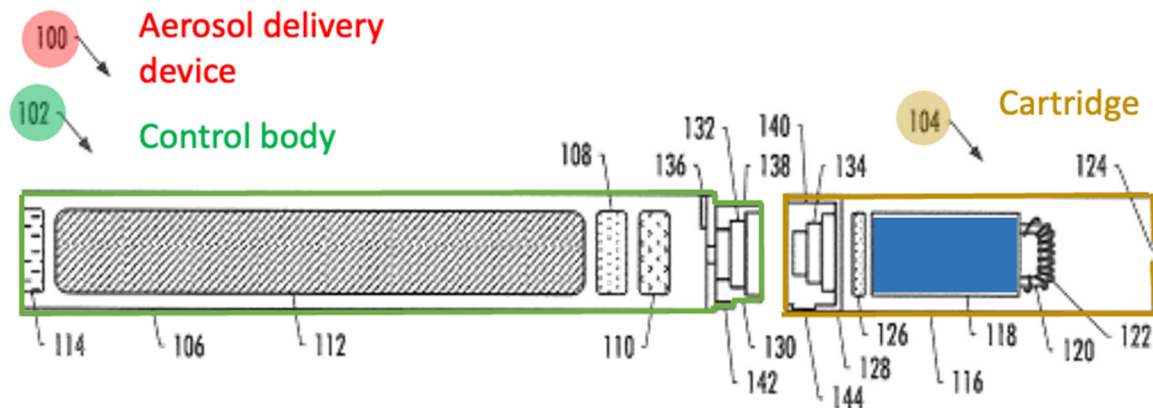


FIG. 1

EX1005, Fig. 1

Lamb teaches that its vaporizable liquid may comprise a nicotine component, which satisfies claim 32. EX1005, [0040] (“The aerosol precursor composition, also

referred to as a vapor precursor composition, may comprise...*nicotine*, tobacco, tobacco extract and/or flavorants.”). EX1003, ¶236.

1. Motivation to Combine each of Grounds 1-4 with Lamb

Lamb is primarily directed to a MEMS-based sensor for detecting a negative pressure during a draw on an e-cigarette. EX1005, [0004] (“The MEMS-based sensor is within the housing and configured to detect a pressure on the MEMS-based sensor caused by airflow through at least a portion of the housing.”). Lamb is similar to Worm and Weigensberg. Lamb discloses that its pressure sensor measures pressure in a portion of the housing relative to ambient. EX1005, [0006] (“In some examples, the MEMS-based sensor may be configured to convert the pressure to the electrical signal that varies with a corresponding variation in the pressure relative to an ambient pressure on the MEMS-based sensor.”); [0004]. Lamb discloses a cartridge containing vaporizable liquid. EX1005, [0026]. EX1003, ¶¶237-239.

It would have been obvious to a POSA to modify Worm and/or Weigensberg in Grounds 1-4 to use Lamb’s MEMS pressure sensor. Lamb’s pressure sensor is used for the same purpose as those in Worm and Weigensberg—measuring the pressure difference on one side of the sensor relative to ambient. EX1005, [0006]; [0045] *compared with* EX1004, [0077] (“...a pressure differential can be created across the pressure sensor between the first end of the pressure sensor in the pressure reduction space and the second end of the pressure sensor in the normal pressure

space within the shell.”); *and with* EX1006, [0059] (“...an internal aperture (not shown) typically constricts the flow, thereby creating a pressure differential, which is sensed by a vacuum sensor 24 of known type.”). EX1003, ¶240. Accordingly, it would have been a simple substitution of a component that operates in the same manner for the same purpose. EX1003, ¶240. The ’123 Patent admits that any differential pressure sensor can be easily substituted, including MEMS. EX1001, 4:49-60 (“In general, the pressure sensors described herein may be *any differential pressure sensor, such as MEMS....*”); EX1003, ¶241.

A POSA would have been motivated to modify Worm and/or Weigensberg to include a MEMS pressure sensor because they have certain advantages including responsiveness, small footprint, low power consumption, low cost, reliability, precision and easy integration. *See* EX1022, [0102] (“...the MEMS pressure sensor 525 occupies less space than a differential pressure sensor because the MEMS pressure sensor 525 can be mounted directly on the PCB 116.”); EX1015, 3:3-7 (“The most significant advantage of MEMS is their ability to communicate easily with electrical elements in semiconductor chips. Other advantages include small size, compact structure, lower power consumption, lower cost, increased reliability and higher precision.”). A capacitive sensor has higher sensitivity than mechanical sensors and better reliability, lower cost and are more easily manufactured compared to conventional capacitor sensors. *See* EX1028, [0003]. EX1003, ¶242.

