

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re *Inter Partes* Review of:)
U.S. Patent No. 9,901,123)
Issued: February 27, 2018)
Application No.: 15/286,087)
Filing Date: October 5, 2016)

For: **Tobacco-Containing Smoking Article**

FILED VIA E2E

**PETITION FOR *INTER PARTES* REVIEW
OF U.S. PATENT NO. 9,901,123**

RAI Strategic Holdings, Inc. Exhibit 2041 Philip Morris Products, S.A. v. RAI Strategic Holdings, Inc. IPR2020-00919

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Exhibit List

Ex.	Description
1001	U.S. Patent No. 9,901,123 (“the ’123 patent”)
1002	File History for U.S. Patent No. 9,901,123
1003	Declaration of Dr. Seetharama C. Deevi in Support of Petition for <i>Inter Partes</i> Review of ’123 Patent (“Deevi Decl”)
1004	Curriculum Vitae of Dr. Seetharama C. Deevi
1005	U.S. Patent No. 5,249,586 (“Morgan”)
1006	U.S. Patent No. 4,947,874 (“Brooks”)
1007	U.S. Patent Application Publication No. 2007/0102013 (“Adams”)
1008	U.S. Patent No. 5,144,962 (“Counts-962”)
1009	U.S. Patent No. 5,060,671 (“Counts-671”)
1010	<i>Chemical and Biological Studies on New Cigarette Prototypes that Heat Instead of Burn Tobacco</i> , R. J. Reynolds Tobacco Company Monograph (1988) (“RJR’s 1988 Monograph”) (markings on exhibit appeared in the used copy purchased by counsel)
1011	U.S. Patent No. 5,692,525 (“Counts-525”)
1012	U.S. Patent No. 5,095,921 (“Losee”)
1013	U.S. Patent No. 5,591,368 (“the ’368 patent”)
1014	International Patent Application Publication No. WO 96/32854 (“Baggett”)
1015	Korean Patent No. 10-0636287 (“Park”) (including certified English translation and original Korean version of patent)
1016	Philip Morris Incorporated Invention Record (submitted May 19, 1994; witnessed May 23, 1994) (“May 1994 Invention Record”)
1017	U.S. Patent No. 4,510,950 (“Keritsis”)

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1018	Steven M. Kaplan, Wiley Electrical and Electronics Engineering Dictionary (2004)
1019	IEEE 100, The Authoritative Dictionary of IEEE Standards Terms (7th ed. 2000) (“IEEE Dictionary”)
1020	Philip Morris Incorporated Invention Record (dated October 11, 1988) (“October 1988 Invention Record”)
1021	U.S. Patent No. 2,104,266 (“McCormick”)
1022	U.S. Patent No. 5,865,185 (“Collins”)
1023	U.S. Patent Application Publication No. 2007/0215167 (“Crooks”)
1024	U.S. Provisional Application Serial No. 60/722,036
1025	Patent Owner’s infringement chart for ’123 patent, <i>In the Matter of Certain Tobacco Heating Articles and Components Thereof</i> , Inv. No. ____, EDIS Doc. ID 707369 (Filed Apr. 9, 2020) (“Infringement Chart”)
1026	U.S. Patent No. 5,498,855 (“the ’855 patent”)
1027	Modern Dictionary of Electronics (7th ed., 1999) (excerpt)
1028	Merriam-Webster’s Collegiate Dictionary (10th ed., 2001) (excerpt)
1029	Concise Oxford English Dictionary (11th ed., 2008) (excerpt)
1030	The Lady Smokes, www.theladysmokes.com (archived at web.archive.org , 2006-2007)
1031	Chambers Dictionary of Science and Technology (1999) (excerpt)
1032	Complaint for Patent Infringement, <i>RAI Strategic Holdings, Inc. v. Altria Client Services</i> , No. 1:20-cv-393 (E.D. Va. April 9, 2020)

I. Introduction

Philip Morris Products, S.A. (“Petitioner”) requests *inter partes* review of claims 27-30 of U.S. Patent No. 9,901,123, titled “Tobacco-Containing Smoking Article” (“the ’123 Patent,” Ex. 1001). The Office’s records indicate that the ’123 patent is assigned to RAI Strategic Holdings, Inc. (“RAI” or “Patent Owner”).

The challenged claims are generally directed to a device that heats tobacco rather than burning it.¹ Such “heat-not-burn” technology releases less harmful chemicals than conventional smoking because it heats tobacco to release a nicotine-carrying aerosol instead of burning it. The general concept of heat-not-burn technology has been around for decades,² but in the last 10-12 years it has evolved to the point where it is commercially viable and scientifically substantiated as a potentially reduced-risk alternative to continued smoking.

In the last decade alone, Petitioner invested over \$7 billion in research and development on technology that does not burn tobacco. As a direct result of this effort, Petitioner launched a new heat-not-burn product—IQOS—which is already

¹ That said, the claims do not rule out burning the tobacco.

² U.S. Patent No. 2,104,266 issued in 1935 and described heating rather than burning tobacco to avoid releasing undesirable elements of tobacco smoke. *See* Ex. 1021 at 1 (left column line 1 to right column, line 18).

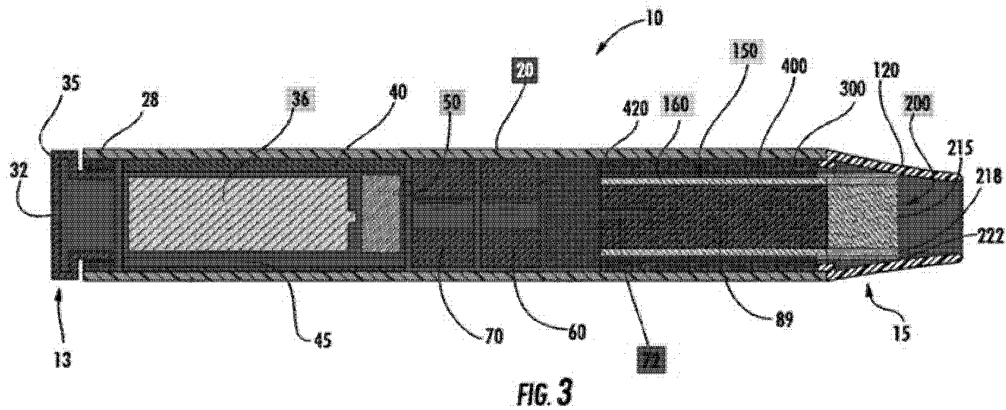
an overwhelming commercial success in more than fifty countries around the world. As can be expected, Petitioner protects its heat-not-burn innovations that demonstrate clear advances over earlier heat-not-burn technology.

Meanwhile, R.J. Reynolds Tobacco Company (“RJR”) and its parent company, British American Tobacco plc (“BAT”), are lagging behind. To date, BAT and its affiliates, including RJR and Patent Owner RAI, have not marketed a heat-not-burn product that can compete with IQOS.³ Failing on that front, BAT and its affiliates are using their patents—including the ’123 patent—in an attempt to exclude others from offering current adult smokers safer alternatives. In the District Court and in the ITC, BAT has accused Petitioner of infringing the ’123 and other patents, even though the asserted claims recite conventional heat-not-burn features already in the public domain, including features in the expired Philip Morris patents asserted as prior art here. *See, e.g.*, Complaint (Ex. 1032).

Specifically, the ’123 patent describes several different examples. Some use a combination of liquid and tobacco materials, while others have only tobacco

³ In addition, BAT and its affiliates have not undergone an expensive Premarket Tobacco Product Application process with the Food and Drug Administration, and therefore cannot lawfully sell such products in the United States.

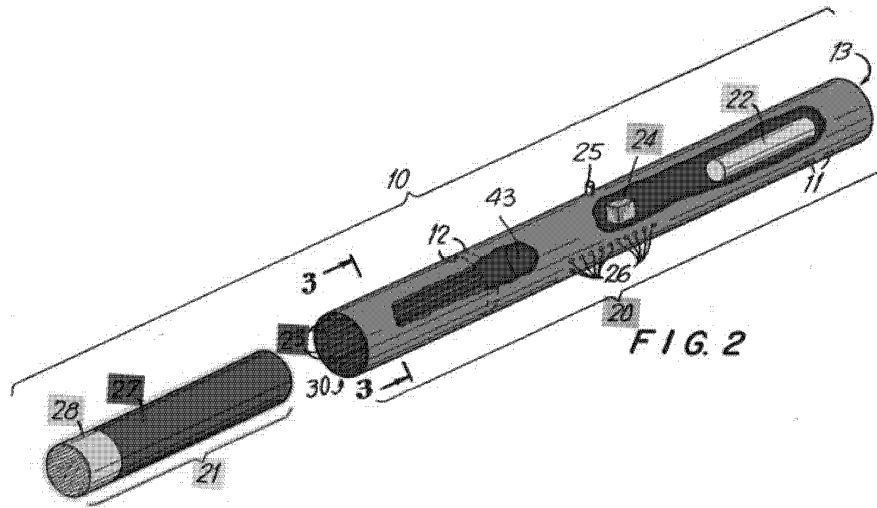
treated with aerosol-generating materials. The claims challenged here most resemble the device shown below in the '123 patent's Figure 3.



'123 patent Fig. 3; 27:35-30:36.⁴

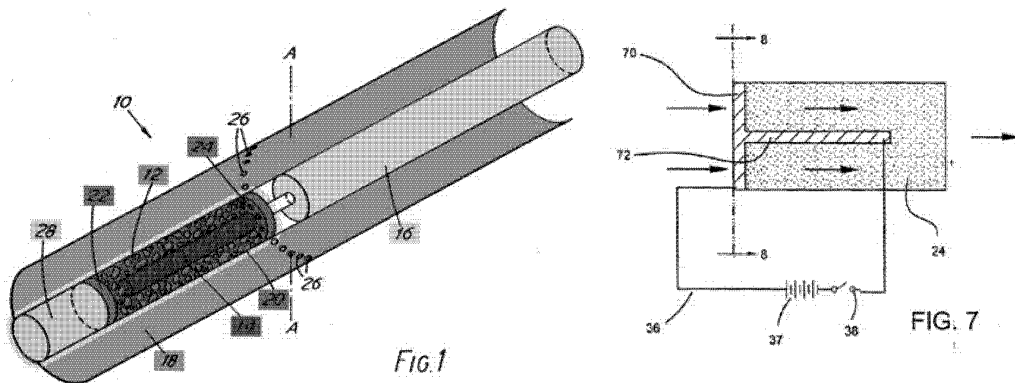
The claimed device was disclosed in the prior art. For example, U.S. Patent No. 5,249,586 (Ex. 1005, "Morgan") issued to Philip Morris USA in 1993—over a decade before the '123 patent's earliest claimed priority date—and taught each and every element of the independent claims:

⁴ Unless otherwise noted, all annotations and emphases are added.



Morgan Fig. 2, 2:44-45; *see also* Figs. 7, 8 (depicting heating elements with elongated portions and proximal to the center of the outer housing).

Likewise, Counts-962 discloses an electrically powered smoking article like the one claimed in the '123 patent, and Adams also discloses a centered heater like the one shown in Figure 3 of the '123 patent above.



Counts-962 Fig. 1 (“heating element 14”); *id.* 3:16-29; Adams Fig. 7.

Accordingly, and for the reasons fully explained in the following sections, Petitioner asks the Board to institute review and find the challenged claims unpatentable.

II. Mandatory Notices under 37 C.F.R. § 42.8

A. Real Parties-in-Interest

For purposes of 35 U.S.C. § 312(a)(2) and 37 C.F.R. § 42.8(b)(1) only, Petitioner Philip Morris Products, S.A. identifies the real parties-in-interest as Philip Morris Products, S.A., Philip Morris International, Inc., Altria Client Services LLC, and Philip Morris USA. Petitioner further states that under the governing standard, Altria Group, Inc. is not a real-party-in-interest. *See Patent Trial Practice Guide*, 77 Fed. Reg. 48,756, 48,759 (Aug. 14, 2012). Altria Group, Inc. nevertheless agrees to be bound by any final written decision in these proceedings. *See* 35 U.S.C. § 315(e).⁵

B. Related Matters

Patent Owner asserted '123 patent in the United States District Court for the Eastern District of Virginia and in the ITC. *See RAI Strategic Holdings, Inc. v.*

⁵ In addition, Philip Morris International, Inc., and Altria Group, Inc. were improperly named as defendants in the litigation noted in the Related Matters section, and the parties have agreed to dismiss them from those matters.

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Altria Client Services LLC, No. 1:20-cv-393 (E.D. Va. filed Apr. 9, 2020); *In the Matter of Certain Tobacco Heating Articles and Components Thereof*, Inv. No. ____, EDIS Doc. ID 707369 (Filed Apr. 9, 2020).

Petitioner is concurrently filing a petition for IPR of U.S. Patent No. 9,814,268 (“the ’268 patent”). The ’268 patent is related to the ’123 patent and shares an identical specification, and is also asserted in the district court litigation cited above.

