IN THE UNITED STATES DISTRICT COURT
FOR THE MIDDLE DISTRICT OF NORTH CAROLINA

FUMA INTERNATIONAL LLC, an Ohio limited liability company, *Plaintiff/Counterdefendant*, v. R.J. REYNOLDS VAPOR COMPANY, a North Carolina corporation, *Defendant/Counterplaintiff.*	Civil Action No. 1:19-cv-260 and Civil Action No. 1:19-cv-660

REYNOLDS'S MEMORANDUM IN SUPPORT OF ITS MOTION FOR SUMMARY JUDGMENT OF NON-INFRINGEMENT

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Exhibit No.	Production No.	Document Description
1	RJRV-F000694660 – 61, RJRV-F000694796 – 815, RJRV-F000694821 – 827, RJRV-F000694829 – 835, RJRV-F000694840 – 841	Cover Letter and Premarket Tobacco Product Application ("PMTA") for VUSE Solo (excerpts)
2	RJRV-F000700734 – 738, RJRV-F000696707 – 716, RJRV-F000696720 – 727, RJRV-F000696730 – 735	Cover Letter and PMTA for VUSE Ciro (excerpts)
3		Expert Report of Glenn Vallee, Ph.D. on Infringement in Reply to August 21, 2020 Rebuttal Report of Dr. Collins, dated September 4, 2020 (excerpts, title page, pp. i-ii, pp. 1, 21-59, 65-94, Ex. A)
4		Expert Report of Glenn Vallee, Ph.D. on Infringement, dated July 23, 2020 (excerpts, title page, pp. 55-56, Ex. E pp. 1, 3-15, 22-39, 85-88, 93-94; Ex. F pp. 1, 18-29, 94-95; Ex. H pp. 1, 3-8, 11-32, 62-69; Ex. I pp. 1, 18-29, 72-73
5	FUMA00000418, FUMA00000423-426, FUMA00000450-453, FUMA00000477-487, FUMA00000510-528, FUMA00000532-542, FUMA00000549-563, FUMA00000613-614	Certified File History for U.S. Patent App. No. 12/843,917 (excerpts)
6	FUMA00000038-45, FUMA00000070-78, FUMA00000118-127,	Certified File History for U.S. Patent No. 9,532,604 (excerpts)

	FUMA00000140, FUMA00000151-175, FUMA00000182-187	
7	FUMA00063611, FUMA00063659-666, FUMA00063904-913, FUMA00063970-975	Certified File History for U.S. Patent No. 10,334,881 (excerpts)
8		Responsive Expert Report of Dr. John M. Collins, dated August 21, 2020 (excerpts, pp. i-vi, 1-8, 15-95, 196-signature page, Exs. A-B)
Physical Exhibit 1		VUSE Solo device
Physical Exhibit 2		VUSE Solo device

I. Nature of the Matter Before the Court

This matter is ripe for summary judgment of non-infringement with respect to the two accused products, the VUSE Solo and the VUSE Ciro.

The evidence undisputedly establishes that the Solo cartridge housing does not include an ***electrically conductive portion*** that is adapted to ***both mechanically and electrically couple*** to ***an electrically conductive portion*** of the power source, as required by each asserted claim of the patents-in-suit. (Dkt.95 at 6, 9.) Rather, the mechanical coupling is provided by ***non***-electrically conductive portions of the cartridge housing and power source, whereas the electrical coupling is provided by distinct electrically conductive portions.

The Solo also does not infringe the asserted claims of the '604 patent for the additional reason that the electrically conductive portions are not "threaded," as required by those claims. (*Id.* at 6.)

The evidence also indisputably demonstrates that the Ciro lacks an airflow passageway that extends in a straight path through the center of the cartridge from a first opening on the first end to a second opening on the opposite end of the cartridge, as required by each asserted claim of the patents-in-suit. (*Id.* at 16.)

Therefore, entry of summary judgment of non-infringement is appropriate.

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II. Statement of Undisputed Material Facts

A. The Asserted Claims of the Patents-in-Suit

This consolidated action involves two patents: U.S. Patent Nos. 9,532,604 ("'604 patent") and 10,334,881 ("'881 patent") (collectively, "patents-in-suit"). (Dkts.76-2; 76-3.) The patents-in-suit generally describe an electronic cigarette comprising a cartridge and a power source.

Both patents claim priority to the same family, including Application No. 12/847,917 ("'917 application"). (Dkt.76-1.) The '604 patent issued on January 3, 2017, from Application No. 14/510,955 ("'955 application"), and the '881 patent issued on July 2, 2019, from Application No. 15/377,522 ("'522 application"). (*Id.*) The '881 and '604 patents share substantially the same specification.

Fuma asserts that the VUSE Solo and the VUSE Ciro infringe claims 1 and 8 of the '881 patent and claims 4, 6, 12, 14, 16, and 18 of the '604 patent. Each of these claims requires a cartridge housing end having an ***electrically conductive portion adapted to mechanically and electrically couple*** to ***an electrically conductive portion*** **of** a power source (paraphrased) and ***an airflow passageway that extends in a straight path through the center of the cartridge from a first opening on the first end to a second opening on the opposite end of the cartridge*** (paraphrased).

Independent claims 1 and 8 of the '881 patent (electrically conductive limitations in yellow, central airflow passageway limitations in green) are representative:

1. An apparatus comprising:
a power source,
wherein the power source includes a battery,
wherein the power source includes an electrically conductive portion; and
a cartridge having a housing that comprises an interior,
wherein the housing includes a first end and a second end that is opposite the first end, wherein the housing includes a first aperture on the first end and a second aperture on the second end,
wherein the housing includes an airflow passageway that extends centrally and axially with respect to the housing intermediate of the first aperture on the first end of the housing and the second aperture on the second end of the housing,
wherein the airflow passageway is configured to allow an airflow through the cartridge from the first aperture to the second aperture of the housing,
wherein the first end of the housing includes an electrically conductive portion that is adapted to mechanically and electrically couple to the electrically conductive portion of the power source,
wherein the housing includes a solution holding medium adapted to hold a solution in the interior of the housing,
wherein the housing includes a heating element located in the interior of the housing, wherein the heating element extends transversely across the airflow passageway, wherein the airflow through the passageway passes on both transverse sides of the element,
wherein the solution holding medium surrounds the airflow passageway and the heating element in the interior of the housing and intermediate of the first end and the second end,
wherein the heating element is electrically configured to vaporize at least a portion of the solution to be contained in the solution holding medium for oral provision to an individual in an airflow from the second aperture responsive to electrical power received from the battery through the electrically conductive portions of the cartridge and the power source.

8. A cartridge configured to mechanically and electrically couple to a power source of an electronic vaporizer, the cartridge comprising:
a housing having an interior and a solution holding medium reservoir adapted to hold a solution, the housing having a first end and a second end that is opposite the first end, the housing having a first aperture on the first end and a second aperture on the second end, the first end of the housing having an electrically conductive portion adapted to mechanically and electrically couple to the electrically conductive portion of the power source;
an airflow passageway in the interior of the housing extending centrally and axially with respect to the housing intermediate of the first aperture on the first end of the housing and the second aperture on the second end of the housing, the airflow passageway being configured to allow an airflow through the cartridge from the first aperture to the second aperture of the housing; and
a heating element located in the interior of the housing, the heating element being located within and extending transversely across the airflow passageway, the airflow through the passageway passing on both transverse sides of the heating element, both the heating element and the airflow passageway being surrounded by the solution holding medium reservoir, the heating element being electrically configured to vaporize at least a portion of the solution to be contained in the solution holding medium reservoir for oral provision to an individual in an airflow from the second aperture responsive to electrical power received from the battery through the electrically conductive portions of the cartridge and the power source.

(Dkt.76-3 at 17:15-57, 18:19-52.)

The asserted claims of the '604 patent further require that the electrically conductive portions are threaded. (Dkt.76-2 at 17:15-54, 18:26-59.) Representative claim 1 (from which claims 4 and 6 depend) is set forth below.