These advantages are particularly important for battery powered electronic vaporizing devices. Low manufacturing costs are important to reduce the ultimate commercial price of the device. Low power consumption is important because e-cigarettes rely on batteries. The fewer charges needed, the more desirable the device. Responsiveness is important because the device will be able to better detect inhalation. Finally, easy integration results in: (1) lower cost of manufacture, (2) high reliability, and (3) easy interface with electrical elements. EX1003, ¶243.

A POSA would also have been motivated to modify Worm and/or Weigensberg to include Lamb's MEMS pressure sensor that outputs pressure values because the pressure values could be used to provide additional features based on real-time data. For example, varying control of the functional elements of the device, such as a heating member, a fluid delivery member, a sensory feedback member, and the like." EX1021, 23:25-28; Abstract; *see also* EX1014, Abstract; [0011] (creating a draw profile of pressure values). EX1003, ¶244.

It also would have been obvious to modify Worm's and/or Thorens' precursor liquid to include Lamb's nicotine composition (EX1005, [0040]). These references suggest using a nicotine component, as discussed in Sections IX.A.3 and IX.C.3. EX1003, ¶245.

Independently, for the combination of Worm and Lamb in Grounds 1-3, it would have been obvious for a POSA to look to Lamb to modify Worm because it

appears to disclose the same device. Specifically, the same Applicant (R.J. Reynolds Tobacco Company) and an overlapping inventor (Frederic Phillippe Amplini) are listed. EX1004; EX1005. Indeed, Worm's Fig. 2 is substantially identical to Lamb's Fig. 1, both patents are directed to an e-cigarette, and are described as operating in fundamentally the same manner. EX1003, ¶¶246-247.