Public PAIR also indicates that Appl. Ser. Nos. 16/271,443, 16/271,426, 16/247,298 are related to the ’123 patent and are currently pending.

C. Grounds for Standing

Petitioner certifies that the ’123 patent is available for *inter partes* review and that Petitioner is not barred from requesting this proceeding.

D. Lead and Backup Counsel and Service Information

Pursuant to 37 C.F.R. §§ 42.8(b)(3), 42.8(b)(4), and 42.10(a), Petitioner designates the following lead counsel:

- Jonathan M. Strang (Reg. No. 61,724). jonathan.strang@lw.com, Latham & Watkins LLP; 555 Eleventh Street, NW, Ste. 1000; Washington, DC 20004-1304; 202.637.2362; 202.637.2201 (fax).

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- Christopher W. Henry (Reg. No. 60,907). christopher.henry@lw.com, Latham & Watkins LLP; 200 Clarendon Street, Boston, MA 02116; 617.880.4550; 617.948.6001 (fax).

Pursuant to 37 C.F.R. § 42.10(b), a Power of Attorney from Petitioner is attached.

Petitioner consents to electronic service.

E. Fee for *Inter Partes* Review

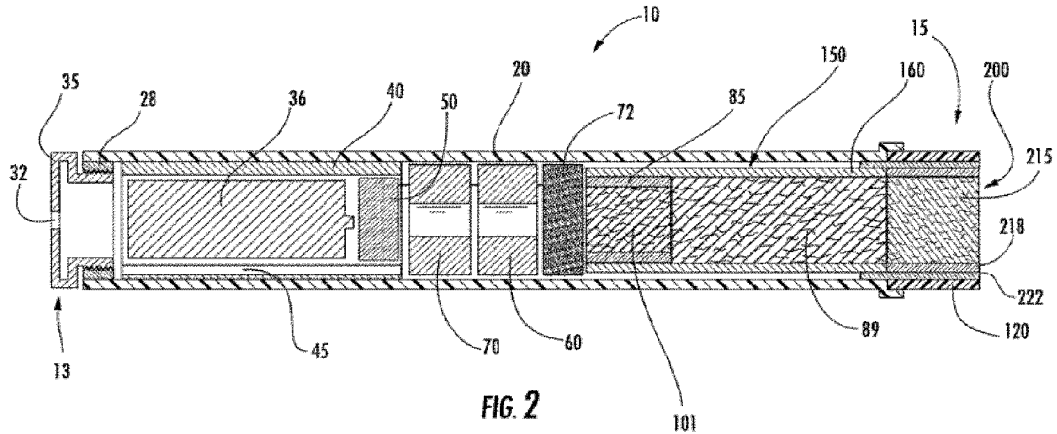
The Director is authorized to charge the fee specified by 37 C.F.R.

§ 42.15(a) to Deposit Account No. 506269.

III. Identification of Challenges (37 C.F.R. § 42.104(b))

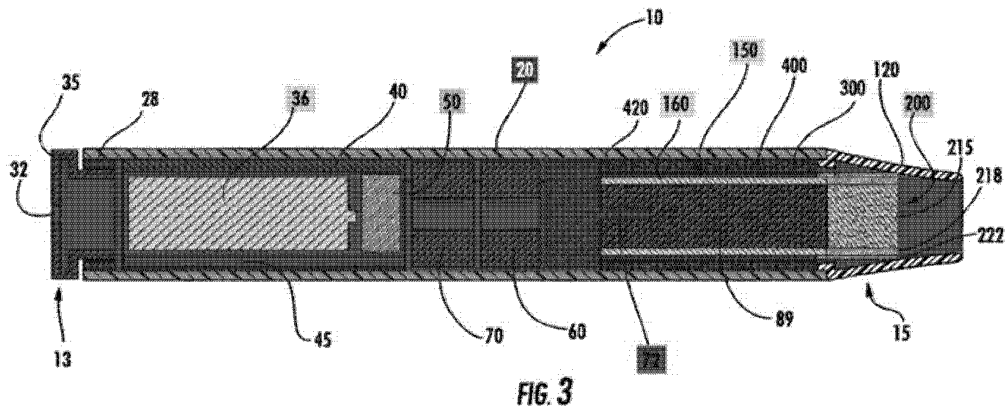
- Ground 1: Claims 27-30 are unpatentable under 35 U.S.C. § 103 over Morgan (Ex. 1005), alone or in view of Adams (Ex. 1007) and Brooks (Ex. 1006).
- Ground 2: Claims 27-30 are unpatentable under 35 U.S.C. § 103 over Adams in view of Morgan and Brooks.

Figure 2 illustrates a different smoking article:



'123 patent Fig. 2. This example includes a cigarette 150 with “a charge or roll of tobacco 89 (*e.g.*, tobacco cut filler or processed tobacco material) wrapped in wrapping material 160 (*e.g.*, paper).” *Id.* 24:57-60. “[T]he cigarette 150 possesses a type of cartridge 85 at its distal end within the wrapping material 160 and in fluid communication with the tobacco rod,” and the “optional cartridge 85 contains an aerosol-generating material composition 101 therein.” *Id.* 25:27-32. Deevi Decl. ¶¶ 43-51.

Figure 3, which includes a heater with an elongated portion and no cartridge, most resembles the challenged claims:



'123 patent Fig. 3; 27:35-30:36. The claimed but conventional features of the patent's smoking article include a tubular outer housing (item 20, light gray); a battery (item 36, green); a heating element 72 (item 72, red); a controller for regulating current flow through the heater (item 50, orange). The smoking article in Figure 3 also incorporates a conventional "cigarette 150," which includes a "tobacco segment 89," "wrapping material 160" and a "filter element 200." *Id.* 27:42-56.

"[A]t least a portion of [heating element 72] can be elongated" to "extend downstream within the outer container 20," and thus "extend into the tobacco segment 89, and hence be in close contact with a significant amount of substrate and aerosol-forming material within the tobacco." *Id.* 28:35-43, Deevi Decl. ¶¶ 52-58. The claimed features not shown in Figure 3 consist of "an actuation mechanism" for turning on the heater (*e.g.*, a switch), *see id.* 34:62-65 (claim 29), and an operating temperature range for the heater of "at least 200° C and less than

600° C ,” *see id.* 34:66-35:2 (claim 30). As will be explained in the following sections, all of these features were disclosed in the prior art.

B. State of the Art

As established in the Introduction, heat-not-burn systems predate the ’123 patent by at least seven decades. *See, e.g.*, Ex. 1021 (filed in 1935); Deevi Decl. ¶¶ 70-76. The ’123 patent recognizes as much. *See, e.g.*, ’123 patent 3:49-4:7 (discussing heat-not-burn prior art). After discussing that prior art, however, the ’123 patent states that it would be “highly desirable” to provide a heat-not-burn smoking article, without explaining how it purports to meet that objective in a way that differs from the prior art. *See id.* 4:28-38 (describing a smoking article that operates without “burning any significant amount of tobacco” and therefore does not deliver harmful combustion products).

The ’123 patent identifies in the prior art most, if not all, of the features recited in the challenged claims. The ’123 patent acknowledges that it was known to use tobacco with aerosol-generating materials. *See, e.g.*, ’123 patent 8:56-9:11 (describing useful tobaccos in the prior art), 9:46-10:54 (same); *id.* 13:59-67 (“Representative types of aerosol-forming materials are set forth in” various prior art references, including [Ex. 1010, RJR’s 1988 Monograph].), 14:13-24 (listing commercially available aerosol-forming materials); Deevi Decl. ¶¶ 73-76. In fact, glycerol, one of the ’123 patent’s preferred aerosol-forming materials (*see* ’123

patent 14:6-15; 16:53-58) already had “a long history of use in the tobacco industry” by 1998. Ex. 1010 at 60, 122 (RJR’s Monograph); Ex. 1011 at 16:33-38; Ex. 1012 at 3:9-13; Ex. 1006 at 6:45-52 (aerosols are “vapors, gases, particles, and the like, both visible and invisible, and especially those components perceived by the user to be ‘smoke-like,’” which may be “generated by action of heat from [a] resistance heating element upon aerosol forming substances and/or tobacco flavor substances”); Deevi Decl. ¶¶ 73-76.

The ’123 patent also admits that wrapping materials and filters were known. *E.g.*, ’123 patent 18:11-37 (“Exemplary types of wrapping materials are set forth in” various prior art patents); *id.* 19:13-18 (“The smoking article typically possesses a mouth-end piece. Representative types of filter elements, such as those employed for cigarettes, including segmented cigarette filters, are set forth in U.S. patent application Ser. No. 11/461,941, ... which is incorporated by herein by reference.”); Deevi Decl. ¶¶ 74-76.

Furthermore, the ’123 patent provides examples of suitable prior art power sources (*e.g.*, batteries), control components, and resistance heating elements. *See* ’123 patent 20:26-32, 20:43-48, 21:45-48; Deevi Decl. ¶76.

In addition, prior art references beyond those discussed in the ’123 patent specification—*e.g.*, Morgan, Adams, Counts-962, and Brooks—also demonstrate that the features recited in the challenged claims were conventional and well-

known long before October 2006. These will be discussed at length in the following sections.

C. Prosecution History

Notably, the applicants overwhelmed the examiner by identifying hundreds of prior-art references without any explanation, despite the Examiner's request to do so. Specifically, the Examiner warned the applicants that their IDS contained "an extremely large number of references for consideration," and asked them to identify particularly pertinent references. Ex. 1002 at 142 (June 26, 2017 office action). Applicants never responded to the Examiner's request.

D. The Person of Ordinary Skill In The Art

A POSA at the time of the purported invention (the October 2006 timeframe) would have had a Bachelor's degree in mechanical engineering, electrical engineering, chemistry, or physics, or a related field, and three to four years of industry experience, or a Master's degree in mechanical engineering, electrical engineering, chemistry, or physics, or a related field, and one to two years of industry experience. Such a POSA would have been familiar with electrically powered smoking articles and/or the components and underlying technology used therein. Deevi Decl. ¶¶ 26-30.

E. Claim Construction

The prior art relied on in this Petition discloses the subject matter of the challenged claims under any reasonable construction, including their plain

meaning.⁶ Petitioner further explains the meaning of the following terms, which might be subject to dispute here.

- 1. The recited “controller” does not invoke § 112, ¶ 6, but if it does, the relevant structure includes Brooks’s prior-art controller.**

Claim 27 recites a “controller ... adapted for regulating current flow through the electrical resistance heater.” The absence of the word “means” “creates a rebuttable presumption...that § 112, para. 6 does not apply.” *Williamson v. Citrix Online, LLC*, 792 F.3d 1339, 1348 (Fed. Cir. 2015).

In its allegations in the ITC proceeding (or district court), Patent Owner did not indicate that § 112, ¶ 6 applies here or otherwise indicate that the term rebuts the *Williamson* presumption. *See* Ex. 1025 at 3. Solely for the purposes of this proceeding, Petitioner agrees: the controller term does not invoke § 112, ¶ 6. The claims do not recite the word “means,” and the Federal Circuit has not deemed “controller” to be a nonce word as it has “mechanism,” “element,” “device,” and “module.” *Williamson*, 792 F.3d at 1350-51. Rather, and for the purposes of this proceeding, a controller has its plain meaning in the context of the patent: it is a device that controls the electric power delivered to the apparatus to which it is

⁶ Petitioner reserves the right to argue alternative constructions in other proceedings, and where such a defense is available, that the claims are indefinite.

connected, *i.e.*, the resistance heater(s). *See* '123 patent 20:33-49 (explaining that controllers typically control “time of operation, control of current, control of electrical resistance heat generation, and the like”); 20:49-21:62 (explaining that common puff-actuated controllers “regulat[e] current flow through” heaters by energizing them when a puff is detected); Exs. 1019, 1027 (defining controller as “a device or group of devices that serves to govern, in some predetermined manner, the electric power delivered to the apparatus to which it is connected”); Ex. 1031 (“an assembly of equipment for controlling the operation of electrical apparatus”); Deevi Decl. ¶¶ 77-90.

Petitioner contends in the alternative that the controller term invokes § 112, ¶ 6, and that the claim language, “controller ... adapted for regulating current flow through the heater,” should be construed to cover that term’s function and the corresponding structures the '123 patent discloses (and equivalents).

In particular, the recited function is regulating (*i.e.*, controlling, *see* Exs. 1028, 1029, 1031, defining control as regulate and vice versa) current flow through the heater. The disclosed structures for performing that function include the circuits shown in Figures 4 and 5 of the '123 patent and described in the accompanying text at 30:30-32:26. The patent also points to Brooks (Ex. 1006) as disclosing a suitable controller structure, stating that “[r]epresentative types of electronic control components” and “sensing mechanism components” disclosed in

the prior art can be used to “regulat[e] current flow through one or more of the resistance heating elements,” citing “U.S. Pat. No. 4,947,874 to Brooks et al.” ’123 patent 20:43-21:14; *see also* 3:58-4:7 and 13:30-35 (also incorporating Brooks by reference); Deevi Decl. ¶¶ 86-90. Brooks therefore discloses an admitted prior art controller structure, and it is applied as such herein.