1. An apparatus comprising:
a power source,
wherein the power source includes a battery,
wherein the power source includes an electrically conductive threaded portion; and
a cartridge having a housing that comprises an interior,
wherein the housing includes a first end and a second end that is opposite the first end, wherein the housing includes a first aperture on the first end and a second aperture on the second end,
wherein the housing includes an airflow passageway that extends centrally and axially with respect to the housing intermediate of the first aperture on the first end of the housing and the second aperture on the second end of the housing,
wherein the airflow passageway is configured to allow art airflow through the cartridge from the first aperture to the second aperture of the housing,
wherein the first end of the housing includes an electrically conductive threaded portion that is adapted to mechanically and electrically couple to the electrically conductive threaded portion of the power source,
wherein the housing includes a solution holding medium comprising a solution located in the interior of the housing,
wherein the solution holding medium surrounds the airflow passageway in the interior of the housing and intermediate of the first end and the second end,
wherein the housing includes a heating element located in the interior of the housing,
wherein the heating element is electrically configured to vaporize at least a portion of the solution for oral provision to an individual in the airflow from the second aperture responsive to electrical power received from the battery through the electrically conductive threaded portions of the cartridge and power source.

The Court construed the "***electrically conductive portion***" limitations to mean "***a portion that is electrically conductive***" (Dkt.95 at 9) and construed the

"***electrically conductive threaded portion***" limitations to mean an "***electrically conductive portion that is threaded***." (*Id.* at 6).

The Court construed the "***airflow passageway***" limitations to mean "***[t]he airflow passageway extends in a straight path through the center of the cartridge from a first opening on the first end to a second opening on the opposite end of the cartridge.***" (*Id.* at 16-18.)

B. The Accused Products

1. The VUSE Solo

The Solo is an electronic nicotine delivery system consisting of a power unit and a cartridge.[1] (Ex.1 at RJRV-F000694807.)

Figure H-1: Vuse Solo Power Unit



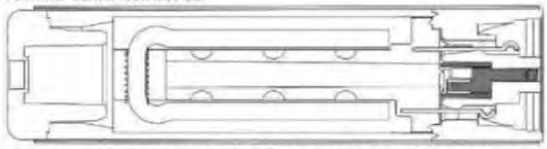
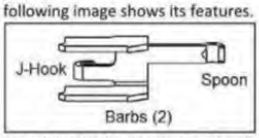
Figure H-2: Vuse Solo Replacement Cartridge

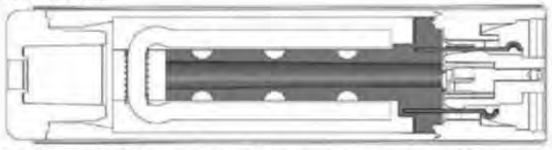
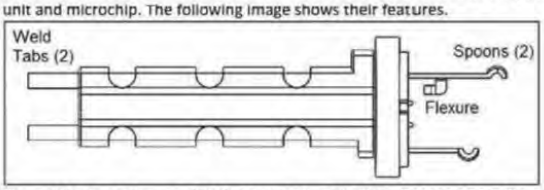


(*Id.*) The cartridge and power unit are electrically coupled through electrical contacts and mechanically coupled through non-electrically conductive structures.

[1] There are Gen 1 and Gen 2 versions of the Solo cartridges. The differences are immaterial for purposes of this motion.

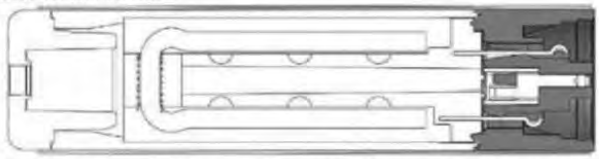
The Solo cartridge has three terminal contacts that electrically couple to three corresponding electrical contacts in the power unit. The terminal contacts (row #4 below) form part of the electrical circuit between the heating element in the cartridge and the battery in the power unit. The center contact (row #2 below) forms part of the electrical circuit between the microchip and the power unit.

#	Location and Description	Physical Appearance
2	Terminal Center Contact G2:  The "Terminal Center Contact G2" is made from 304 stainless steel and forms part of the electrical circuit between the power unit and microchip. The following image shows its features.  • The J-hook contacts the signal pad on the microchip. • The barbs resist removal after being pressed into the base. • The spoon passes through the base to make contact with the corresponding terminal on the power unit.	

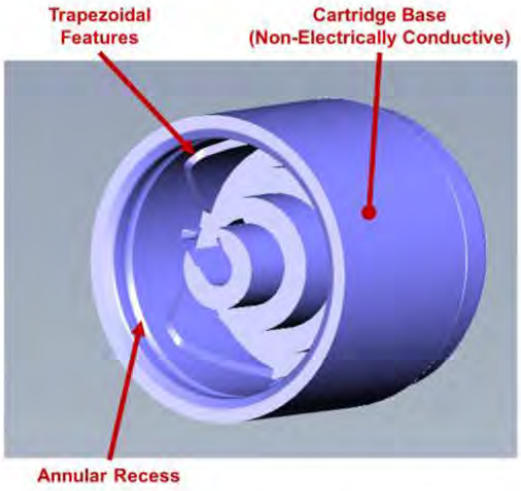
#	Location and Description	Physical Appearance
4	Flow Tube G2:  The "Flow Tube G2" is a pre-assembled component composed of two sub-components, a flow tube and two in-molded electrical terminals. The flow tube is made from Tritan (copolyester) and directs air flow across the heater. The flow tube is ultrasonically welded to the base and captures the center terminal and microchip. The two terminals are made from 304 stainless steel and form parts of the electrical circuit between the power unit and heater coil, as well as the power unit and microchip. The following image shows their features.  The weld tabs are laser welded to opposite ends of the heater where the coils abut. • The flexure contacts the ground pad on the microchip. • The spoons pass through the base to make contact with the corresponding terminals on the power unit.	

(Ex.1 at RJRV-F000694832-33.)

The Solo also includes a non-electrically conductive cartridge base which includes structure for mechanically coupling the cartridge to a non-electrically conductive connector of the power unit. The cartridge base is made from a non-conductive plastic.

#	Location and Description	Physical Appearance
1	Base Cartomizer G2:  The "Base Cartomizer G2" is made from Tritan (copolyester) and positions the terminals in place while electrically insulating them from each other. The base houses the microchip and connects to the power unit, using four trapezoidal features to limit rotation after connection.	

(Ex.1 at RJRV-F000694831.) An annotated image of the Solo cartridge base is depicted below.



(Ex.8, ¶36 (annotated).) An annular recess on the non-conductive cartridge base is adapted to receive protrusions on the non-conductive power unit connector. The cartridge base also includes "trapezoidal features" that interface with corresponding trapezoidal features on the power unit connector to limit rotation

after mechanical engagement. (Ex.1 at RJRV-F000694811, -831; Ex. 8, ¶¶36-37, 39.)

The Solo's power unit includes three electrical "contacts" that electrically couple to the corresponding electrical contacts of the cartridge (rows 1b-1d below).

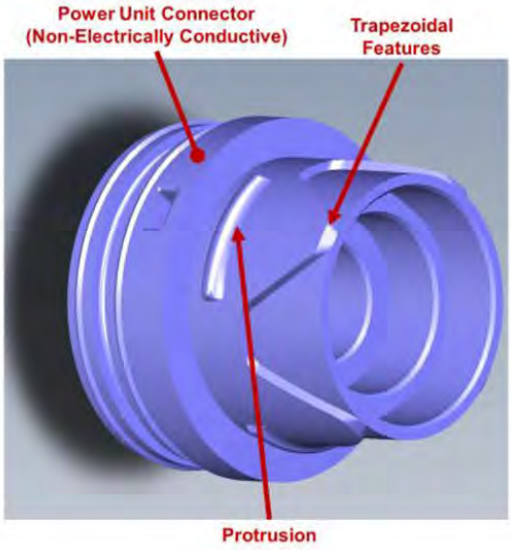
1b	*Subcomponent:* The "Contact, Signal Center" or signal pin, is made from tin-plated copper and provides the inner ring contact that connects with the inner contact of the cartridge.	
1c	*Subcomponent:* The "Contact, Ground" or ground pin, is made from tin-plated copper and provides the middle ring contact that connects with the middle contact of the cartridge.	
1d	*Subcomponent:* The "Contact, Plus Voltage" or power supply pin, is made from tin-plated copper and provides the outer ring contact that connects with the outer contact of the cartridge.	

(Ex.1 at RJRV-F000694811.)

The Solo's power unit also includes a non-electrically conductive "connector" (shown below) that includes structure for mechanically coupling to the non-electrically conductive cartridge base.