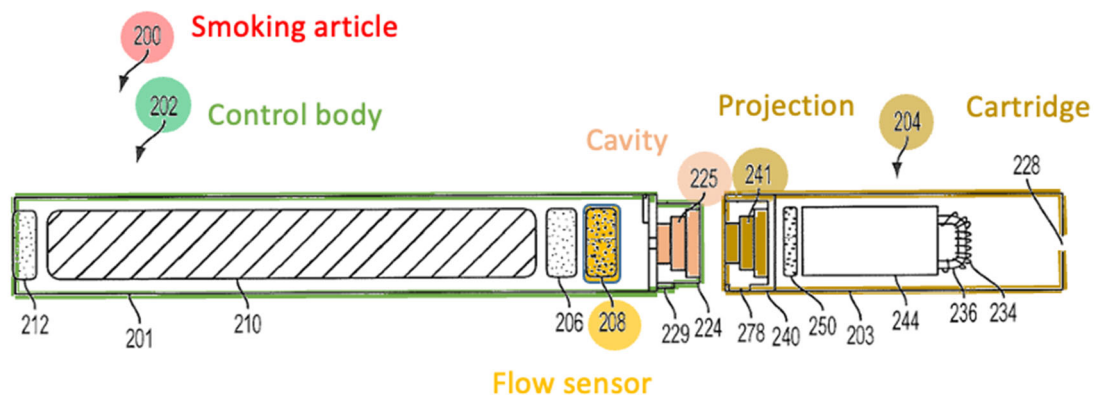


FIG. 2

EX1004 (Worm), Fig. 2

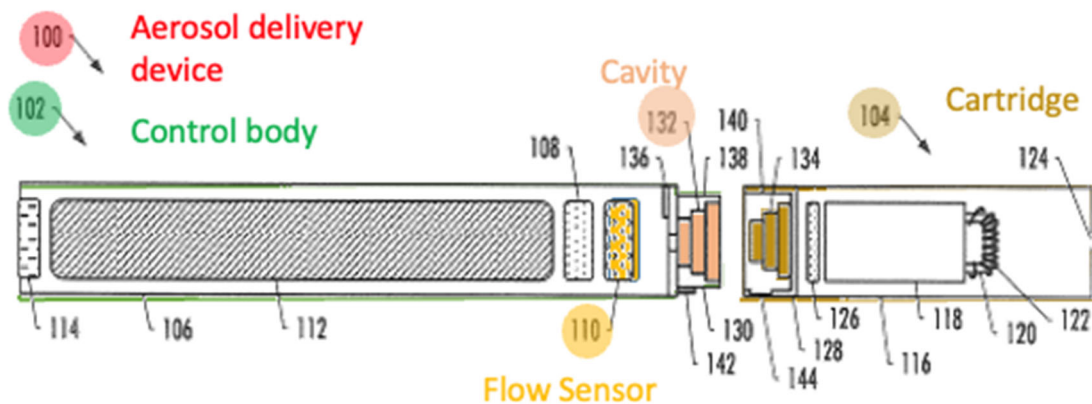


FIG. 1

EX1005 (Lamb), Fig. 1

Independently for Ground 8, Thorens suggests that a MEMS pressure sensor could be used for its puff sensor. EX1016, [0015] (“Alternatively, the sensor may be any of:...a micro electro mechanical systems (MEMS) based sensor.”). EX1003, ¶248.

A POSA would have had a reasonable expectation of success in combining Worm, Thorens, and/or Weigensberg with Lamb because the designs of the underlying systems are similar, and Worm and Lamb appear to be the same devices. Worm, Weigensberg, Thorens, and Lamb disclose two-piece e-cigarettes, with a mechanical coupler, and whereby the device is activated when the pressure sensor detects air flow and Worm, Weigensberg, and Lamb are activated with a negative pressure differential in a sealed portion of the device. Weigensberg and Thorens have circuitry ready to receive variable pressure sensor data. EX1006, [0107]; EX1016, [0046]. The detection of the draw by the pressure sensor in Worm, Thorens, Weigensberg and Lamb is used to control various aspects of the devices. Further, pressure sensors that output pressure values for use in electronic cigarettes were known and available. *See, e.g.*, EX1020; EX1028, [0003] (capacitive MEMS pressure sensors). EX1003, ¶249.

2. Claims 14 and 27: a pressure sensor configured to output sensor readings;

Worm and/or Weigensberg in each of Grounds 1-4 further in combination with Lamb discloses this limitation. EX1003, ¶¶250-254.

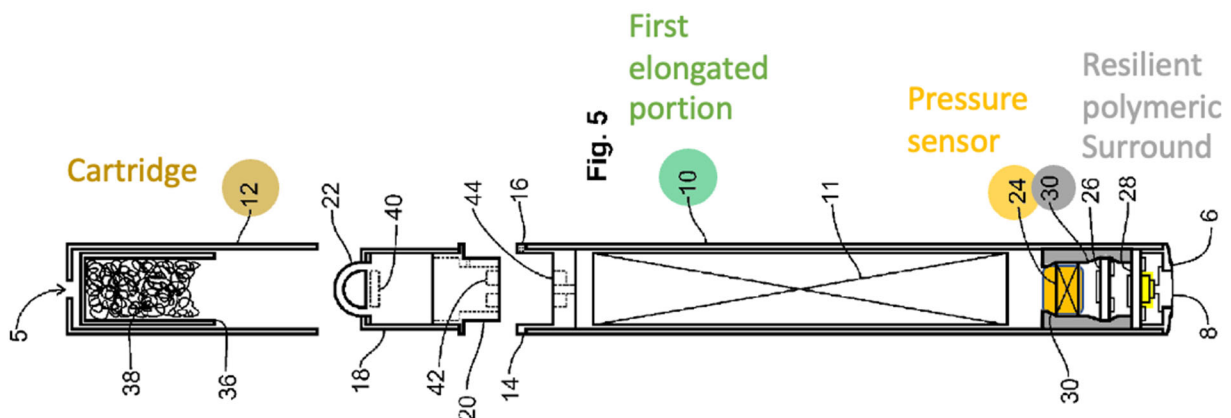
Worm and Weigensberg each discloses this limitation. *See* Grounds 1-4, [14.C], [27.E]. To the extent it is argued that either Worm or Weigensberg fails to disclose output sensor readings, Lamb discloses that its pressure sensor outputs sensor readings. EX1005, [0043] (“The MEMS-based sensor may be configured to detect a pressure on the MEMS-based sensor caused by airflow through at least a portion of the housing, convert the pressure to an electrical signal, and output the electrical signal.”); [0045]; [0046] (“The change in the electrical property causes a change in an output voltage across the micromachined sensor. This output voltage may be output by the MEMS-based sensor as the electrical signal. Or in some examples, the MEMS-based sensor (e.g. on the second die) may include an appropriate analog-to-digital converter (ADC) or other circuitry configured to convert the output voltage to a digital representation, which the MEMS-based sensor may then output as the electrical signal.”). Therefore, Lamb discloses a pressure sensor that outputs sensor readings. EX1003, ¶¶251-252.