Notably, Brooks states that its puff-actuated controller provides “accurate and sophisticated” current actuation and regulation. Brooks Abstract, 4:50-5:12. Brooks explains that Figures 9 and 10 illustrate exemplary controllers (Brooks 9:55-65), and those figures are described in detail at 12:39-16:31. *See also id.* 17:41-18:19 (Example 1 “Assembly of the Controller”); 20:54-21:41 (Example 4, “Assembly of the Controller”); Deevi Decl. ¶¶ 88-90.

For example, Brooks’s Figure 9 example is a puff-actuated controller that, like the description in the ’123 patent, uses a timer with a pressure switch or a transducer with a threshold detector. Brooks 12:39-13:30. Brooks explains in detail how to implement the timer, set the duty cycle, and so forth. Brooks 13:31-15:27. Brooks actually built this controller, and documented its performance using a “standard smoking machine.” Brooks 17:43-18:33. Deevi Decl. ¶ 88.

Brooks also disclosed another implementation of a puff-actuated controller in its Figure 10. That controller uses the same mechanism to detect a puff and the same timer circuitry, and further includes an LED to inform the user when the

heating element is energized. Brooks 15:28-16:31. Brooks actually built this controller (20:53-21:27), too, and it provided visible aerosol for 12 consecutive puffs, lighting up the LED on each puff. Brooks 21:30-41. Deevi Decl. ¶90.

Accordingly, the patent disclosed sufficient structure for performing the controlling function, and that structure includes Brooks's prior-art controllers.

2. The art teaches the “removably engaged” term even if it requires the cigarette-type device to be interlocked with the outer housing

Challenged independent claim 27 recites “a cigarette-type device *removably engaged* with the mouth-end of the tubular outer housing.” The '123 patent does not use the term “removably engaged” anywhere but in the claims.

Regarding infringement, Patent Owner alleges that a “tobacco stick” is “removably engaged” with the mouth-end of the outer housing when it is inserted into the device and may be removed later. Ex. 1025 at 4; *see also id.* at 3 (showing that the IQOS device's blade is inserted into the “tobacco stick” when the tobacco stick is inserted into the device). Solely for the purposes of this proceeding, Petitioner agrees that “a cigarette-type device” is “removably engaged with the mouth-end of the tubular outer housing” when it is inserted into the mouth-end of the outer housing and may be removed later. As demonstrated herein, the art teaches this broad reading.

V. Ground 1: Claims 27-30 are Unpatentable Over Morgan (Ex. 1005), Alone or in Combination with Adams (Ex. 1007) and Brooks (Ex. 1006)

As will be demonstrated in the following paragraphs, Morgan discloses every element of the challenged claims. Deevi Decl. ¶¶ 113-131. To the extent the Patent Owner argues that Morgan’s heater is not “positioned proximal to the center of the outer housing,” a POSA would have so positioned the heater (in view of Morgan and a POSA’s background knowledge or Adams in particular). The patent admitted that selecting a heating element is a matter of design choice and “will be readily apparent” to a POSA. ’123 patent 29:32-50. In addition, locating a heating element proximal to the center confers many practical benefits, including reduced heat transmission to the external body of the device, less need for insulation, and reduced heat-induced release of off-tastes from the wrapping paper.

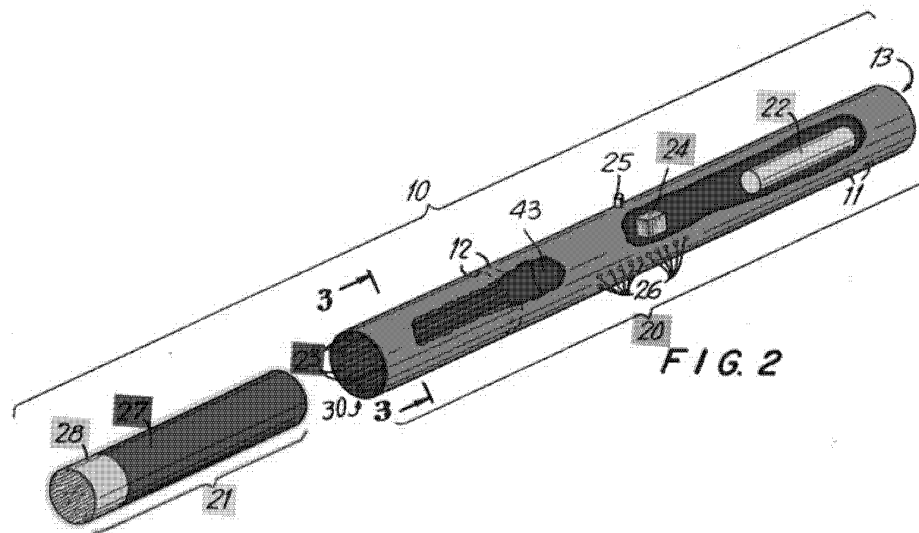
Morgan also discloses the claimed controller, and if the controller term invokes § 112, ¶ 6 (and even if it does not), a POSA would have been motivated to implement Morgan using Brooks’s controller to achieve the “accurate and sophisticated current actuation and current regulati[on]” that Brooks describes. Brooks 4:50-57; *see also* Claim Construction section above.

A. Overview of Morgan

Morgan is § 102(b) prior art because it issued on October 5, 1993, over a year before the ’123 patent’s earliest claimed priority date. Morgan is cited on the face of ’123 patent, in the “extremely large number of references” the applicants

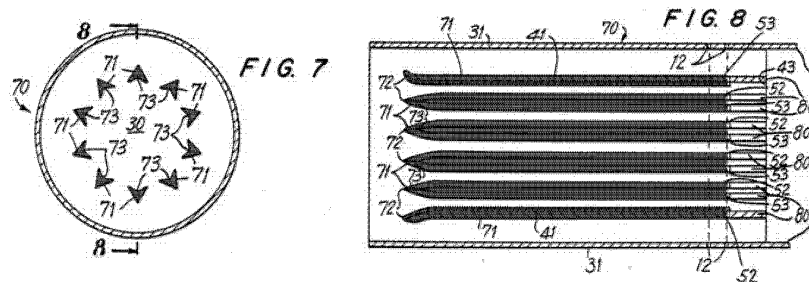
submitted for the examiner's consideration (Ex. 1002 at 142), but was not discussed by the examiner.

Morgan discloses an “electrical smoking article” with the claimed tubular outer housing (item 20, light gray below); a battery (“power source 22 which could include a battery,” green); an electrical resistance heater (“heating elements 23,” red); a controller (“control circuit 24,” orange); and a cigarette-type device (“disposable portion 21,” circled in blue) consisting of a filter (“filter segment 28,” pink) and a “flavor segment 27,” which contains “tobacco” and an “aerosol precursor” (brown). *See* Deevi Decl. ¶¶ 97-100.



Morgan Fig. 2, 4:44-5:46; Deevi Decl. ¶¶ 97-98. “[F]lavor segment 27 and ... filter segment 28 [are] attached by a plug wrap or other fastening means (not shown),” *i.e.*, the claimed wrapping material. *Id.* 5:26-28.

In Figures 7 and 8, Morgan also depicts electrical resistance heaters wherein at least a portion of the resistance heating element is elongated and extending downstream toward the mouth-end of the outer housing, the elongated portion of the resistance heating element positioned proximal to the center of the outer housing:



Morgan Figs. 7-8 (“heating elements 71”), 6:46-52. Morgan also discloses that its heaters can be energized by “the depression of a manual switch” and “in response to manual actuation,” and that to heat but not burn tobacco, those heaters should be operated at “a temperature of between about 150° C and about 500° C.” *Id.* 1:11-13, 1:26-32, 3:65-68; Deevi Decl. ¶¶ 99-100, 184, 291.

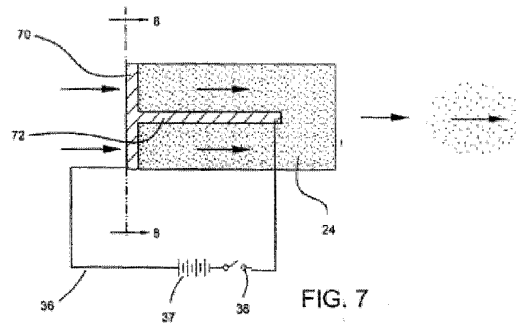
B. Overview of Adams

Adams is § 102(e) prior art because it issued from an application that was filed on September 28, 2006, before the '123 patent's earliest claimed priority date

of October 18, 2006.⁷ Like Morgan, it is cited in the '123 patent but was not expressly considered by the examiner. Adams is analogous art because it, like Morgan, relates to “tobacco smoking systems” that use “electrical energy rather than combustion” to “generate[] an aerosol.” Adams Title, ¶ 1.

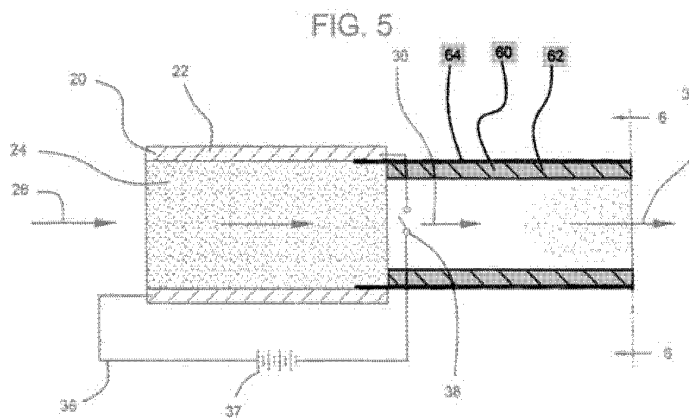
Adams’ Figure 7 depicts an electrical resistance heater that may be used in such a system. Adams’ heater has a “projection 72,” which is an elongated portion of the resistance heating element that extends downstream and is positioned proximal to the center of the outer housing. Projection 72 is “inserted into and received by [a] tobacco plug 24” and the heater “energized to generate heat, *e.g.*, by resistance heating or induction heating”:

⁷ If Patent Owner attempts to prove that the challenged claims are entitled to an earlier effective filing date, Petitioner reserves the right to demonstrate in reply that Adams is entitled to claim priority to its provisional application’s September 30, 2005 filing date. *See Dynamic Drinkware, LLC v. National Graphics, Inc.*, 800 F.3d 1375 (Fed. Cir. 2015). For now, Petitioner notes the description in the Adams’ provisional (Ex. 1024) was carried over into its non-provisional application and fully supports its claims. *See Deevi Decl.* ¶¶ 106-108.



Adams ¶ 45, Fig. 7; Deevi Decl. ¶¶ 101-105.

Adams also illustrates in Figure 5 a mouth piece on such a system that secures the cigarette, engaging it with the mouth-end of the device's housing:



Id. Fig. 5, ¶¶ 11, 42, 47. Adams explains that the mouth-end piece's sheath extends into the assembly so that the system with the mouthpiece resembles a conventional cigarette. *Id.* ¶¶ 43-44; Deevi Decl. ¶¶ 101-103.

C. Overview of Brooks

Brooks is also § 102(b) prior art because it issued on August 14, 1990. Brooks is cited on the '123 patent, but it was not expressly considered by the examiner. Brooks is analogous art because it, like Morgan, is directed to smoking

articles, and describes a suitable puff-actuated controller. Brooks Title, Abstract.

As discussed in the Claim Construction section above, the '123 patent admits that Brooks discloses a prior-art controller suitable for the patent's purported invention, and Brooks in fact discloses controller structures that regulate current flow through heaters as recited in the claims. *See* Deevi Decl. ¶¶ 77-90, 109-111.

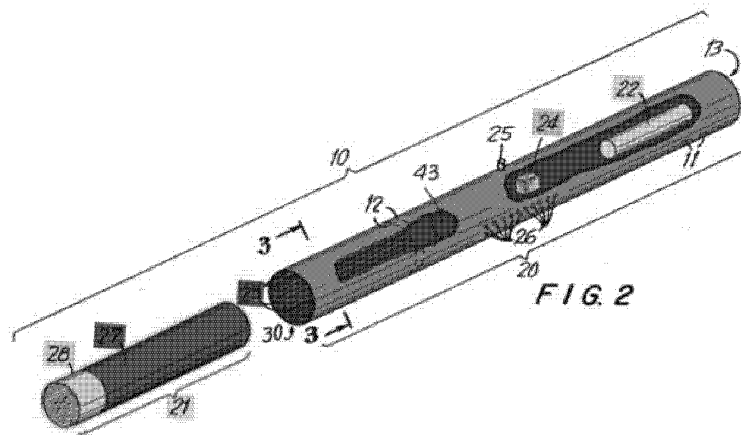
D. Claim 27

1. Preamble

Independent claim 27 recites, “An electrically-powered, aerosol-generating smoking article comprising.” To the extent Patent Owner contends this preamble is limiting, Morgan discloses it. Morgan discloses “an electrical smoking article” “in which a replaceable tobacco flavor medium is electrically heated by a set of permanent reusable heaters to evolve inhalable flavors or other components in vapor or aerosol form.” Morgan Abstract, 3:9-11; Deevi Decl. ¶¶ 132-134.