1a	*Subcomponent:* The "Connector" is made from polycarbonate and locks the terminals in place while electrically insulating them from each other. This component connects to the cartridge and uses four trapezoidal features to limit rotation after connection.	 Bottom view  Top view

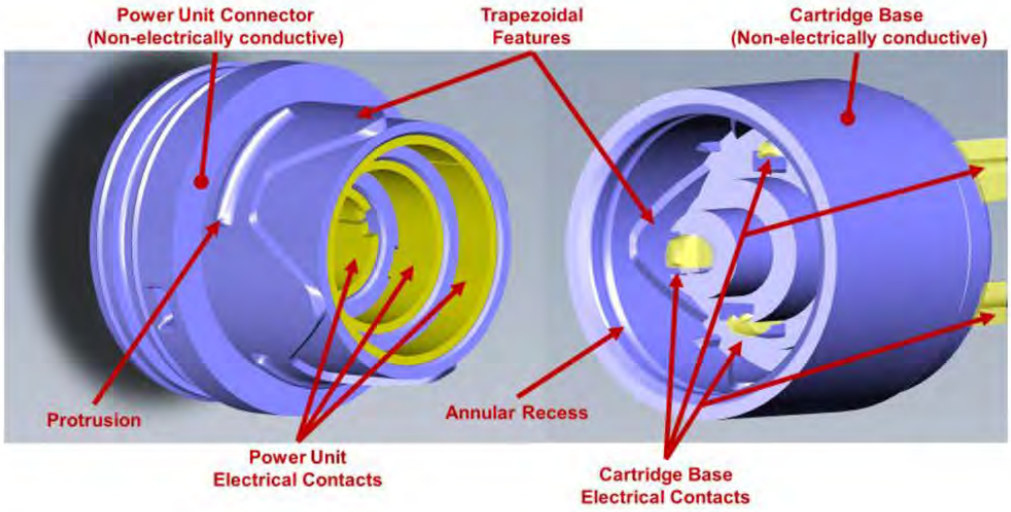
(*Id.*) An annotated image of the Solo power unit connector is shown below.



(Ex.8, ¶36 (annotated).) A series of protrusions on the power unit connector snap into the annular recess on the cartridge base to mechanically couple the device

when the user manually presses the two pieces together. (*Id.*, ¶37.) The power unit connector also includes "four trapezoidal features" that interface with corresponding trapezoidal features on the cartridge base to limit rotation of the cartridge and power unit with respect to each after mechanical engagement. (Ex.1 at RJRV-F000694811, -831; Ex.8, ¶¶36-37, 39.)

As illustrated in the annotated figure below, when assembled the electrically conductive terminal contacts (yellow) and the non-electrically conductive cartridge base (purple) are positioned at an end of the cartridge housing. Similarly, when assembled the electrically conductive contacts (yellow) and the non-electrically conductive power unit connector (purple) are positioned at an end of the power source.



(Ex.8, ¶38 (annotated).)

When the two pieces are pressed together, the trapezoidal features will deflect (if not aligned) and slide past each other, and the protrusions on the power unit connector will "snap" into the annular recess located on the cartridge base. The trapezoidal features prevent rotation of the cartridge and power unit with respect to each other once mechanically connected. (Ex.1 at RJRV-F000694811, -831.) The electrical contacts in the cartridge electrically couple to the electrical contacts in the power source. (*Id.* at RJRV-F000694811, -831–32, -840–41.)[2]

2. The VUSE Ciro

The VUSE Ciro also is an electronic nicotine delivery system consisting of a power unit and a cartridge. (Ex.2 at RJRV-F000696720.)

Figure H-1: Vuse Ciro Power Unit



[2] Two physical samples of the Solo are submitted herewith to assist the Court's understanding of the connection between the cartridge and power unit.

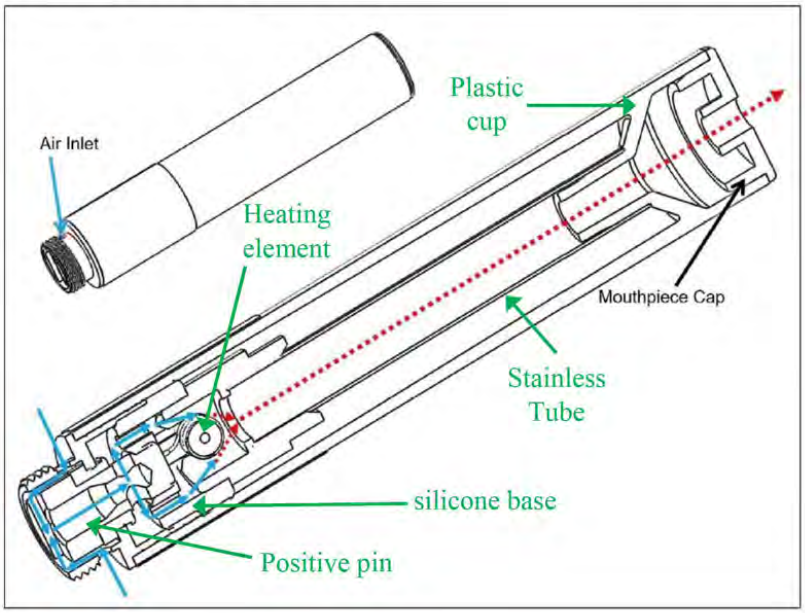
Figure H-2: Vuse Ciro Cartridge



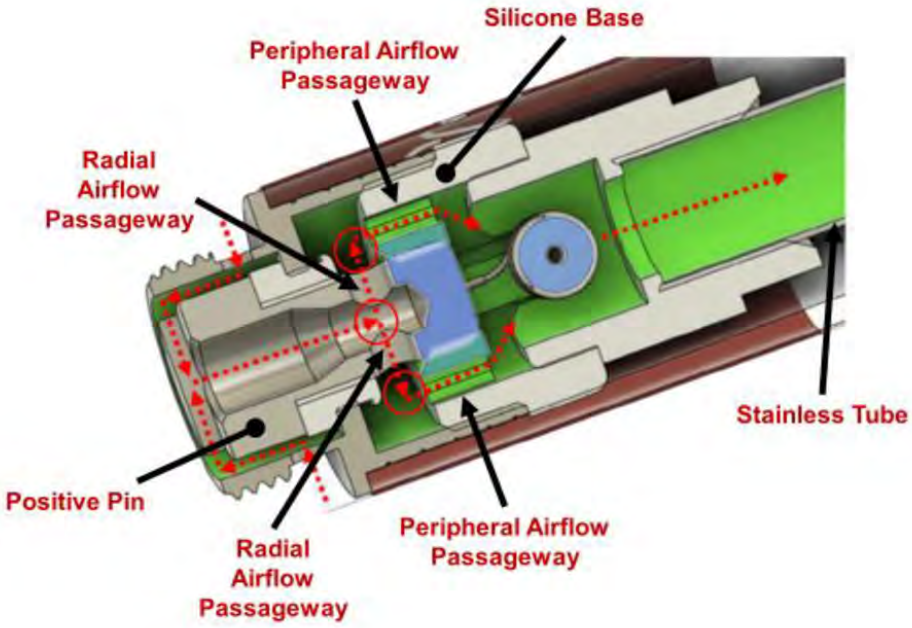
(*Id.* at RJRV-F000696720-21.)

The airflow passageway in the Ciro cartridge is constructed from several components. These components define multiple, multi-directional passageways through which air flows in the Ciro cartridge (in the figure immediately below, the air flow path through these passageways is depicted in blue before and in red after the heating element).

Figure H-12: Vuse Ciro Cartridge Air Flow Path



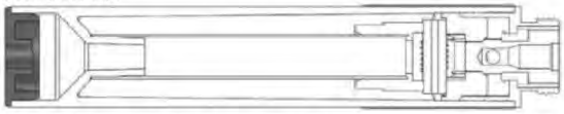
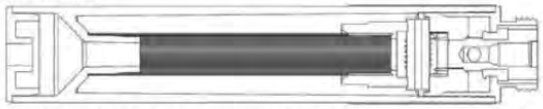
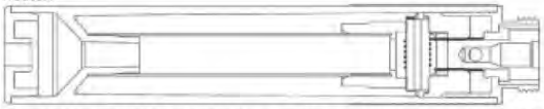
(Ex.2 at RJRV-F000696735 (annotated).)