As discussed in Section IX.E.1, it would have been obvious to modify Worm and/or Weigensberg to include Lamb’s MEMS-based pressure sensor that outputs sensor readings. EX1003, ¶253. Therefore, each of Grounds 1-4 further in view of Lamb render obvious claims 14 and 27 of the ’123 Patent. EX1003, ¶254.

3. **Claims 14 and 27: a gasket around the pressure sensor, the gasket configured to seal the device air path from the sealed air flow path.**

Worm and/or Weigensberg in each of Grounds 1-4 further in view of Lamb discloses this limitation. EX1003, ¶¶255-260.

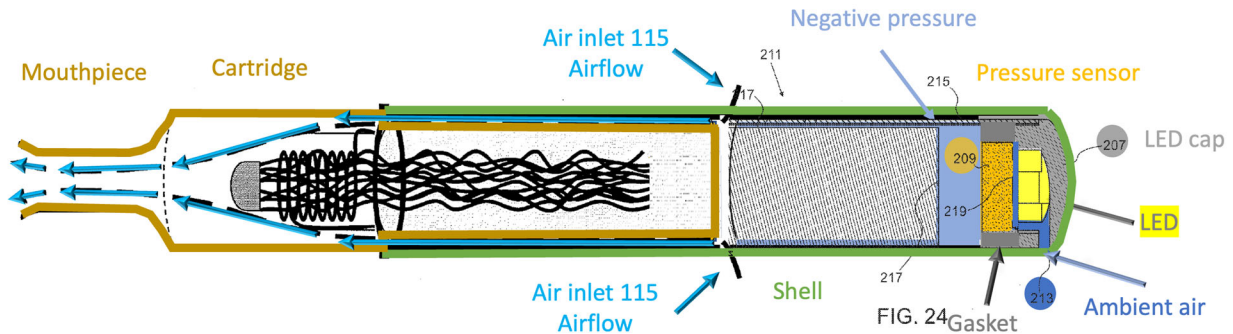
Worm and Weigensberg alone or in view of the knowledge of a POSA discloses this limitation. *See* Grounds 1-4, [14.G], [27.I]. To the extent it is argued that Worm or Weigensberg alone or in view of the knowledge of a POSA do not disclose the claimed gasket, Lamb incorporates by reference Newton766. EX1005, [0041]. As discussed above, Newton766's sealing member surrounds pressure sensor 24, seals the sealed air flow path from the other side of the sensor and is located with the circuitry and LED. EX1009, 6:6-9 ("The polymeric surround 30 also acts as a pressure seal to insure the draw pressure sensor 24 is properly coupled to detect the negative pressure of the draw."). EX1003, ¶¶256-258.



EX1009, Fig. 5

As discussed in Section IX.E.1, it would have been obvious to modify Worm and/or Weigensberg to include a gasket such as Newton766's sealing member. Thus,

Lamb discloses a gasket surrounding the pressure sensor that seals the device air path from the sealed air flow path. EX1003, ¶259.



Modified Thorens

Therefore, Grounds 1-4 each further in view of Lamb render obvious claims 14 and 27 of the '123 Patent. EX1003, ¶260.

4. Claims 15 and 28: The vaporizer device [body] of claim [14] / [27], wherein the pressure sensor comprises a capacitive membrane.

Every limitation of claims 14 and 27 are met. *See* Grounds 1-4. Worm and/or Weigensberg in Grounds 1-4 further in view of Lamb discloses this limitation. EX1003, ¶¶265-268. As discussed above, Lamb discloses a MEMS pressure sensor with a “micromachined, pressure-sensitive diaphragm 306a and a backplate 306b that form a *variable capacitor 306*.” EX1005, [0047]. A POSA would have understood that Lamb’s pressure sensor includes a capacitive membrane. EX1003, ¶266.