2. Limitation 27[a]: an electrical power source

Claim 27 further recites, “an electrical power source in the form of a battery within a tubular outer housing having a mouth-end and an end distal to the mouth-end.” Morgan discloses this limitation.



As shown in Figure 2 above, Morgan’s permanent portion 20 has a tubular outer housing, a mouth-end (“cavity 30 at the mouth end”), and an end distal to the mouth-end (“far end 13”). Morgan Fig. 2, 4:44-47, 5:1-5. Within permanent portion 20, Morgan’s smoking article includes “a **power source 22**, which could include a **battery**.” See Morgan 4:42-5:5, Fig. 2; Deevi Decl. ¶¶ 135-139.

Morgan also provides that “[t]he functions of power source 22, control circuit 24, pushbutton 25 (or a puff-actuated sensor), and indicators 26 are described in more detail in above-incorporated U.S. Pat. No. 5,060,671.” Morgan 4:62-67. The incorporated patent’s “preferred power source is four...nickel-cadmium cells” because “[t]hese **batteries** provide 1.2-volts each, for a total of 4.8 volts when connected in series” and can “power at least one ten-puff article without recharging.” Ex. 1009 at 8:65-9:4 (“Counts-671”); Deevi Decl. ¶¶ 138-139.

3. Limitation 27[b]: at least one electrical resistance heater

Claim 27 next recites “at least one electrical resistance heater powered by said electrical power source.”

Morgan discloses that its “[p]ower source 22 provides power for heating elements.” Morgan 4:56-57. Morgan’s heating elements are electrical resistance heaters. *See id.* 4:9-15 (“[T]he heaters should have an active surface area... and a resistance of between about 1.0 ohm and 1.6 ohms. ... [H]eater power consumption is determined by resistance....”), Claim 25 (“electrical heating means has a resistance of between about 0.5 ohm and about 3.0 ohms”), Claim 26 (“electrical heating means has a resistance of between about 1.0 ohm and about 1.6 ohms”), Figs. 2-4 (heating elements 23), Figs. 5-6 (heating elements 51), Figs. 7-8 (heating elements 71); Deevi Decl. ¶¶ 140-143.

This claim element is further discussed in the next section.

4. Limitation 27[c]: elongated portion of resistance heating element

The next limitation in claim 27 recites:

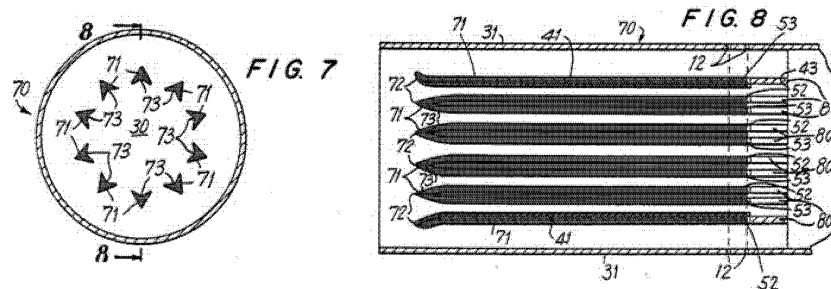
wherein at least a portion of the resistance heating element is elongated and extending downstream toward the mouth-end of the outer housing, the elongated portion of the resistance heating element positioned proximal to the center of the outer housing

The ’123 patent provides little explanation of this claim language, showing only Figure 3, and stating that a portion of a “second resistance heating element” is

“elongated” and extends downstream into the tobacco segment. ’123 patent 28:37-43, Fig. 3; Deevi Decl. ¶¶ 114-130, 140-151.⁸

As already noted, the patent also admits that selecting an appropriate heater is “a matter of design choice” that will be “readily apparent to one skilled in the art.” ’123 patent 29:32-50; Deevi Decl. ¶¶ 38, 59, 76, 144-146. In view of this admission, patentability cannot turn on this claim element, especially since it was well known that heaters located proximal to the center provided various benefits that will be discussed herein.

In any event, Morgan teaches this limitation. In Figures 7 and 8, Morgan depicts a heater with elongated portions extending downstream and proximal to the center of the smoking article’s outer housing:



⁸ For the purposes of this proceeding, Petitioner contends that “proximal to the center” means “near or at the center.” Petitioner reserves the right to argue alternative constructions in other venues, and where such a defense is available, that the claims are indefinite.

Morgan Figs. 7-8; 3:33-36 (describing heaters that “protrude” and “actually pierce and extend into the disposable portion”). Morgan’s “heating elements 71...pierce and extend into disposable portion 21 to provide the desired intimate thermal contact,” placing the heaters as claimed and described in the ’123 patent. Morgan 6:46-52; ’123 patent 28:41-43 (heater “in close contact with a significant amount of substrate and aerosol-forming material within the tobacco”); Deevi Decl. ¶¶ 99, 144-147.

In addition and in the alternative, even if the heating elements depicted in Morgan’s Figures 7 and 8 are considered *not* “proximal to the center” of Morgan’s outer housing, limitation 27[c] would have been obvious based on Morgan alone and a POSA’s knowledge, and in the alternative, further in view of Adams.

As the ’123 patent admits, it was long understood that “[s]election of...resistance heating elements can be a matter of design choice, and will be readily apparent to one skilled in the art of design and manufacture of electrical resistance heating systems.” ’123 patent 29:32-50; *see also* Adams ¶ 4 (“The heating system may also have a variety of configurations.”); Ex. 1009 at 5:22-67 (explaining that a POSA would choose an “appropriate heater” configuration taking into account “mechanical considerations—*e.g.*, ease of manufacture—and materials considerations—*e.g.*, the effect of the heater material on the composition of the flavor-containing substance.”), 8:23-40 (“Whatever heater design is used, it

is subject to several design criteria” including electrical characteristics, surface area, and ability to conduct heat to the tobacco rather than the surroundings); Deevi Decl. ¶ 144-145. Indeed, the industry had used many different heater configurations before October 2006, each having different advantages and disadvantages. *See, e.g.*, Morgan Figs. 3, 5, and 7; Ex. 1007 Fig. 7; Ex. 1006 Fig. 1; Ex. 1008 Figs. 1, 3, 6; Ex. 1013 Figs. 3-14; Ex. 1014 Figs. 3, 12-23; Ex. 1026 Figs. 3-4, 13-14; Deevi Decl. ¶¶ 115-116, 148-151.

Making such a design choice, a POSA could have, and would have, implemented a heating element with an elongated portion proximal to the center of Morgan’s outer housing to obtain the many practical benefits over heaters on or near the periphery, including:

- little or no heat-induced release of undesirable flavors from the wrapping paper (Ex. 1016 at 3, explaining “there is no off-taste from paper” when using a heater located proximal to the center because it does not burn the paper or cause pyrolysis);
- reduced aerosol condensation on the inside of the device (Ex. 1016, explaining that locating the heater proximal to the center “eliminate[es] smoke condensation inside the article”);
- less heat lost through the device’s housing, and therefore lower power consumption and longer battery life (Ex. 1015 at 3, explaining that heaters

on the periphery “inevitably cause[] heat emission to the outside of the heater unit 221, resulting in a low thermal efficiency”); and

- reduced need for insulation and therefore allowing for a less-bulky device (Ex. 1015 at 3, 5).

Deevi Decl. ¶¶ 115-128, 148-151 (also discussing Ex. 1026 at 2:60-67).

To be sure, the industry had positioned heaters proximal to the center long before the putative date of invention. In 1994, for example, Philip Morris developed a centrally located bullet-shaped heater that inserted into a tobacco segment as shown below:

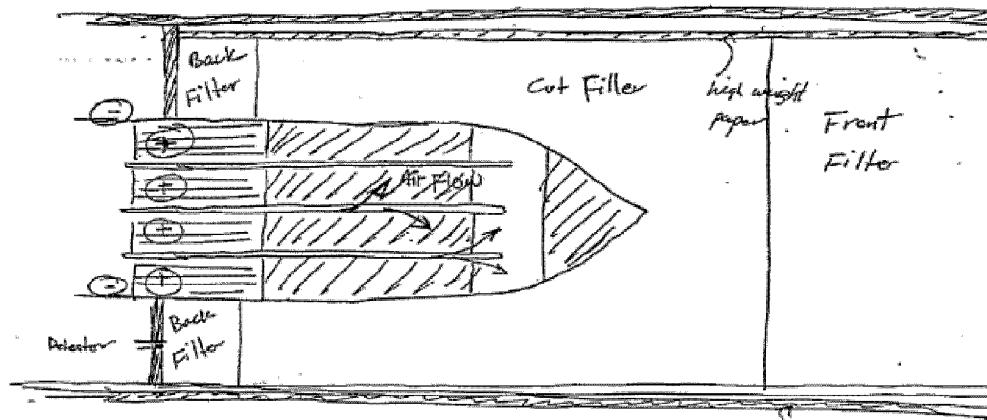


Fig. 2. Schematic of a heater with cut filler outer sleeve

Ex. 1016 Fig. 2, ¶¶ 1, 5, 8 (May 1994 Invention Record, made publicly available no later than 2002); Deevi Decl. ¶¶ 118-122, 150-151. This heater was “a metallic tube that is tapered on one end with a solid [and] sharp head.” Ex. 1016 ¶ 8. A POSA would “not have difficulty” making such a heater because all the steps were

similar to those for existing heaters. *Id.*; Deevi Decl. ¶¶ 116-122, 144-151. This heater, with its 6 or 8 heating blades, operated like the heaters described in Morgan, in that each heater blade was sequentially actuated (*e.g.*, one blade heated with each puff), heating only one portion of the inserted cigarette-type device at a time. *See* Deevi Decl. ¶¶ 97-108, 118-123, 148-151; Morgan 1:32-36, 5:18-25.

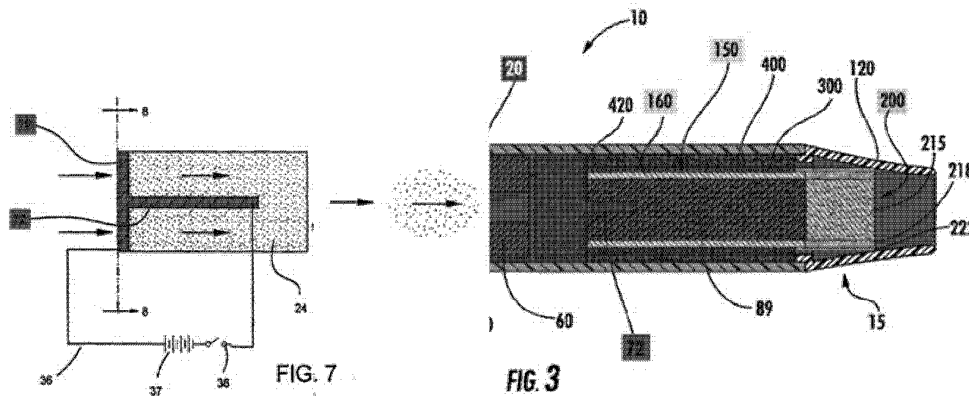
As mentioned above, a POSA would have been motivated to make this design choice for many different reasons. For example, surrounding the tobacco with heating elements is inefficient compared to positioning the heaters proximal to the center because much of the heat dissipates to and through the outer housing instead of into the tobacco, wasting battery power. Ex. 1015 at 3 (such heaters “inevitably causes heat emission to the outside of the heater unit 221, resulting in a low thermal efficiency”); Ex. 1020 (October 1988 Invention Record, made publicly available not later than 2002). For similar reasons, heaters proximal to the center also reduce the amount of insulation needed to maintain a comfortable exterior temperature, allowing the device to be slimmer—more like a conventional cigarette—allowing consumers to comfortably hold the device between their fingers. Ex. 1015 at 3, 5. Deevi Decl. ¶¶ 117-119, 124-127, 148-151.

And because the heaters are separated from the wrapping paper by tobacco, the wrapping paper stays at a lower temperature and undergoes less heat-related

degradation (pyrolysis), reducing or eliminating the concomitant release of undesirable flavors from the paper. Ex. 1016 at 3; Deevi Decl. ¶¶ 122.

In addition and in the alternative, a POSA would have also been motivated to make an even simpler heater with just one elongated portion positioned proximal to the center of the housing, such as that taught by Adams (Ex. 1007). A POSA would have been motivated to use Adams' simpler heater because it would be less expensive to manufacture, more durable, easier to clean, and because it would have less friction with the cigarette-type device, easier to insert. Ex. 1015 at 3, 5; Deevi Decl. ¶¶ 114-128.

Specifically, Adams' "projection 72" is an elongated portion of heater 70 extending downstream and centrally positioned inside of Adams' device, as illustrated in Adams' Figure 7:



Compare Adams, Fig. 7 with '123 Patent Fig. 3 (element 72 in both). Adams' projection 72 is a "rod constructed and arranged so that it can be inserted into and received by the tobacco plug," just like the extended portion of the '123 patent's

heater 72. Adams ¶ 45 (“sufficient heat” generated by the elongated portion alone), Abstract, Claims 6, 11; Deevi Decl. ¶¶ 115, 149.