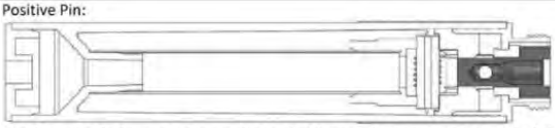


(Ex.8, ¶94 (annotated).)

As reflected in the images above, the internal walls of the positive pin (row 9 below) form a portion of the airflow passageway through the cartridge. Air enters through the base of the positive pin and travels through the airflow passageway formed inside the positive pin before traveling radially away from the center axis and exiting through two holes on the sides of the positive pin toward the external wall of the cartridge. Two slots in the silicone base (row 6 below) provide additional structure for the airflow passageway through the cartridge. These slots direct air along two parallel, peripheral airflow passageways proximate the exterior wall of the cartridge. Air then exits the silicone base and travels towards the

heating element where it mixes with the vaporized nicotine solution to form an aerosol that enters the stainless steel tube (row 2 below) before traveling through a passageway in the plastic cup (row 10) and exiting through an opening in the mouthpiece cap (row 1).

1	Mouthpiece Cap:  The "Mouthpiece Cap" is made from Tritan. Aerosol is drawn through the hole at the center of the mouthpiece cap. The raised lip around the hole in the mouthpiece cap is intended to minimize the condensate from exiting the cartridge.	
2	Stainless Tube:  The "Stainless Tube" is made from 304 stainless steel. This component provides a flow path for aerosol to travel from the heater to the mouthpiece cap.	
5	Heater:  The "Heater" is made from nichrome wire with nickel wire leads spot welded to each side. This component is wrapped around the ceramic wick to form a coil. The heater coil produces the heat required to vaporize the e-liquid.	
6	Silicone Base:  The "Silicone Base" is made from silicone. This component positions the ends of the ceramic wick and the heater leads, and electrically insulates the leads from each other. Two slots in this component allow for airflow.	

9	Positive Pin:  The "Positive Pin" is made from nickel-plated brass. This component is part of the heater circuit, making contact with one of the heater leads that protrudes from the silicone base. Two circular holes in this component allow for airflow.	
10	Plastic Cup:  The "Plastic Cup" is made from Tritan. This component acts as the outer body of the cartridge assembly and the e-liquid reservoir. The transparent outer wall allows visual observation of the e-liquid level.	

(Ex.2 at RJRV-F000696732-34; Ex.8, ¶¶87-95.)

III. Questions Presented

1. Whether a reasonable juror could find that the non-electrically conductive portions of the Solo device, which provide only a mechanical coupling, satisfy the "electrically conductive portion that is adaptable to electrically and mechanically couple" claim language. If the answer is no, then summary judgment of non-infringement of the patents-in-suit by the Solo device is appropriate.

2. Whether a reasonable juror could find that the non-threaded trapezoidal features found on the non-electrically conductive portion of the Solo cartridge base and power unit connector satisfy the "electrically conductive threaded portion" claim language. If the answer is no, then summary judgement of non-infringement of the '604 patent by the Solo device is appropriate for this additional and independent reason.

3. Whether a reasonable juror could find that the Ciro's multi-directional airflow passageway, which includes portions that extend radially away from the center axis and additional portions that run proximate the exterior wall of the cartridge rather than along the central axis, satisfy the limitation that requires a central airflow passageway that extends in a straight path through the center of the cartridge from a first opening on the first end to a second opening on the opposite end of the cartridge. If the answer is no, then summary judgment of non-infringement of the patents-in-suit by the Ciro device is appropriate.

IV. Elements to Be Proven

A. Summary Judgment Standard

Summary judgment is appropriate if there is no genuine issue as to any material fact and the moving party is entitled to judgment as a matter of law. Fed.R.Civ.P. 56(c). To survive a motion for summary judgment, the non-moving party must produce "evidence on which the jury could reasonably find for the plaintiff." *Anderson v. Liberty Lobby*, 477 U.S. 242, 252 (1986).

B. Infringement

It is the patentee's burden to prove infringement, whether literal or under the doctrine of equivalents, by a preponderance of the evidence. *Morton Intern., Inc. v. Cardinal Chemical Co.*, 5 F.3d 1464, 1468 (Fed. Cir. 1993). "If even one

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limitation is missing or not met as claimed, there is no literal infringement." *Mas-Hamilton Group v. LaGard, Inc.*, 156 F.3d 1206, 1211 (1998).

Infringement under the doctrine of equivalents ("DOE") may be found "where the differences between the claimed elements of the patented device and the accused product are insubstantial." *Interlink Electronics v. Incontrol Solutions, Inc.*, No. 98-1567, 1999 WL 641230, at *2 (Fed. Cir. Aug. 24, 1999). "One test used to determine 'insubstantiality' is whether the element performs substantially the same function in substantially the same way to obtain substantially the same result as the claim limitation." *Id.* Further informing the equivalence analysis, "[t]he Supreme Court emphasizes that the doctrine of equivalents must not expand to eliminate a claim element entirely." *Planet Bingo, LLC v. GameTech Intern., Inc.*, 472 F.3d 1338, 1344 (Fed. Cir. 2006). For example, the Federal Circuit has found the DOE cannot expand the scope of a claim to cover the opposite of what is claimed. *Id.* at 1344-45 (performing claimed step "after" not equivalent to limitation requiring step be performed "before"). "Summary judgment is appropriate under the doctrine of equivalents when no reasonable jury could determine that the claim limitation and the accused elements are equivalent." *Interlink*, 1999 WL 641230, at *2.

C. Prosecution History Estoppel

"Prosecution history estoppel applies as part of an infringement analysis to prevent a patentee from using the doctrine of equivalents to recapture subject matter surrendered from the literal scope of a claim during prosecution. Prosecution history estoppel can occur in two ways: either (1) by making a narrowing amendment to the claim (amendment-based estoppel) or (2) by surrendering claim scope through argument to the patent examiner (argument-based estoppel)." *Amgen Inc. v. Coherus BioSciences Inc.*, 931 F.3d 1154, 1159 (Fed. Cir. 2019) (internal quotations omitted). "Whether prosecution history estoppel applies, and thus whether the doctrine of equivalents is available for a particular claim limitation, is a question of law." *Id.* (internal quotations omitted). Prosecution history estoppel can extend from a parent to a child application and between sibling applications (those that claim priority to the same parent application). *See Microsoft Corp. v. Multi-Tech Systems, Inc.,* 357 F.3d 1340, 1349-50 (Fed. Cir. 2004); *Elkay Mfg. Co. v. Ebco Mfg. Co.*, 192 F.3d 973, 980-81 (Fed. Cir. 1999).

When a patentee narrows the claims by amendment, the patentee is presumed to have disclaimed "the territory between the original claim and the amended claim." *Pharma Tech Solutions, Inc. v. LifeScan, Inc.*, 942 F.3d 1372, 1380 (Fed. Cir. 2019). The presumption of a disclaimer can be overcome if the

patentee demonstrates that "(1) the equivalent was 'unforeseeable at the time of the application'; (2) 'the rationale underlying the amendment may bear no more than a tangential relation to the equivalent in question'; or (3) 'there may be some other reason suggesting that the patentee could not reasonably be expected to have described the insubstantial substitute in question.'" *Id.* (quoting *Festo Corp. v. Shoketsu Kinzoku Kogyo Kabushiki Co.*, 535 U.S. 722, 740-41 (2002)).

Argument-based estoppel applies when the patentee makes "a clear and unmistakable surrender of subject matter" during prosecution. *Pharma Tech*, 942 F.3d at 1380.

In determining whether prosecution history estoppel applies, the relevant inquiry is "whether a competitor would reasonably believe that the applicant had surrendered the relevant subject matter," not whether the amendment was "actually required to secure allowance of the claim." *Id.*; *see also Felix v. Am. Honda Motor Co., Inc.,* 562 F.3d 1167, 1182-83 (Fed. Cir. 2009) ("The fact that the first amendment did not succeed and that a further amendment was required to place the claim in allowable form, however, is of no consequence as to the estoppel.").