As discussed in Section IX.E.1, it would have been obvious to modify Worm and/or Weigensberg to use Lamb’s pressure sensor. EX1003, ¶267.

5. Claims 16 and 29: The vaporizer device [body] of claim [14] / [27], wherein the pressure sensor comprises a MEMS pressure sensor.

Every limitation of claims 14 and 27 are met. *See* Grounds 1-4. Worm and/or Weigensberg in Grounds 1-4 further in view of Lamb discloses this limitation. EX1003, ¶¶261-264. As discussed above, Lamb discloses a MEMS-based pressure sensor. EX1005, [0046] (“FIG. 2 illustrates a MEMS-based sensor 200 that in some examples may correspond to a flow sensor such as the flow sensor 110 of FIG.1.”); [0004]. EX1003, ¶262.

As discussed in Section IX.E.1, it would have been obvious to modify Worm and/or Weigensberg to use Lamb’s MEMS pressure sensor. EX1003, ¶263.

6. Claims 18 and 31: The vaporizer device [body] of claim [14] / [27], wherein the sensor readings output by the pressure sensor comprise pressure values.

Every limitation of claims 14 and 27 are met. *See* Grounds 1-4. Worm and/or Weigensberg in Grounds 1-4 further in view of Lamb discloses this limitation. EX1003, ¶¶269-275. As discussed above, Lamb discloses a pressure sensor that outputs detected pressure that has been converted into a corresponding electrical signal that varies with the pressure. EX1005, [0006]; [0043]; [0044]-[0046]. EX1003, ¶270. Therefore, Lamb discloses a pressure sensor that outputs sensor readings that are pressure values under either Parties’ construction in the ITC Investigation. *See* EX1019; EX1003, ¶¶271-272.

As discussed in Section IX.E.1, it would have been obvious to modify Worm and/or Weigensberg to include Lamb's pressure sensor. EX1003, ¶273-274.

7. Claim 32: The vaporizer device of claim 27, wherein the cartridge comprises the vaporizable material, and wherein the vaporizable material comprises a nicotine formulation.

Every limitation of claims 14 and 27 is met. *See* Grounds 1-4. To the extent it is argued that Worm and/or Thorens do not disclose a nicotine formulation, each of Worm and/or Thorens further in view of Lamb discloses this limitation. EX1003, ¶¶276-279. Lamb discloses using a nicotine component in the vaporizable liquid precursor. EX1005, [0040]. EX1003, ¶276.

As discussed in Section IX.E.1, it would have been obvious to modify Worm and/or Thorens to include Lamb's nicotine formulation as part of either aerosol precursor. EX1003, ¶277.

Thus, for the reasons stated above, Worm, Thorens and/or Weigensberg in Grounds 1-4 each further in view of Lamb, render obvious claims 15, 16, 18, 19, 28, 29, 31 and 32 of the '123 Patent. EX1003, ¶¶254, 260, 264, 268, 275, 278-279.

X. DISCRETIONARY DENIAL IS NOT WARRANTED

A. 35 U.S.C. § 314(a) Denial Not Warranted

Discretionary denial under 35 U.S.C. § 314(a) is not warranted because *Apple Inc. v. Fintiv, Inc.*, IPR2020-00019, Paper 11 (PTAB. Mar. 20, 2020) ("*Fintiv*") does not apply to the ITC Investigation, and the *Fintiv* factors weigh against discretionary

denial over the Arizona Litigation.

First, the ITC Investigation is not a basis for denial under *Fintiv* because the Director proclaimed the Board “will not discretionarily deny petitions based on applying *Fintiv* to a parallel ITC proceeding.” Director Memorandum, *Interim Procedure for Discretionary Denials in AIA Post-Grant Proceedings with Parallel District Court Litigation*, at 7 (June 21, 2022).

Second, applied to the Arizona Litigation, the *Fintiv* factors favor institution. *See Fintiv*, IPR2020-00019, Paper 11 at 6-16. The Arizona Litigation was stayed pursuant to 28 U.S.C. § 1659 on August 18, 2023. EX1031. Because the Arizona Litigation was stayed early—even before the defendants filed a responsive pleading—the court and the parties have made minimal investments, and the trial would likely occur long after a final written decision in this proceeding. *See id.*

Accordingly, discretionary denial under 35 U.S.C. § 314(a) is not warranted.