In addition to the advantages listed above, a single-pronged heater presented many additional advantages that would have motivated a POSA to forgo the more complicated heaters, such as the bullet heater above or those in Morgan. “A given course of action often has simultaneous advantages and disadvantages,” and POSAs often make such design tradeoffs. *Allied Erecting v. Genesis Attachments*, 825 F.3d 1373, 1381 (Fed. Cir. 2016).

Relevant here, a POSA would have understood that a single-prong heater would be less expensive to manufacture than a multi-blade heater because it “eliminat[es] unnecessary components so as to reduce manufacturing cost and improve user convenience.” Ex. 1015 at 3, 5 (reduced manufacturing costs reduce prices for consumers). In addition, a POSA would have understood that a single larger centralized heater as in Adams would be, all else being equal, stronger and more durable than one with many thin blades and more complicated electrical connections. Deevi Decl. ¶¶ 123-127, 148-151; Ex. 1026 at 2:60-67 (also explaining that a heater should be strong enough to avoid “mechanical weakening and possible failure due to stresses induced by inserting and removing the cylindrical tobacco medium.”). Further, the smaller surface area would impose less

friction when inserting and removing the cigarette-like device, further increasing durability and longevity. Deevi Decl. ¶¶ 116, 123-124, 148-151.

Accordingly, a POSA would have been motivated to implement Morgan with a heater positioned proximal to the center of the outer housing, in view of the POSA's background knowledge alone or Adams in particular, to realize the many advantages discussed above. Deevi Decl. ¶¶ 128, 151.

5. Limitation 27[d]: controller

Claim 27 next recites, “a controller within the tubular outer housing and adapted for regulating current flow through the electrical resistance heater.”

Morgan teaches the claimed controller because Morgan's control circuitry and sensors regulate current flow to its heaters. *See* Claim Construction section above; Ex. 1025 at 3 (Patent Owner accusing “a microcontroller [that] controls current flow through the heating blade”); Deevi Decl. ¶¶ 130-131, 152-161.

Specifically, Morgan discloses a control circuit 24 within the tubular outer housing of its smoking article. *See* Morgan Fig. 2 (item 24). Morgan's “heating elements” are “energized under the control of control circuit 24, which is in turn actuated by pushbutton 25 or by a puff-actuated sensor.” Morgan 4:48-67, Fig. 2 (item 24); Deevi Decl. ¶¶ 152-157.

To describe “suitable control circuitry,” Morgan incorporates by reference the application that issued as Counts-671 (Ex. 1009). Morgan 3:13-25 (“Suitable

control circuitry is described in above-incorporated copending, [Counts-671].”); *see also* Morgan 1:15-41 (describing Counts-671’s controller), 4:62-67 (also referring to Counts-671). Like the controllers described in the ’123 patent, Morgan (via its incorporation of Counts-671) describes in detail a “control circuit 32... [that] applies current to the selected heater for a predetermined duration that is long enough to produce sufficient flavor-containing substance for an average puff, but not so long that the charge of flavor generating medium can begin to burn.” Ex. 1009 at 10:20-12:27, Figure 10; *see also* id. 1:28-41, 2:44-49, 4:44-5:29; Deevi Decl. ¶¶ 156-157; ’123 patent 30:33-32:35 (describing circuits with similar functionality).

If the “controller” term of limitation 27[d] invokes 35 U.S.C. § 112, ¶ 6 (and even if it does not), Brooks teaches the “controller” term. The ’123 patent admits that Brooks teaches a suitable structure for performing the “controller” term’s recited function. *See* Background and Claim Construction sections above; ’123 patent at 20:43-67 (“[r]epresentative types of electronic control components” and “sensing mechanism components” are disclosed in Brooks).

Brooks teaches “control circuits and related wiring for preferred controllers” for smoking articles “employ[ing] an electrical resistance heating element and an electrical power source to produce a tobacco flavored smoke or aerosol.” Brooks 1:6-10, 7:5-7, 12:39-16:31 (describing the Figure 9 and 10 circuits in detail), Figs.

9 and 10. Brooks’s controllers also regulate current flow through heaters. Brooks 12:41-46 (“[T]he circuit of FIG. 9 includes a power source 34, the electrical resistance heating element 18, a current actuation mechanism 28, and a preferred current regulating circuit or means for controlling the passage of current through the resistance element during periods of current actuation.”); Deevi Decl. ¶¶ 158-161; Claim Construction section above.

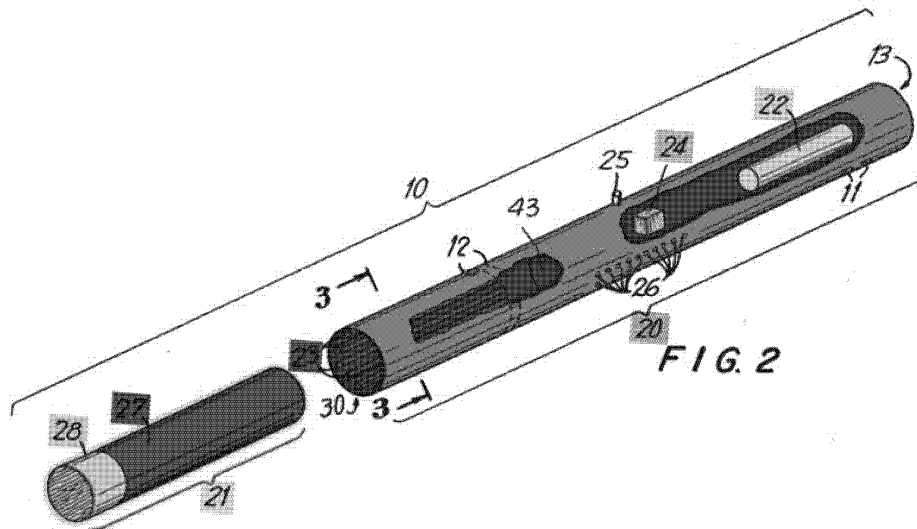
Furthermore, A POSA would have been motivated to use Brooks’s controller when implementing Morgan to achieve the “accurate and sophisticated current actuation and current regulati[on]” that Brooks describes. Brooks 4:50-57; Deevi Decl. ¶¶ 130-131, 158-161. For example, Brooks discloses a smoking article that—with its “controller” comprising “a pressure sensitive switch 28, a current control circuit 30” (like that in Brooks’s Figure 10), and “a battery power supply”—can produce “[v]isible aerosol ... on all puffs for 12 consecutive puffs” and illuminate an “indicator light” “during each puff period.” *Id.* 20:55-58, 21:6-7, 21:38-41 (Example 4, “Assembly of the Controller”).

6. Limitation 27[e]: removably engaged cigarette-type device

Claim 27 next recites, “a cigarette-type device removably engaged with the mouth-end of the tubular outer housing and comprising a tobacco segment circumscribed by a wrapping material and comprising a tobacco material and an

aerosol-forming material.” Morgan discloses this limitation for the reasons that follow.

Morgan discloses “a cigarette-type device,” namely disposable portion 21:



Morgan Fig. 2. Disposable portion 21 includes a flavor segment 27 comprising a processed tobacco material and “an aerosol precursor such as glycerine,” a filter 28, and a wrapping material (“a plug wrap”), and provides the feel of a “conventional cigarette.” *Id.* 5:26-42; Ex. 2017 at 4:61-5:2, 8:47-55 (incorporated by reference into Morgan, explaining that portion 21 is wrapped with paper); Deevi Decl. ¶¶ 99, 162-164. Morgan’s disposable portion 21 is received in cavity 30 at the mouth end of Morgan’s permanent portion 20. Morgan 4:44-47, Figs. 1-2.

Morgan’s disposable portion includes a tobacco material and an aerosol-forming material: “[i]t is desirable to add an aerosol precursor to deliver tobacco flavor substance as an aerosol, so that when the consumer exhales the tobacco

flavor substance, the visible condensed aerosol may mimic the appearance of cigarette smoke.” *Id.* 5:42-46. Morgan also discloses that “[t]he parameters of [its] heaters are chosen to allow delivery of an effective amount of tobacco flavor substance—*e.g.*, an aerosol containing tobacco flavors—to the consumer,” *id.* 3:58-61, and Morgan’s claims require, among other things, “extruded tobacco material” (claim 10), “tobacco foam material” (claim 11), “open-cell [tobacco] foam” (claim 12), “tobacco” (claim 15), “aerosol-forming material” (claims 13-14, 16-19, 22-24), and “an aerosol comprising tobacco components” (claims 13 and 20), *id.* 8:27-68; Deevi Decl. ¶¶ 164-166.

In addition, Morgan’s cigarette-type device (disposable portion 21) is “removably engaged with the mouth-end of the tubular outer housing” of Morgan’s permanent portion 20 for multiple reasons, even if the term is more narrowly construed than set forth in the Claim Construction section above.

First, Morgan’s cigarette can be positioned within and removed from the mouth-end of that outer housing. Morgan Figs. 1-2; 3:9-37, 4:43-47 (Morgan’s “removable disposable portion 21” is inserted and removed from “a cavity 30 at the mouth end” of the device); Deevi Decl. ¶¶ 97-100, 162-166. Morgan’s cigarette (disposable portion 21) has a length that “is preferably such that some part of filter segment 28 protrudes from cavity 30 to aid removal of spent portions.” *Id.* 5:47-68. Morgan’s “removable portion” is “substantially cylindrical” and its “protruding

end” “provid[es] a grip for [the] smoker for insertion and removal of [the removable] portion,” or alternatively, the user may use Morgan’s “ejection system” to remove the cigarette from the device. *Id.* 5:65-6:2, 7:55-62 (claims 3 and 4). Thus, Morgan’s removable disposable portion 21 is “removably engaged” with Morgan’s tubular housing (permanent portion 20). Deevi Decl. ¶¶ 164-166; *see also* Claim Construction above; Ex. 1025 at 4-6.

Second, a POSA reading Morgan would understand that its cigarette (disposable portion 21) snugly fits inside of the mouth-end of the housing and does not disengage under normal use, thus requiring the user to grasp the cigarette or use the aforementioned ejection system. Further, when discussing its embodiments with peripheral heaters, Morgan explains that the diameter of its cigarette is “at most equal to the inner diameter of cavity 30, and should be at least somewhat greater than the diameter of the cylindrical space between heating elements 23” to provide good thermal contact and securely engage the cigarette in the device. Morgan 5:47-54. A POSA would have further understood that embodiments using the heaters shown in Morgan’s Figures 7 and 8, which “actually pierce and extend into disposable portion 21 to provide the desired intimate thermal contact” (Morgan 6:46-63), also fit snugly into the cavity at the end of the tubular outer housing to help ensure the cigarette is inserted squarely and not inadvertently disengaged during use. Deevi Decl. ¶¶ 165-166.

Third, Morgan's cigarette (disposable portion 21) is further engaged by the elongated portions of its heater(s) which is(are) inserted into the disposable portion when the cigarette is inserted into the mouth end of Morgan's housing, as explained herein with respect to limitations 27[c] and 27[f]. Deevi Decl. ¶¶ 165-167 (explaining that friction from the heater and the heater expanding the cigarette against the inner walls of the outer housing secure the cigarette inside the device).

Fourth, to the extent Patent Owner contends the above is insufficient (and even if Patent Owner does not), it would have been obvious to add a removably attached mouthpiece to Morgan, supporting the cigarette's filter and ensuring the cigarette does not become inadvertently disengaged. Doing so was well-known in the art. For example, Adams (Ex. 1007) teaches a "mouthpiece 60 [that] include[s] a generally cylindrical shell 62 and an attachment sheath 64." Adams ¶ 42; *see also* Ex. 1012 at Figs. 1, 3, 5, 3:61-63 ("In addition, mouthpiece 113 can optionally be included.); Counts-962 Figs. 3, 6. "[S]heath 64 extends beyond the end of the shell 62 and into an opening within the heating assembly 22," such that "the combination of the smoking system 20 and the mouthpiece 60 cosmetically resembles a conventional cigarette." Adams ¶ 43. "[T]he sheath may be fabricated from a sufficiently rigid material [such] that the mouthpiece can be **removably attached** to the smoking system 20 by inserting the extending portion of the sheath 64 between the heating assembly 22 and the tobacco plug 24." Adams ¶¶ 168-171.

Thus, Adams, like the '123 patent, recognized that a mouthpiece can “act as a support for the filter element 200 of the cigarette 150, and can be removably attached to the outer housing 20 of the smoking article,” thus locking the cigarette into the device until the mouthpiece is removed. '123 patent 27:2-15; 29:29-32; Adams ¶ 42; Deevi Decl. ¶¶ 162-172. In addition to providing additional support and helping to ensure the cigarette (Morgan’s disposable portion) does not disengage during use, a POSA would have been motivated to add a mouthpiece to Morgan to provide an additional “cooling region” for vapor cooling and aerosol formation, improving the user’s experience and reducing the likelihood of a consumer being burned or experiencing unpleasantly overheated aerosols. Adams ¶ 5; Deevi Decl. ¶¶ 167-171.