V. Argument

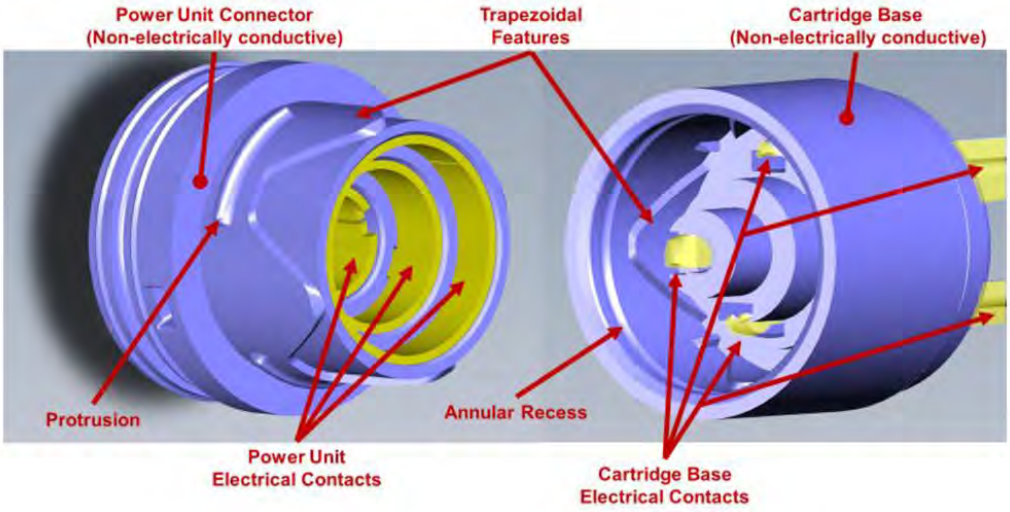
A. The Solo Lacks The "Electrically Conductive Portion That Is Adapted to Mechanically Couple" Limitations Found In Each Asserted Claim of the Patents-in-Suit

1. The Solo Does Not Literally Infringe

The asserted claims of the patents-in-suit require that the electrically conductive portions of the cartridge housing and power source be "adapted to mechanically and electrically couple" the cartridge housing and power source. In other words, the claimed electrically conductive portions must provide ***both*** the mechanical and electrical coupling between the cartridge and the power source. (Dkt.76-3 at 17:34-37, 18:26-30; Dkt.76-2 at 17:34-38, 18:49-53.) Summary judgment of no literal infringement is appropriate because the electrically conductive portions of the Solo's cartridge housing and power unit, respectively, do not mechanically couple the cartridge and power source. Instead, the mechanical coupling is provided by structure located on the ***non***-electrically conductive portions of the Solo cartridge and power unit. No reasonable juror could find otherwise. *See Anderson*, 477 U.S. at 252.

In the Solo, the electrical couple between the cartridge and power unit is provided by the electrical contacts (annotated in yellow below) of the cartridge housing and power unit, whereas the mechanical couple is provided by the annular recess and protrusions located on the ***non***-electrically conductive portions of the

cartridge and power unit (non-electrically conductive portions annotated in purple).[3]



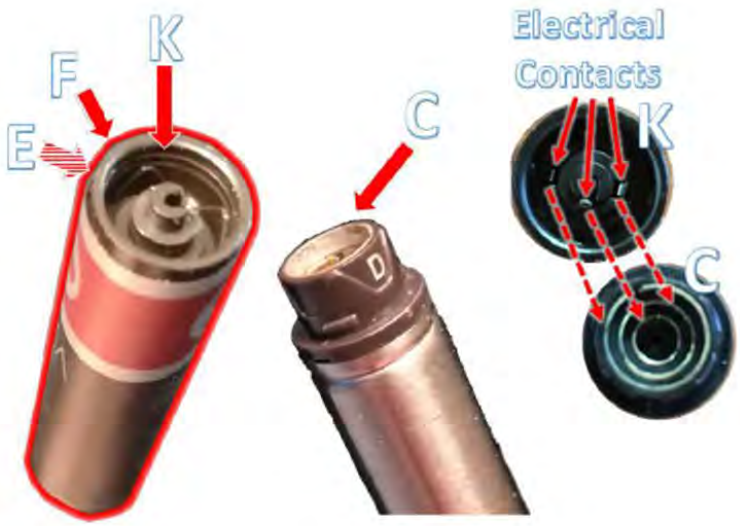
(Ex. 8, ¶38 (annotated).) It is undisputed that the plastic cartridge base and power unit connector are ***not*** electrically conductive. (Ex.1 at RJRV-F000694823, -831; Ex.8, ¶¶ 51, 122-23, 153.) Therefore, the cartridge base and the power unit connector, while they provide a mechanical connection, cannot be the claimed electrically conductive portion because they are not electrically conductive.

[3] Fuma contends that the trapezoidal features also contribute to the mechanical coupling. (*E.g.,* Ex.4 at Ex. E pp. 3-15, 31-39, 93-94.) Although Reynolds disagrees, this purported dispute is immaterial to this Section V.A. of Reynolds's motion because the trapezoidal features are also located on the ***non***-electrically conductive portions.

Moreover, in contrast to the asserted claims, the electrically conductive portions of the Solo's cartridge housing and power unit do not provide ***both*** the electrical and mechanical couple between the cartridge and power source.

In an attempt to overcome the undisputed evidence of Solo's non-infringement, Fuma contends that the ***combination*** of the electrical contacts and the non-electrically conductive cartridge base and power unit connector form the claimed "electrically conductive portions." The excerpt below is from Fuma's expert report:

> In the Vuse Solo, "the first end [F] of the housing [E] includes an electrically conductive portion [K] that is adapted to mechanically and electrically couple to the electrically conductive portion of the power source [C]" as recited in Claim 1 of the '881 Patent.



(Ex.4 at Ex. H pp. 24-25.) Fuma's position is without merit because it combines two distinctly different portions – one portion that is not electrically conductive and another portion that is – and arbitrarily labels the combination (which includes the non-electrically conductive portion) an electrically conductive portion. No reasonable juror could find that the Solo's ***non-electrically conductive*** cartridge base and power unit connector are "a portion that is electrically conductive" as required by the Court's construction (Dkt.95) or are otherwise part of the distinctly different ***electrically conductive*** portions (i.e., the electrical contacts) of that device. Indeed, such a finding would improperly ignore the Court's construction. (*See* Ex.1 at RJRV-F000694811, -831-32 (describing the separate and distinct constructions and functions of the electrical contacts and non-electrically conductive cartridge base and power unit connector)); *see Charleswater Products, Inc. v. Nevamar Corp.,* 1998 WL 911688, at *5-6 (Fed. Cir. Dec. 10, 1998) (finding no literal infringement of "conductive" limitation by non-conductive structure).

2. The Solo Does Not Infringe Under the DOE

No reasonable juror could find that the Solo's non-electrically conductive portion is equivalent to the claimed "electrically conductive portion" for providing both the mechanical and electrical coupling. *See Anderson*, 477 U.S. at 252.

Fuma's technical expert, Dr. Vallee, asserts that "the substance of [Fuma's] Doctrine of Equivalents argument" is "that mechanically and electrically coupling using separate features ***on a portion of the cartridge housing*** would be equivalent to mechanically and electrically coupling using a single feature on the cartridge housing." (Ex.3, ¶84 (emphasis added).) Not only does this conclusory "analysis" miss the point by ignoring the "electrically conductive" language modifying "portion" in the claims, it also lacks the required factual inquiry for determining equivalence. *See, e.g., Interlink*, 1999 WL 641230, at *2 (describing insubstantial differences and function, way, result tests for equivalence). The issue under the DOE is not whether using "separate features" is equivalent to using a "single feature" for providing the mechanical and electrical coupling. The relevant analysis is whether a ***non***-electrically conductive portion that undisputedly only mechanically couples the cartridge and power source is equivalent to the claimed electrically conductive portion that is adapted for providing ***both*** the mechanical and electrical coupling. It is not.

Fuma's conclusory DOE allegation fails as a matter of law because no reasonable juror could find that the Solo's use of ***non***-electrically conductive portions to mechanically couple the device and distinct electrically conductive portions to electrically couple the device is substantially the same as using "***electrically conductive portion[s]***" that are "adapted to ***mechanically and***

electrically couple" the components, as required by the claims. The Solo achieves these electrical and mechanical couples in a substantially different way (and indeed, the opposite way); namely, by separating those functions and using distinctly different portions with distinctly different conductivities, *i.e.,* electrically and non-electrically conductive portions. *See Planet Bingo*, 472 F.3d at 1345 ("[The Federal Circuit] has refused to apply the doctrine in other cases where the accused device contained the antithesis of the claimed structure."); *Interlink*, 1999 WL 641230, at *2; *Charleswater,* 1998 WL 911688, at *5-6 (finding no infringement under DOE of the claimed "conductive layer" by the accused non-conductive structure).