B. 35 U.S.C. § 325(d) Denial Not Warranted

Discretionary denial under 35 U.S.C. § 325(d) is not warranted because the Office has not previously considered the same or substantially the same prior art or arguments. *See Advanced Bionics, LLC v. MED-EL Elektromedizinische Geräte GmbH*, IPR2019-01469, Paper 6 at 8-11 (PTAB Feb. 13, 2020) (precedential) (explaining discretionary denial is appropriate under 35 U.S.C. § 325(d) only if: (1) the same or substantially the same prior art or arguments were previously presented

to the Office, and (2) the petitioner did not show the Office erred in a manner material to the patentability of challenged claims).

Certain grounds of this petition argue and show invalidity based largely on five prior art references. Thorens, Levitz, Weigensberg and Lamb, were not previously considered by the Office. While Worm was identified in an IDS during prosecution of the '123 Patent (EX1002, 345), Worm was not discussed by the Examiner or Applicant during the prosecution of the application leading to the '123 Patent, nor were any of the combinations of prior art addressed as set forth by the Petitioner herein. Because the Office has not previously considered Thorens, Levitz, Weigensberg, Lamb, or any of the prior art combinations in this Petition, discretionary denial under 35 U.S.C. § 325(d) is not warranted.

XI. NO SECONDARY CONSIDERATIONS APPLY

Although Patent Owner presents alleged evidence of secondary indicia of nonobviousness in its October 3, 2023 first supplemental response to Petitioner's Interrogatory No. 3 in the ITC Investigation, Patent Owner did not even attempt to establish a nexus between the alleged evidence and the challenged claims.¹² Also, Worm, Thorens, Levitz, Weigensberg and Lamb demonstrate there was no long-felt

¹² Patent Owner's Interrogatory Responses are marked confidential. Petitioner will work with Patent Owner to submit their Interrogatory Responses.

but unsolved need or failure by others because the features recited in the challenged claims were readily available in the prior art. EX1003, ¶281. Indeed, the references identify commercially available pressure sensors that could be used. EX1026; EX1020. Thus, Petitioner is unaware of any evidence of secondary considerations that would support a nonobviousness finding.

XII. CONCLUSION

For the reasons stated above, review should be instituted.

Respectfully submitted,

Dated: November 28, 2023

By: /Anish R. Desai/

Anish R. Desai

Lead Counsel for Petitioner

Registration No. 73,760

Weil, Gotshal & Manges LLP

767 Fifth Ave.

New York, NY 10153

T: 212-310-8000

anish.desai@weil.com

CERTIFICATE OF COMPLIANCE

1. The undersigned certifies that this brief complies with the type volume limitations of 37 CFR § 42.24(a)(1)(i). This brief contains 13,918 words (excluding the table of contents, the table of authorities, mandatory notices under 37 CFR § 42.8, the certificate of service, certificate of compliance, and appendix of exhibits), as calculated by the “Word Count” feature of Microsoft Word 2016, the word processing program used to create it.

2. The undersigned further certifies that this brief complies with the typeface requirements of 37 CFR § 42.6(a)(2)(ii) and typestyle requirements of 37 CFR § 42.6(a)(2)(iii). This brief has been prepared in a proportionally spaced typeface using Microsoft Word 2016 in Times New Roman 14 point font.

Respectfully submitted,

WEIL, GOTSHAL AND MANGES LLP

Dated: November 28, 2023

By: /Anish R. Desai/
Anish R. Desai
Lead Counsel for Petitioner
Reg. No. 73,760
Weil, Gotshal & Manges LLP
767 Fifth Ave.
New York, NY 10153
T: 212-310-8000
anish.desai@weil.com

CERTIFICATE OF SERVICE

Pursuant to 37 C.F.R. § 42.105 and § 42.6(e), the undersigned certifies that on November 28, 2023, a complete and entire copy of this **PETITION FOR *INTER PARTES* REVIEW OF U.S. PATENT NO. 10,130,123, PETITIONERS’S POWER OF ATTORNEY, and all supporting exhibits** were sent via FedEx next business day delivery to the following:

Elissa M. Kingsland
Mintz Levin
One Financial Center
Boston, MA 02111

/Timothy J. Andersen/
Timothy J. Andersen
Case Manager
Weil, Gotshal & Manges LLP
2001 M Street, N.W., Suite 600
Washington, D.C. 20036
202-682-7000
timothy.andersen@weil.com