Further, as evidenced by their admitted use in electrically-powered smoking articles available before the '123 patent’s earliest claimed priority date, POSAs understood that such mouthpieces were preferred by some consumers. '123 patent 24:3-18 (admitted prior art using mouth-end pieces). Indeed, consumers had long placed them on conventional cigarettes for reasons of personal preference:



Deevi Decl. ¶¶ 171-172; Ex. 1030 (website selling cigarette mouthpieces as a fashion accessory and to provide a “cooler draw”). Accordingly, it would have been obvious to add a “removably attached” mouthpiece to Morgan’s smoking article, and a POSA would have reasonably expected to succeed in making this well-known and predictable physical modification that also locks the cigarette into place. See Deevi Decl. ¶¶ 162-172.

7. Limitation 27[f]: elongated heater portion extends into tobacco segment

Claim 27 next recites, “wherein the elongated portion of the resistance heating element extends into the tobacco segment when the cigarette-type device is

engaged with the mouth-end of the outer housing.” Morgan discloses this limitation.

Specifically, the elongated portions of the heating elements illustrated in Morgan’s Figures 7 and 8 extend downstream toward the mouth-end of Morgan’s permanent portion 20, and have a “sharper ‘V’ tip” to “pierce and extend into disposable portion 21.” *See* Morgan Figs. 7-8; *id.* 6:46-52. Thus, when Morgan’s disposable portion 21 is engaged with the mouth-end of permanent portion 20, the Figure 7 and 8 heating elements will extend into the tobacco segment (flavor segment 27) of Morgan’s disposable portion 21. Morgan 5:26-37, 4:44-47, Figs. 2, 7-8; Deevi Decl. ¶¶ 173-174; Element 27[c] above.

Furthermore, if Morgan’s heating elements were modified and moved closer to the center of permanent portion 20, the resulting heating element portion(s) would remain elongated and still extend downstream into flavor segment 27. For example, Adams’ “projection 72” heater extends downstream and is “inserted into and received by” the flavor segment of Morgan’s disposable portion 21. *See* Adams Fig. 7, ¶ 45; Deevi Decl. ¶¶ 145-151, 173-174; Limitation 27[c] above.

8. Limitation 27[g]: visible mainstream aerosol

The final limitation of Claim 27 recites, “such that during draw, aerosol-forming material can be volatilized to produce a visible mainstream aerosol incorporating tobacco components or tobacco-derived components that can be

drawn into the mouth of the user of the smoking article.” Morgan discloses this limitation. Deevi Decl. ¶¶ 70-76, 164, 175-176.

Morgan’s preferred flavor segment 27 contains a “tobacco product” and “an aerosol precursor such as glycerine.” Morgan 5:35-42. As noted in the state of the art section above, by 1998, glycerol (*i.e.*, Morgan’s “glycerine”) already had “a long history of use in the tobacco industry,” because it could (and can) be vaporized to carry volatile components of tobacco, such as nicotine, through electrically powered smoking articles to consumers. Ex. 1010 at 60, 122; Brooks 6:45-52; Ex. 1011 at 16:33-38; Deevi Decl. ¶¶ 164, 175-176; *see also* Ex. 1025 at 6 (Patent Owner’s infringement chart).

This is the precise use Morgan discloses for its “aerosol precursor such as glycerine,” explaining that “[i]t is desirable to add an aerosol precursor to deliver the tobacco flavor substance as an aerosol, so that when the consumer exhales the tobacco flavor substance, the visible condensed aerosol may mimic the appearance of cigarette smoke.” Morgan 5:42-46. The visible aerosol Morgan’s smoking article produces from its volatilized glycerol is drawn into the mouth of a consumer before it is exhaled. Ex. 1012 at 3:9-13 (“[F]lavor generating media can also include an aerosol-forming material, such as glycerine or water, so that the consumer has the perception of inhaling and exhaling ‘smoke’ as in a conventional cigarette.”); Deevi Decl. at ¶¶ 73-74, 164, 175-176; *see also* Limitation 27[d]

above (discussing Morgan’s and Brooks’s puff-actuated controllers that actuate heaters during draw).

* * *

For these reasons, claim 27 would have been obvious over Morgan, alone or with Adams and Brooks.

E. Claims 28-30

Claims 28-30 of the ’123 patent would have been rendered obvious by Morgan, alone or with Adams and Brooks, for the same reasons as independent claim 27, and as further discussed below.

Claim 28 further recites, “wherein the cigarette-type device further comprises a filter element downstream from the tobacco segment.” As explained with respect to claim 27, Morgan’s disposable portion 21 includes filter segment 28, which is downstream from flavor segment 27 (the tobacco segment). *See* Morgan 5:26-35, Fig. 2; Deevi Decl. ¶¶ 177-178.

Claim 29 recites, “further comprising an actuation mechanism in the form of a switching mechanism that can be manually operated by the user in order to heat the cigarette-type device.” Morgan and Brooks both disclose that their heaters can be energized by “the depression of a manual switch” and “in response to manual actuation.” *See* Morgan 1:26-32 (“disposable heater/flavor unit is mated to a more or less permanent unit containing a source of electrical energy such as a battery or

capacitor, as well as control circuitry to actuate the heating elements in response to a puff by a smoker on the article or the **depression of a manual switch**”), 3:13-20 (“control circuitry ... energiz[es] the heaters in an appropriate sequence, **in response to manual actuation**”); Brooks 12:47-57; Deevi Decl. ¶¶ 179-182.

Claim 30 recites “wherein the electrical resistance heating element provides surface region temperatures of at least 200° C and less than 600° C such that the tobacco material does not burn during use.” Morgan discloses this. Its “tobacco flavor media are **heated but not burned** to release tobacco flavors,” and “in order to achieve such delivery, the heaters should be able to reach a **temperature of between about 150° C and about 500° C** when in contact with the tobacco flavor medium.” *Id.* 1:11-13, 3:65-68; Deevi Decl. ¶¶ 183-188 (also explaining that the claimed range encompasses temperatures that have long been used to heat but not burn tobacco); Brooks 9:56-10:12 (using temperatures “often above 200° C” but not “substantially in excess of 550° C”); Ex. 1021 (explaining that heat-not-burn is an old idea); Counts-962 at 3:58-61, 4:1-2 (Ex. 1008).

Morgan’s values disclose the claimed ranges because a species (*i.e.*, single value in a range) anticipates a genus (*i.e.*, the range of values). *King Pharms., Inc. v. Eon Labs, Inc.*, 616 F.3d 1267, 1277 (Fed. Cir. 2012) (“It is an elementary principle of patent law that when, as by a recitation of ranges or otherwise, a claim covers several compositions, the claim is ‘anticipated’ if one of them is in the prior

art.” (citation omitted)); *In re Peterson*, 315 F.3d 1325, 1329 (Fed. Cir. 2003) (“even a slight overlap in range” presumptively teaches the claim element). Even if viewed as merely overlapping, this creates “a presumption of obviousness.” *E.I. DuPont de Nemours & Co. v. Synvina C.V.*, 904 F.3d 996, 1006 (Fed. Cir. 2018).

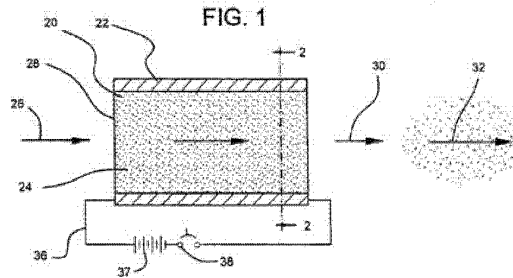
To rebut that presumption, Patent Owner would need to show that the claimed range is critical, such as by showing that values in the range achieves unexpected results relative to the prior-art range, or that the art taught away from the claimed range. *Id.* at 1006-1007. Here, there is not a slight overlap, but nearly complete overlap, and the prior art is replete with examples within the claimed range. Deevi Decl. ¶¶ 183-188, 249-253. Accordingly, the claimed range fails to bestow patentability.

VI. Ground 2: Claims 27-30 are Unpatentable Over Adams (Ex. 1007), Morgan (Ex. 1005), and Brooks (Ex. 1006)

The challenged claims are also unpatentable under § 103 over Adams in view of Morgan and Brooks. All of these references were discussed in Ground 1, but this ground differs in that it starts with Adams as the base reference.

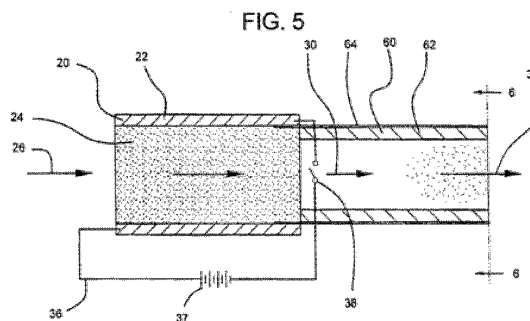
Like Morgan, Adams teaches an electrical smoking system that “generates an aerosol through conductive and/or convective combustionless heating of tobacco by an electrical heating source.” Adams ¶ 1; Deevi Decl. ¶¶ 101-108, 197-200. As shown in Fig. 1 below, Adams’ smoking system 20 includes “a heating system 22” and a “tobacco plug 24,” which may contain “tobacco” and an “aerosol

former,” such as “glycerol,” and can be wrapped in “a paper or mesh cover or carrier to facilitate handling”:



Id. Fig. 1, ¶¶ 23-24, 32; Deevi Decl. ¶¶ 101-108, 189-196, 203, 225-229.

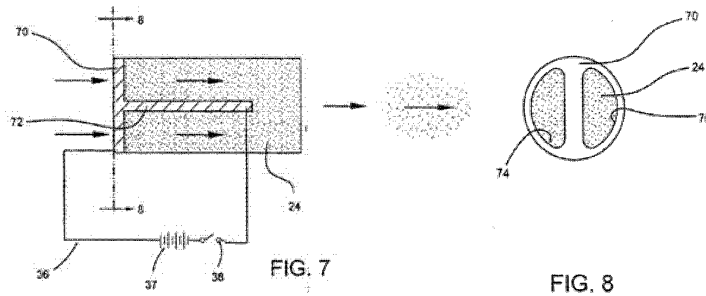
Furthermore, as shown in Fig. 5 below, Adams’ smoking system “may also include a mouthpiece 60 ... having an end in fluid communication with the tobacco mass”:



Adams Fig. 5, ¶ 42. Sheath 64 “removably attaches” the mouthpiece to the tobacco plug 24 such that “the combination of the smoking system 20 and the mouthpiece 60 cosmetically resembles a conventional cigarette.” *Id.* ¶¶ 42-43. Mouthpiece 60 may include “a suitable filter (not shown) such as a plug of cellulose acetate in the discharge end of the mouthpiece 60.” *Id.* ¶ 44; Deevi Decl. ¶¶ 101-108, 189-196.

Adams' heating assembly 22 can be configured as shown in Figs. 7 and 8

below:



Adams Figs. 7-8, ¶ 45. “In this embodiment, the heating assembly includes an end piece 70 and a projection 72.” *Id.* ¶ 45. End piece 70 has “openings 74, 76 through which air can be introduced into the tobacco plug 24.” *Id.* Adams discloses that “a cylindrical shell may surround . . . the tobacco plug along with the end piece 70.” *Id.* ¶ 47; Deevi Decl. ¶¶ 101-108, 189-196.

The following modified figure illustrates use of the heating assembly 72 of Adams' Figure 7 in Adams' Fig. 5 heater arrangement with the removably attached mouthpiece:

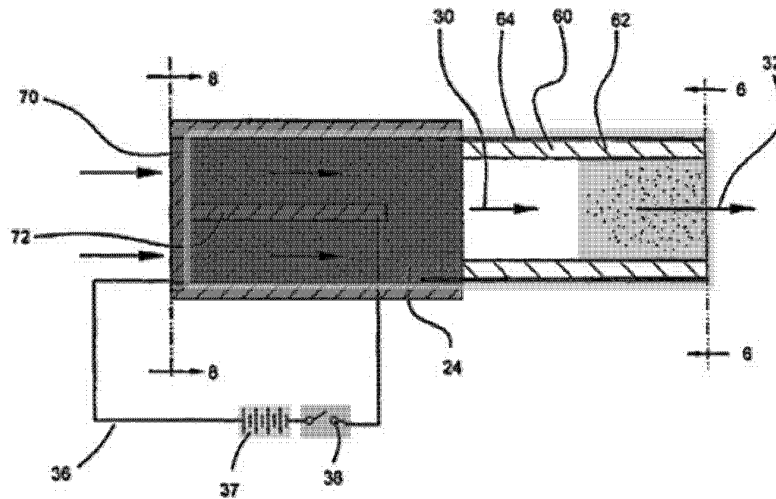


Fig. 5 with heating assembly of Fig. 7

Deevi Decl. ¶¶ 101-108, 189-196. As discussed more below, in the context of the challenged claims, Adams’ smoking article includes a tubular outer housing (gray), a battery (green), an electrical resistance heater (red), a controller (orange), and a cigarette-type device (light blue) comprising a tobacco plug (brown) and a mouthpiece with a filter (pink). One of ordinary skill in the art would understand that Adams’ diagram is not intended to show the details of the housing, power source, or controller, and in implementing Adams’ teachings, would turn to references such as Morgan (and Brooks) that provide such details.