Moreover, a finding that the Solo's non-conductive portions are equivalent to the claimed electrically conductive portions eviscerates the "electrically conductive" language from the phrase "electrically conductive portion," and rewrites the claim to merely require "***a portion*** that is adapted to mechanically and electrically couple." A DOE analysis that eliminates a limitation is wrong as a matter of law. *See Planet Bingo*, 472 F.3d at 1344 (internal citations omitted.)

B. The Solo Does Not Infringe the '604 Patent for The Additional Reason That the Electrically Conductive Portions Are Not "Threaded"

1. The Solo Does Not Literally Infringe

The '604 patent additionally requires that the claimed electrically conductive portions are "threaded." (Dkt.76-2 at 17:19-20, 34-38; 18:49-59.) Fuma contends that this claim requirement is satisfied by the Solo's trapezoidal features. Fuma is wrong as a matter of law.

As an initial matter, the accused trapezoidal features are not located on electrically conductive portions as the claims require, but instead are located on ***non***-electrically conductive portions of the cartridge housing and power unit, respectively. (Ex.8, ¶¶35-36, 39; Ex.1 at RJRV-F000694811, -831.) For this reason alone, no reasonable juror could find that the Solo's accused trapezoidal features meet the "threaded" limitations, which require "an electrically conductive portion that is threaded."

And, even if the fact finder were to conclude that the ***non***-electrically conductive portions of the Solo cartridge housing and power unit are electrically conductive portions (which no reasonable fact finder could), the Solo does not infringe because the accused trapezoidal features are not "threaded," nor are they "adapted to mechanically couple" the cartridge and power source.

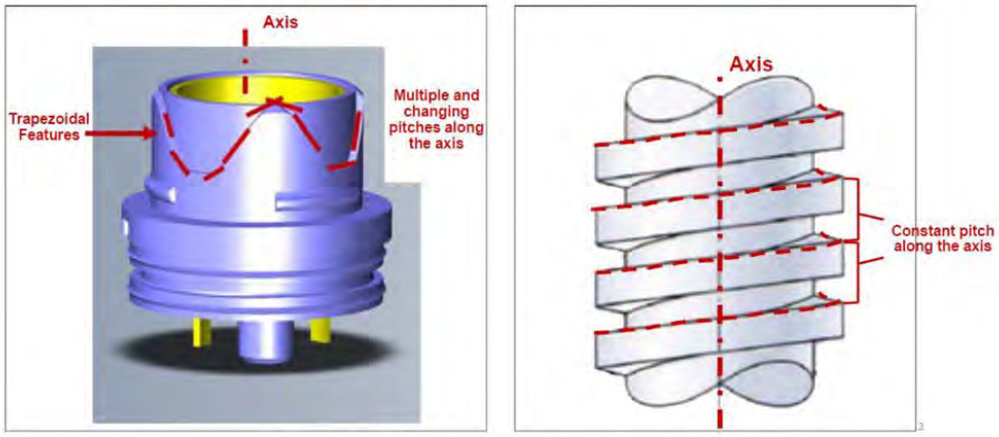
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According to the plain meaning of the claim language, and as described in the patent specification, the "threaded" portions are "adapted to mechanically couple" complimentary "threaded" portions on the cartridge housing and power source, much like a common nut-and-bolt connection. (Dkt.76-2, claims 1 and 12; 2:63-3:1 ("the cartridge 104 may comprise an electrically conductive threaded fastener, and the power source 102 may comprise an electrically conductive threaded receiver. The threaded fastener and the threaded receiver can be coupled to one another, thereby mechanically . . . coupling the power source 102 with the cartridge 104."); *see also* Ex.5 at FUMA00000561-62 and Ex.6 at FUMA00000166-68 (file history excerpts in which Fuma emphasized that these limitations were directed to threaded electrical connections to threadably couple the cartridge and power source).)

To achieve the claimed mechanical couple, the claimed complimentary "threaded" portions of the cartridge housing and power source must have a constant pitch to allow for rotating the threaded portions with respect to each other. (Ex.8, ¶¶48-50.)[4] As illustrated below, and in contrast to the "threaded" portions

[4] Fuma's technical expert contends that threads need not have a constant pitch and cites examples of variable pitch threads. (Ex.3, ¶37.) However, those examples are irrelevant because they do not illustrate a mechanical coupling of two threaded components, as required by the asserted claims. (*Id.*) Dr. Vallee does not provide any example of a threaded connection between complimentary threads that lack a

adapted to mechanically couple to each other as claimed, the Solo's accused trapezoidal features have multiple and changing pitches. (*Id.*)



(left: Ex.8 ¶49; right: Ex.3 at Ex.A p. 401 (annotated).) The trapezoidal features do not have a constant pitch; they are not adapted to mechanically couple, and they operate in a distinctly different manner than threaded connections, namely by preventing rotation. (*See* Ex.1 at RJRV-F000694811, -831; Ex.8, ¶¶44-50.) As such, they are not a "threaded" portion adapted to provide a mechanical couple between the cartridge and power source as claimed. No reasonable juror could find otherwise.

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constant pitch. Indeed, no such connection can be made between threaded components that lack a constant pitch. (Ex.8, ¶¶48-50.)

2. Prosecution History Estoppel Precludes Infringement Under the DOE

The "electrically conductive threaded portion" limitations were added by amendment during prosecution of the '917 priority application and were repeatedly relied upon in distinguishing the claims over the cited prior art during prosecution of the '917 and '955 applications. (Ex.5 at FUMA00000551-52, 561-62; Ex.6 at FUMA00000070-71, 74, FUMA00000166-168.)

In remarks accompanying the "electrically conductive threaded portion" amendments, Fuma argued that "none of the applied art shows a cartridge . . . that is ***threadably coupled*** to a power source" or "suggests any apparent reason to electrically power a heating element via electrically conductive ***threaded*** portions of the cartridge and power source." (Ex.5 at FUMA00000561-62 (emphases added).) Similarly, during prosecution of the '955 application, Fuma argued that Thorens failed to disclose at least three "explicitly claimed" features, including "a ***threaded*** electrical connection that electrically couples a battery to a heating element in the cartridge," and that the Examiner failed to demonstrate that it would have been obvious to include "the interengaging ***threaded*** electrical connection features explicitly recited in Applicant's claim 1" in the combination of Thorens and Ray. (Ex.6 at FUMA00000166-168 (emphasis added).)

Both amendment and argument-based estoppel preclude the application of the DOE to the "electrically conductive threaded portion" limitations. With respect to amendment-based estoppel, these limitations were added by narrowing amendments. As such, Fuma is presumed to have disclaimed devices that lack the claimed "electrically conductive threaded portion." *See Pharma Tech*, 942 F.3d at 1380.

Fuma cannot overcome this presumption. Non-threaded electrical connections were foreseeable. Indeed, as Fuma argued during prosecution, Thorens disclosed an electrical connection that lacked threads. And, original claim 20 of the '917 application claimed a "first conductive element configured to electronically couple[]" to a power source that did not require threads. (Ex.5 at FUMA0000041452-53.) Nor can Fuma reasonably argue that the amendments bore no more than a tangential relation to the equivalent in question in this case; namely, non-threaded electrical connections. To the contrary, the electrically conductive threaded portion limitations were added and relied upon to distinguish over Thorens and the other cited art which, like the accused Solo, lacked this claimed feature. *See Lucent Techs., Inc. v. Gateway, Inc.*, 2007 WL 925354, at *6 (S.D.Cal. Mar. 6, 2007) ("The amendment and the accused equivalent are not tangential because they fall into the very subject that was at issue in the prosecution.") Finally, nothing suggests that Fuma could not reasonably have been

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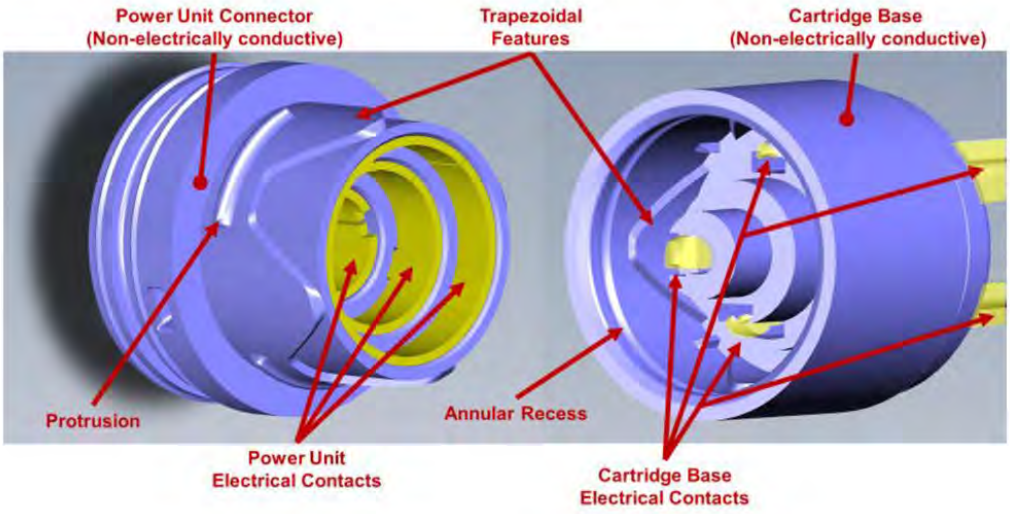
expected to claim non-threaded electrically conductive portions. Indeed, in the '881 patent, Fuma claimed electrical conductive portions that both electrically and mechanically couple, but that do not require threads. However, Fuma elected against doing so during prosecution of the applications that led to the '604 patent.

Argument-based estoppel also precludes application of the DOE. On multiple occasions, Fuma distinguished Thorens and the other cited art on the basis that it lacked the "threaded electrical connection" or "electrically conductive threaded portions" as claimed. *See Amgen,* 931 F.3d at 1160 (finding argument-based estoppel where patentee argued that the cited prior art lacked the claimed combination of salts). Based on Fuma's statements during prosecution, a competitor would reasonably believe that Fuma surrendered devices that lacked the claimed "electrically conductive threaded portion[s]."

3. Even if Fuma Is Not Estopped, The Solo Still Does Not Infringe Under the DOE

No reasonable juror could find that the accused trapezoidal features are equivalent to the claimed electrically conductive threaded portions. The claimed electrically conductive threaded portions mechanically couple and de-couple the cartridge and the power unit (function) by converting rotational applied forces (*i.e.*, rotating in one direction to couple and in the other to de-couple) into axial movement of the cartridge and power unit with respect to each other (way) to

achieve a mechanical coupling that resists de-coupling in response to an outwardly directed axial force (*i.e.,* where the user attempts to pull the two pieces apart) (result). (Ex.8, ¶¶55-65.) In contrast, the trapezoidal features do not perform the function of the claimed electrically conductive threaded portions. As illustrated below, the mechanical coupling function is provided by the protrusions on the power unit connector and the annular recess on the cartridge base.[5]



[5] Fuma's expert argues that the trapezoidal features mechanically couple because they prevent rotation. (Ex.3, ¶¶33-34.) However, preventing rotation after engagement (as the trapezoidal features do) and providing a mechanical couple in the first instance are two distinct functions. The mechanical coupling is achieved when the protrusions on the power unit connector snap-fit into the annular recess of the cartridge base. (Ex.1 at RJRV-F000694807.) Once the mechanical couple is achieved, the trapezoidal features perform the different function of preventing rotation of the cartridge and power unit with respect to each other. (*Id.* at RJRV-F000694811, -831.) Moreover, the fact that Fuma acknowledges the trapezoidal features prevent rotation belies its argument that those features are "threaded."

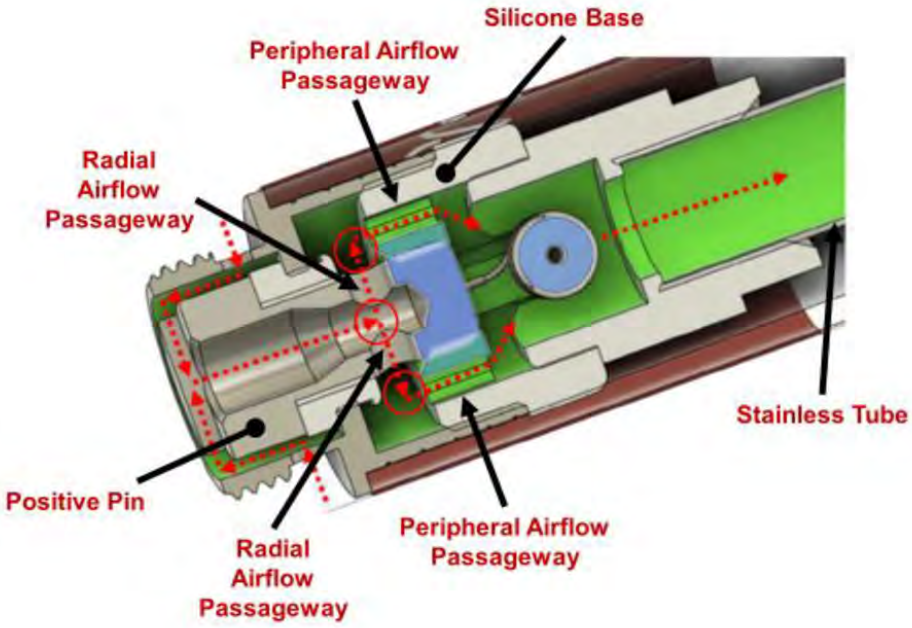
(Ex.8, ¶38.) The accused trapezoidal features also work in a substantially different way. In contrast to the claimed threaded portions, which convert a ***rotationally applied force into axial movement*** of the cartridge and power source with respect to each other, the trapezoidal features convert an ***axial applied force into*** *de minimis* ***rotational movement*** for purposes of alignment (not engagement) when the trapezoidal features deflect (if not aligned), slide past each other and ***prevent*** rotation once the pieces are mechanically connected. The trapezoidal features also achieve a substantially different result. In contrast to the claimed threaded portions, which resist decoupling when the user attempts to pull the pieces apart and require rotational forces to be applied to decouple, the trapezoidal features do not. (Ex.8, ¶¶55-65.) To the contrary, the Solo device disengages by pulling the pieces apart, not by rotating them. In fact, the trapezoidal features are there to prevent efforts by the user to disengage the device by rotating the pieces. For at least these reasons, no reasonable juror could find that the accused trapezoidal features are the equivalent of the claimed threaded portions. *See Aeroquip Corp. v. U.S.*, 37 Fed.Cl. 139, 145-46 (1997) (accused coupling that prevented movement within locking mechanism not equivalent to claimed coupling requiring movement).

C. The Ciro Lacks the Claimed Airflow Passageway, and Therefore, Does Not Infringe Any Asserted Claim of the Patents-in-Suit

1. The Ciro Does Not Literally Infringe

No reasonable juror could find that the airflow passageway in the Ciro cartridge extends in a straight path through the center of the cartridge from a first opening on one end of the cartridge to a second opening on the opposite end, as required by the asserted claims of the patents-in-suit.[6] In contrast to the claimed airflow passageway, the Ciro's airflow passageway is not a straight path through the center of the cartridge. The passageway includes multiple 90 degree turns (circled below), first where the airflow passageway splits into two separate, radially extending airflow passageways before exiting the positive pin and then again at the peripheral airflow passageways that extend through the two slots in the silicone base proximate the exterior walls of the cartridge (as shown below):

[6] While the parties disagree on whether the air enters the Ciro cartridge at a first opening on one end of the cartridge, that disputed factual issue is irrelevant for purposes of this motion.