Adams also discloses use of “a push-button switch,” and that to heat but not burn tobacco, the heating assembly is operated “in the range of about 150° to about 220° C.” Adams ¶¶ 27-28; Deevi Decl. ¶¶ 101-108, 189-196, 244-245. Also, if the

Board determines that the “controller” term invokes 35 U.S.C. § 112, this ground looks to Brooks for similar reasons as in Ground 1 above.

1. Preamble

Independent claim 27 recites, “An electrically-powered, aerosol-generating smoking article comprising.” To the extent Patent Owner contends this preamble is limiting, Adams discloses it. Adams’ “electrically operated tobacco smoking system...release[s] flavorful volatiles without reaching the tobacco kindling temperature and without generating smoke and/or ash.” Adams ¶¶ 23, 28; Deevi Decl. ¶¶ 197-200. Adams also discloses the use of “aerosol formers.” *See, e.g.*, Adams ¶ 32; Deevi Decl. ¶¶ 197-200, 225-229.

2. Limitation 27[a]: an electrical power source

Claim 27 further recites, “an electrical power source in the form of a battery within a tubular outer housing having a mouth-end and an end distal to the mouth-end.”

Adams discloses using “batteries 37.” Adams ¶¶ 27, 45. Adams shows the battery in an electrical diagram (*e.g.*, Fig. 7), and leaves it to the POSA to find a suitable location for the battery. Deevi Decl. ¶¶ 201-208. Likewise, Adams discloses the claimed “tubular outer housing,” but leaves the implementation details to the POSA: it teaches that “a cylindrical shell may surround...the tobacco plug along with the end piece 70.” Adams ¶ 47; Fig. 5 modified above. Adams’

“mouth-end” is the end of the cylindrical shell from which mouthpiece 60 extends. The “end distal to the mouth-end” is the opposite end of the cylindrical shell. *See* Deevi Decl. ¶¶ 202-204.

For the battery’s location, a POSA would have had just two options—either inside or outside the device’s outer housing. Deevi Decl. ¶¶ 204-206; *see also* *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 421 (2007) (“When there is a design need or market pressure to solve a problem and there are a finite number of identified, predictable solutions, a person of ordinary skill has good reason to pursue the known options within his or her technical grasp.”). A POSA would have been motivated to position the battery inside the device’s housing, as taught by Morgan, to achieve Adams’ objective of “cosmetically resembl[ing] a conventional cigarette,” and to improve user convenience and increase durability by reducing the risk of damage to the battery and cut, tangled, or otherwise damaged wiring. Adams ¶ 43; Deevi Decl. ¶¶ 204-208; Morgan Fig. 2 (battery 22 inside housing), 4:44-50; *see also* Ground 1, limitation 27[b] above.

Such an arrangement was long known in the art. Deevi Decl. ¶¶ 206-208; *see also, e.g.*, Ex. 1012 at Figs. 2-6, 9:1-27 (battery 121 inside of outer housing); Ex. 1022 at Fig. 2 (battery 22 inside of outer housing); Ex. 1008 at Figs. 1-3, 6 (battery 16 inside of outer housing). Notably, Morgan, like Adams, provides a tubular, cigarette-like form factor. Deevi Decl. ¶ 206; Morgan 4:67-5:1 (“Portion 20

is preferably covered by cigarette wrapping paper 31, to give it the appearance of a conventional cigarette.”); Adams ¶ 43.

Accordingly, this claim element would have been obvious over Adams and Morgan.

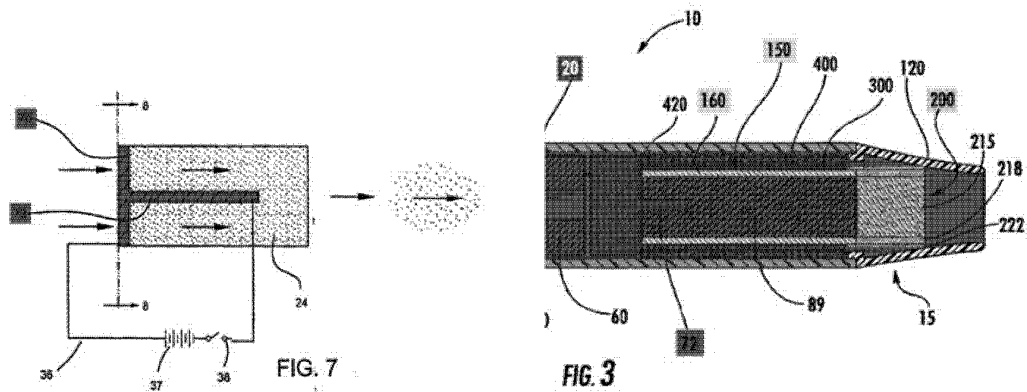
3. Limitation 27[b]: at least one electrical resistance heater

Claim 27 next recites “at least one electrical resistance heater powered by said electrical power source.”

Adams discloses this limitation. Its “end piece 70 and the projection 72 may be energized to generate heat, *e.g.*, by resistance heating[.]” Adams ¶ 45. Adams also teaches that “[a] suitable conductor 36 connects the batteries 37, the switch 38, and the heating system 22 in series.” Adams ¶ 27; Deevi Decl. ¶¶ 203, 209-211; *see also* Ground 1, Limitations 27[b], [c].

4. Limitation 27[c]: elongated portion of resistance heating element

As explained in Ground 1, Adams discloses a resistance heating element with an elongated portion that extends downstream and is positioned proximal to the center of the outer housing as required by the claims and shown in Figure 3 of the ’123 patent:



Compare Adams, Fig. 7 with '123 Patent Fig. 3 (element 72 in both). Adams' "projection 72" heater is an elongated portion of its heating element that extends downstream and is positioned proximal to the center of Adams' outer housing. See Adams Fig. 7; see also Ground 1, limitation 27[c] above, Deevi Decl. ¶¶ 140-151, 209-211.

5. Limitation 27[d]: controller

Claim 27 next recites, "a controller within the tubular outer housing and adapted for regulating current flow through the electrical resistance heater."

Adams discloses a controller as part of its "actuation system" that "is operable to electrically energize [its] heating system 22." Adams ¶ 27. Specifically, Adams' actuation system includes a switch 38 that regulates current flow to the heater: when the switch is open, current will not flow to the heater, and this switch may be manually operated, puff-actuated, or flow-actuated, or controlled by a timer. Adams ¶¶ 27, 30-31, 44-45; Deevi Decl. ¶¶ 212-216.

For the controller’s location, a POSA had only two options—either inside or outside the device’s outer housing. Deevi Decl. ¶¶ 217-222; *KSR*, 550 U.S. at 421 (explaining a POSA “has good reason to pursue the known options within his or her technical grasp.”). A POSA would have been motivated to position the controller inside the device’s housing, as taught by Morgan, to achieve Adams’ (and Morgan’s) objective of “cosmetically resembl[ing] a conventional cigarette,” to improve user convenience, and to increase durability by reducing the risk of damage to the controller and cut, tangled, or otherwise damaged wiring. Adams ¶ 43; Deevi Decl. ¶¶ 217-222; Morgan Fig. 2 (controller 24 inside housing); *see also* Ground 1, limitation 27[d] above.

Such an arrangement was long known. Ex. 1012 at Figs. 4 and 6 (control circuit 32 inside of outer housing); Ex. 1022 at Fig. 2 (control circuit 24 inside of outer housing); Ex. 1008 at Figs. 7 and 9 (control circuit 46/98 inside of outer housing); Deevi Decl. ¶¶ 217-222. Notably, Morgan, like Adams, provides a tubular, cigarette-like form factor. Morgan 4:67-5:1; Adams ¶ 43. In addition, Morgan describes a suitable manual-, timer-, and puff-actuated controller. *See* Ground 1, limitation 27[d] above; Deevi Decl. ¶¶ 217-222.

If the “controller” term of limitation 27[d] invokes 35 U.S.C. § 112, ¶ 6 (and even if it does not), Brooks teaches this claim element for the same reasons discussed above in Ground 1. A POSA would have been motivated to adapt a

Brooks controller for use in Adams for the same reasons too, *e.g.*, to achieve the “accurate and sophisticated current actuation and current regulati[on]” Brooks describes. Brooks 4:50-57; Deevi Decl. ¶¶ 130-131, 158-161, 222.

6. Limitation 27[e]: removably engaged cigarette-type device

Claim 27 next recites, “a cigarette-type device removably engaged with the mouth-end of the tubular outer housing and comprising a tobacco segment circumscribed by a wrapping material and comprising a tobacco material and an aerosol-forming material.” Adams and Morgan disclose this limitation.

Adams discloses the claimed “cigarette-type device” as shown in Figure 5 below, which has been modified to use the heating assembly of Figure 7:

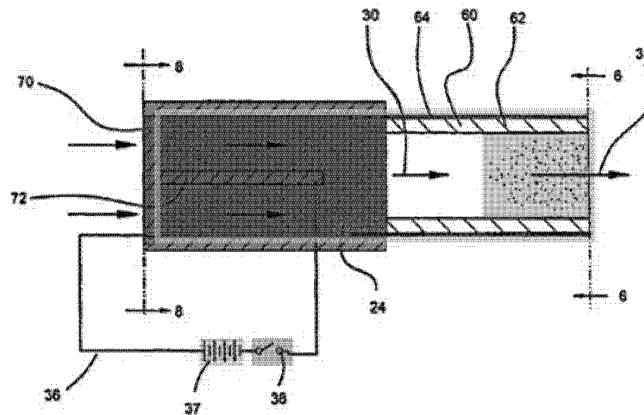


Fig. 5 with heating assembly of Fig. 7

Adams Figs. 5, 7; Deevi Decl. ¶¶ 192-196, 223-231. The cigarette-type device circled in light blue—which is also depicted in Adams’ unmodified Figure 5—comprises a tobacco plug 24 and optionally a mouthpiece 60 with an attachment

sheath 64 that removably attaches the mouthpiece to the tobacco plug 24 so that “the combination of the smoking system 20 and the mouthpiece 60 cosmetically resembles a conventional cigarette.” *Id.* ¶¶ 42-43; Deevi Decl. ¶¶ 223-226.

Adams’ tobacco plug itself corresponds to the claimed cigarette-type device even when the optional mouthpiece is not used or taken into account. Adams’ tobacco plug is cylindrical and held together with wrapping paper, just like a conventional unfiltered cigarette: it “may include a paper...carrier to facilitate handling.” Adams ¶ 24; *see also id.* ¶ 2 (“The heated tobacco may have a variety of shapes including without limitation ... **a cigarette shape**”). Adams further explains that “[t]he particular shape of the tobacco mass is preferably adapted to the shape of the heating apparatus” and that “the [wrapping] paper” around that insert “needs to have sufficient strength to maintain integrity of the tobacco plug during handling, removal, and insertion.” *Id.* ¶¶ 24, 26; Deevi Decl. ¶¶ 227-229.

Adams’ tobacco plug also comprises a tobacco material and an aerosol-forming material. For example, the tobacco plug 24 may be made of “cut filler tobacco” or “tobacco particles.” Adams ¶¶ 23-24. “[A]n aerosol former may be added to the tobacco plug 24” such as “glycerol, propylene glycol, triacetin, and the like, as well as mixtures thereof.” *Id.* ¶ 32; Deevi Decl. ¶¶ 227-229.

Adams’ cigarette-like device is also removably engaged with the mouth end of its tubular housing: “[a]fter the tobacco plug 24 has been used, it may be

removed from the heating system 22 and replaced with a fresh plug or cartridge.”

Adams ¶ 33. The tobacco plug is further engaged by the mouthpiece and the elongated portion of the heater which is inserted into the disposable portion, as explained above with respect to limitation 27[c] and further in limitation 27[f] below. The addition of Adams’ optional mouthpiece with integrated filter, which is also removably engaged, results in the filtered cigarette-type device as outlined above in light blue. Adams Abstract, ¶¶ 5 and 44 (filter in mouthpiece); *see also id.* at ¶¶ 42-44 (mouthpiece with sheath is removably attached). As in the ’123 patent, the cigarette-type device cannot be removed without removing the mouthpiece. Deevi Decl. ¶¶ 169-170, 225-229.