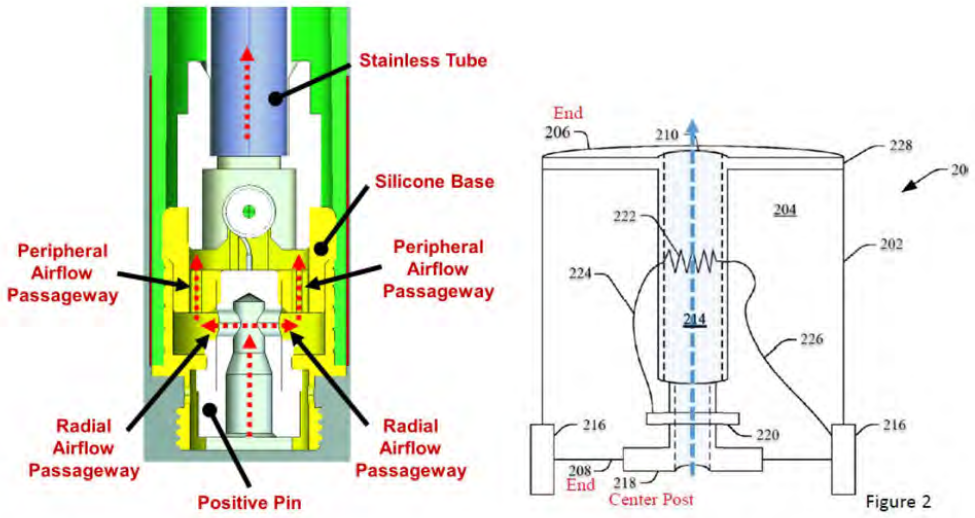
(Ex.8, ¶94 (annotated); *see also id.* at ¶¶87-90.)

As the Court noted when construing the "airflow passageway" limitations, "[n]othing in the specification or claim language indicates the passageway can be crooked, zig-zag, or anything other than generally straight." (Dkt.95 at 19.) Fuma ignores the Court's construction by continuing to allege that the multi-directional, zig-zag airflow passageway through the Ciro cartridge is straight.

Fuma also ignores the requirement that the claimed passageway extends "centrally" through the cartridge, or as the Court construed the limitation, "through the center." (*Id.* at 18-21.) As shown in the figure above, the airflow passageway through the Ciro's cartridge splits into two radial airflow passageways that extend

away from and perpendicular to the center of the cartridge through two openings on the sides of the positive pin. These airflow passageways then proceed outwardly toward the exterior wall of the cartridge before turning and proceed along passageways defined by slots in the silicone base along ***the periphery*** of the cartridge. (Ex.8, ¶¶87-90.)

To overcome the indisputable evidence that these airflow passageways do not meet the claim language, Fuma argues that the passageways through the positive pin and silicone base should be ignored. According to Fuma, the positive pin and silicone base are merely obstructions (like the heating element) in a central airflow passageway. (Ex.3, ¶¶65-66.) No reasonable juror could accept Fuma's position. In contrast to the heating element (around which air flows according to some of the claims), air flows ***through the radial airflow passageways formed inside the positive pin and the peripheral airflow passageways formed inside the silicone base***, and those airflow passageways form a portion of the airflow passageway that extends through the Ciro's cartridge. Thus, in contrast to the heating element, the positive pin and the silicone base provide ***structure that defines portions of the airflow passageway*** through the cartridge, much like the center post in FIG 2 of the patents-in-suit provides structure that defines a portion of the airflow passageway through the cartridge (as shown below):



(left: Ex.8, ¶89 (annotated); right: Dkt.76-3 at Fig. 2 (annotated); *see also id.* at 6:25-40.) Moreover, in stark contrast to the center post of FIG 2, which forms an airflow passageway that is a straight path through the center of the cartridge, the airflow passageways formed by the positive pin and silicone base are not straight paths through the center of the cartridge, but instead have a zig-zag configuration that extends away from the center of the cartridge. For this reason, the Ciro does not literally infringe as a matter of law.

2. Prosecution History Estoppel Precludes Infringement Under the DOE

The airflow passageway limitations were added by amendment during prosecution of the related '917 application and were repeatedly relied upon in distinguishing the claims over the cited prior art during prosecution of the '917 and

'955 applications. (Ex.5 at FUMA00000511, -514-15, -520-526; Ex.6 at FUMA00000070-71, -74, -152, -156, -166-169.)

In remarks accompanying the "airflow passageway" amendments, Fuma argued that "nowhere does Thorens, Ray, or Morgan disclose or suggest" the airflow passageway "recited in claim 1" which "extends ***centrally and axially*** with respect to the housing" between first and second apertures on the ends of the housing or as "recited in claim 20" that extends "through the interior of the housing ***along the central longitudinal axis*** of the housing." (Ex.5 at FUMA00000520, -522 (emphasis added).) Similarly, during prosecution of the '955 application, Fuma argued that Thorens failed to disclose as least three "explicitly claimed" features, including "a [cartridge] housing having a ***centrally and axially extending*** airflow passageway." (Ex.6 at FUMA00000166, -169-70 (emphasis added).)

Both amendment and argument-based estoppel preclude application of the DOE to the "airflow passageway" limitations. With respect to amendment-based estoppel, the "airflow passageway" limitations were added by narrowing amendments. As such, Fuma is presumed to have disclaimed devices that lack the claimed "airflow passageway." *See Pharma Tech*, 942 F.3d at 1380; *see also Elkay*, 192 F.3d at 980-81 (holding estoppel applies to patents in same family).

Fuma cannot overcome this presumption. Airflow passageways that lack the claimed configuration were certainly foreseeable. As Fuma repeatedly argued during prosecution, Thorens, which prompted the narrowing airflow passageway amendments, discloses an airflow passageway that lacks the claimed configuration. Nor can Fuma reasonably argue that the amendments bore no more than a tangential relation to the equivalent in question in this case; namely, an airflow passageway that lacks the claimed configuration. To the contrary, the airflow passageway limitations were added and relied upon to distinguish over Thorens which, like the accused Ciro, lacks the claimed airflow passageway configuration. *See Lucent Techs.,* 2007 WL 925354, at *7. Finally, Fuma has not offered some other reason suggesting why it could not have reasonably been expected to claim the airflow passageway differently. Fuma certainly could have attempted to claim airflow passageways with any number of different configurations or without any particular configuration. However, it chose not to do so in light of Thorens. *See Lucent Techs.,* 2007 WL 925354, at *7 (patentee reasonably expected to have described the claimed equivalent when distinguishing prior art).

Argument-based estoppel also deprives the "airflow passageway" limitations to any scope of equivalence. On multiple occasions, Fuma distinguished Thorens on the basis that it lacked the claimed airflow passageway configuration. (Ex.5 at FUMA00000524-25; Ex.6 at FUMA00000166, -169-70.) Based on Fuma's

statements during prosecution, a competitor would reasonably believe that Fuma surrendered devices that lacked the claimed airflow passageway configuration. *Pharma Tech*, 942 F.3d at 1381; *Amgen,* 931 F.3d at 1160.

3. Even if Fuma is Not Estopped, the Ciro Does Not Infringe Under the DOE

Even if this limitation were entitled to some range of equivalents (it is not), the airflow passageway through the Ciro is substantially different from the claimed airflow passageway, no reasonable juror could find otherwise. The claimed airflow passageway provides an airflow path through the cartridge via a single airflow passageway through the central axis of the cartridge housing. In stark contrast, the airflow path through the Ciro cartridge travels through multiple airflow passageways that extend through multiple, non-central axes of the cartridge housing. This is antithesis of the claimed "airflow passageway." *See, e.g., Planet Bingo*, 472 F.3d at 1344. As a result, these passageways also create a higher velocity jet of air to impinge on the ceramic wick from two directions and increase convection of vapor as compared to a single airflow stream that strikes from one direction, resulting from the claimed passageway. (Ex.8, ¶95.)

VI. Conclusion

For the reasons stated herein, summary judgment that neither the VUSE Solo nor VUSE Ciro infringe any asserted claim is warranted.

Dated: October 20, 2020

/s/ John F. Morrow, Jr.

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CERTIFICATE OF SERVICE

The undersigned hereby certifies that all counsel of record who are deemed to have consented to electronic service are being served with a copy of **REYNOLDS'S MEMORANDUM IN SUPPORT OF ITS MOTION FOR SUMMARY JUDGMENT OF NON-INFRINGEMENT** through the Court's CM/ECF system on October 20, 2020. Any other counsel of record will be served by First Class U.S. mail on this same date.

Dated: October 20, 2020 */s/ John F. Morrow, Jr.*

CERTIFICATE OF COMPLIANCE

The undersigned certifies that this brief complies with the word count limitation of Local Rule 7.3(d).

Dated: October 20, 2020 */s/ John F. Morrow, Jr.*