In addition, Morgan teaches the claimed cigarette-type device for the reasons described fully for this claim element in the Morgan ground. And a POSA would have been motivated to use Morgan’s cigarette-type device in Adams (in place of the portion outlined in blue above, including the mouthpiece) because it provides a convenient and familiar package, and its filter segment 28 has a desirable appearance and gives the article “a ‘mouth feel’ similar to a conventional cigarette” desired by consumers. Morgan 5:25-33; Deevi Decl. ¶¶ 230-233 (explaining that a POSA would have expected the combination of Morgan’s cigarette-type device and Adams to properly function and have the advantages described above for

Morgan, *e.g.*, easier insertion and more durability than with Morgan's multiple-element design in Figures 7 and 8).

7. Limitation 27[f]: elongated heater portion extends into the tobacco segment

Adams discloses limitation 27[f]. The elongated "projection 72" portion of Adams' heater element extends into an inserted tobacco segment (tobacco plug 24). Adams Fig. 7, ¶ 45 ("The projection 72... can be inserted into and received by the tobacco plug 24.... [B]oth the end piece 70 and the projection 72 are capable of generating heat."); *see also* Ground 1, limitation 27[f] above; Deevi Decl. ¶¶ 173-174, 192-193, 234-236.

8. Limitation 27[g]: visible mainstream aerosol

Adams and Morgan disclose this limitation. Adams' tobacco plug 24 contains an "aerosol former" such as "glycerol," which is another name for glycerine, to form an aerosol with the tobacco-derived elements that is drawn into the user's mouth. Adams Abstract (tobacco volatiles are "condensed to form an inhalable aerosol"), ¶¶ 2, 5, 31-32 (added aerosol formers "enhance tobacco involvement in aerosol formation"), 39 (volatiles condense to form aerosol for delivery to consumer); Deevi Decl. ¶¶ 176, 227-228, 237-240.

A POSA would have understood that Adams' glycerine forms a visible condensed aerosol inhaled by the user. Morgan 5:42-46 (adding glycerine "so that when the consumer exhales the tobacco flavor substance, the visible condensed

aerosol may mimic the appearance of cigarette smoke.”); Deevi Decl. ¶¶ 227-228, 237-240. As the ’123 patent admitted, it was known that aerosol-forming materials produce “smoke-like” visible aerosols upon the application of heat. *See* ’123 patent 13:57-14:24. Conventional aerosol precursors, such as glycerol, were commonly used for this specific purpose. Ex. 1010 at 60, 122; Ex. 1012 at 3:9-13; Brooks 6:45-52; Ex. 1011 at 16:33-38; *see also* State of the Art section above; Deevi Decl. ¶¶ 175-176, 237-240. Also, as established above in Ground 1, this limitation is met by Morgan’s cigarette-type device.

* * *

For these reasons, claim 27 would have been obvious over Adams in combination with Morgan and Brooks.

B. Claims 28-30

Claims 28-30 of the ’123 patent would have been obvious over Adams in view of Morgan and Brooks for the same reasons claim 27 would have been obvious, and as further discussed below.

Claim 28 further recites, “wherein the cigarette-type device further comprises a filter element downstream from the tobacco segment.” As explained with respect to claim 27, Adams’ mouthpiece 60 may include a filter and Morgan’s cigarette-like device includes a filter. Adams ¶ 44; Deevi Decl. ¶¶ 241-243.

Claim 29 recites, “further comprising an actuation mechanism in the form of a switching mechanism that can be manually operated by the user in order to heat the cigarette-type device.” Adams discloses that “to control activation of the heating system 22, a suitable switch 38 may be connected in series with the batteries 37” and that “switch 38 may be a push-button switch.” Adams ¶ 27, Figs. 5, 7; Deevi Decl. ¶¶ 244-245.

Claim 30 recites, “wherein the electrical resistance heating element provides surface region temperatures of at least 200° C and less than 600° C such that the tobacco material does not burn during use.” Adams heats the tobacco to a temperature in the range “of about 150° to about 220° C to release flavorful volatiles without reaching the tobacco kindling temperature and without generating smoke and/or ash.” Adams ¶ 28. Adams does not explain its heater’s surface region temperatures, but a POSA would understand that the heaters are at least somewhat warmer than 150-220° C to transfer heat to the tobacco. Deevi Decl. 246-249. Morgan provides further guidance, explaining that its heaters in contact with the tobacco medium reach a temperature between 150° C and about 500° C to ensure that it heats, but does not burn, the tobacco. Morgan 1:11-13, 3:65-68; Deevi Decl. ¶¶ 248-253 (explaining that the claimed range encompasses temperatures that have long been used to heat but not burn tobacco); Brooks 9:56-10:12 (using

temperatures “often above 200° C” but not “substantially in excess of 550° C”); Counts-962 at 3:58-61.

The values in Adams and Morgan each disclose the claimed ranges because a species (*i.e.*, single value in a range) anticipates a genus (*i.e.*, the range of values). *King Pharms.*, 616 F.3d at 1277; *Peterson*, 315 F.3d at 1329 (“even a slight overlap in range” presumptively teaches the claim element). Even if viewed as merely overlapping, this creates “a presumption of obviousness.” *E.I. DuPont*, 904 F.3d at 1006. To rebut that presumption, Patent Owner will need to show that the claimed range is critical, such as by showing that values in the range achieves unexpected results relative to the prior-art range, or that the art taught away from the claimed range. *Id.* at 1006-1007. Here, Adams presents an overlapping range, Morgan provides nearly perfect overlap, and the prior art is replete with examples within the claimed range. Deevi Decl. ¶¶ 246-253. Accordingly, Adams in view of Morgan teaches and renders obvious the claimed range.

VII. Ground 3: Claims 27-30 are Unpatentable Over Counts-962, Alone or in Combination with Brooks

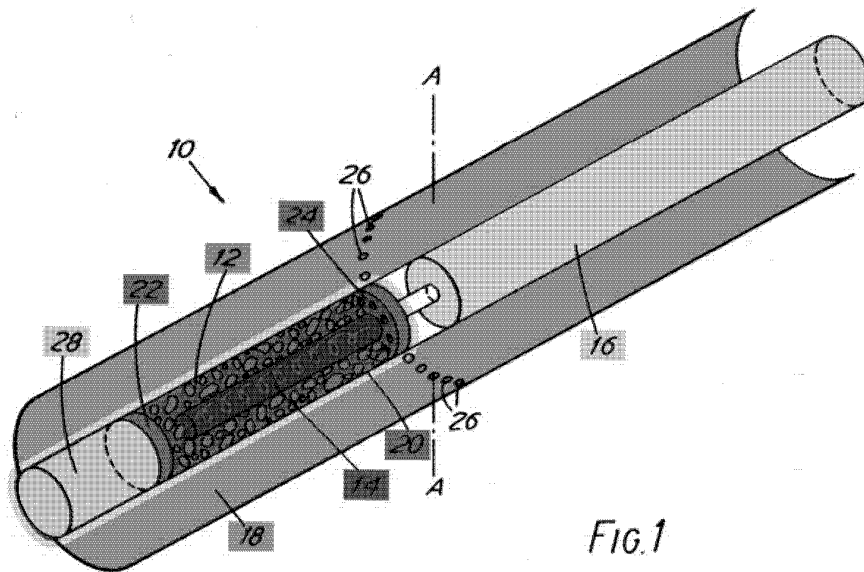
The challenged claims would have been obvious over Counts-962 alone.

Should the Board determine that the “controller” term invokes 35 U.S.C. § 112, this ground looks to Brooks for the same reasons explained in Ground 1.

A. Overview of Counts-962

Counts-962 issued on September 8, 1992 and is § 102(b) prior art. Counts-962 is cited on the '123 patent in the “extremely large number of references” the applicants submitted for the examiner’s consideration (Ex. 1002 at 142), but Counts-962 was not expressly considered by the examiner and is substantively different than Counts-525 (Ex. 1011), which was considered by the examiner during prosecution.

Counts-962 describes electrically powered smoking articles that “produce the taste and sensation of smoking without burning of tobacco,” such as the one shown below.



Counts-962 Fig. 1, 1:9-16, 1:26-31, 1:57-61. This smoking article 10 includes an “outer tube ... 18” (light gray above); “power source 16,” which “typically” consists of “rechargeable nickel cadmium (NiCd) batteries” (green); an elongated “heating element 14” (red), which extends downstream and is proximal to the center of the smoking article’s outer housing; a controller (disclosed, but not shown in Fig. 1); and a cigarette-type device (circled in light blue) comprising filter 28 (pink) and front and rear clips 22 and 24 and tube 20 (dark blue). *See id.* 3:16-29, 9:59-60, *see also id.* 4:34-46 (discussing Counts-962’s “control system”), 6:56-59 (describing Fig. 7, including “control circuit 46”), Fig. 7; Deevi Decl. ¶¶ 112, 255-256.

Counts-962’s smoking article is designed to “generate/release designed flavors, vapors, and aerosols” from a “[f]lavor-generating medium 12 [that] may

include tobacco or tobacco-derived materials” (brown, above). *Id.* 1:21-25, 4:1-2. It can also include a “power switch” (*id.* 7:16-17), and Counts-962’s “preferred temperature range” is 120-400° C with the “most preferred range” being 200-350°C. *Id.* 3:58-61, 4:1-2; Deevi Decl. ¶¶ 112, .

B. Claim 27

1. Preamble

Independent claim 27 recites, “An electrically-powered, aerosol-generating smoking article comprising.” To the extent Patent Owner contends that the preamble is limiting, Counts-962 discloses it.

Counts-962 describes “[s]moking articles utilizing electrical power,” which “generate/release designed flavors, vapors, and aerosols” (what Counts-962 refers to collectively as “flavor components”) to “produce the taste and sensation of smoking without burning of tobacco.” Counts-962 1:9-16, 1:21-31, 1:57-61, 6:15-22, Deevi Decl. ¶¶ 258-260.

2. Limitation 27[a]: an electrical power source

This limitation recites, “an electrical power source in the form of a battery within a tubular outer housing having a mouth-end and an end distal to the mouth-end.”

Counts-962 discloses this limitation. Counts-962’s smoking article includes “power source 16,” which is “surrounded by” the smoking article’s “outer tube,” and “typically” consists of “rechargeable nickel cadmium (NiCd) **batteries.**”

Counts-962 at 3:19-20, 9:54-60 (“Internal power sources are disposed within the article (see FIG. 1).”), Figs. 1, 3, 6, 7, and 9; Deevi Decl. ¶¶ 261-262.

3. Limitation 27[b]: at least one electrical resistance heater

This limitation recites “at least one electrical resistance heater powered by said electrical power source.”

Counts-962 discloses this limitation. Counts-962 discloses that its heaters are “resistance heaters” powered by Counts-962’s power source. Counts-962 3:26-29 (“Electrical energy from power source 16 is applied to the terminals of heating element 14, which heats the flavor-generating medium”), 4:6-12 (“In a preferred embodiment, heating element 14 is a resistive wire coil”), 4:58-61 (“Power source 16 discharges electrical energy to heating element 14. Heating element 14 converts the discharged electrical energy into heat.”), 5:41-59 (teaching that “heating element 14 is a positive temperature coefficient thermistor” and describing changes in its “electrical resistance”), 10:40-55; Deevi Decl. ¶¶ 263-267.

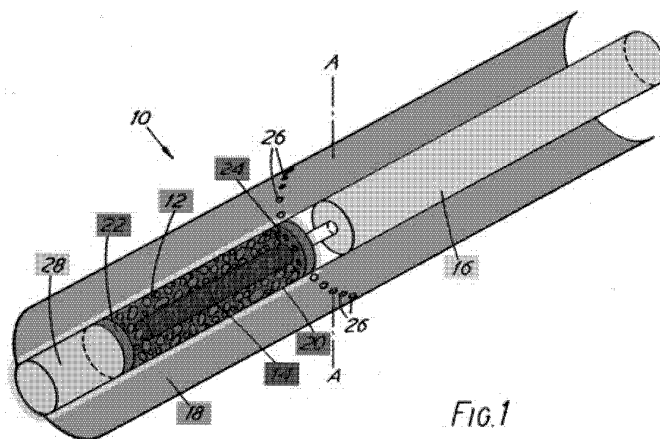
4. Limitation 27[c]: elongated portion of resistance heating element

This limitation recites:

wherein at least a portion of the resistance heating element is elongated and extending downstream toward the mouth-end of the outer housing, the elongated portion of the resistance heating element positioned proximal to the center of the outer housing

As discussed in Ground 1, the '123 patent provides little explanation of this claim language, showing only Figure 3, and stating that a portion of a “second resistance heating element” is “elongated” and extends downstream into the tobacco segment. '123 patent 28:37-43, Fig. 3; Deevi Decl. ¶¶ 112, 254-257, 263-267. And as noted, the patent also admits that a POSA could select an appropriate heater “as a matter of design choice” to provide “adequate heating of relevant components within the smoking article,” and that would be “readily apparent to one of skilled in the art.” '123 patent 29:32-50; Deevi Decl. ¶¶ 59, 76. In view of this admission, patentability cannot turn on this claim element.

In any event, Counts-962 teaches this limitation. As shown in its figures, at least a portion of Counts-962's heating element (item 14) is elongated, extends downstream toward the mouth end of the smoking article, and is positioned proximal to the center of the outer housing.



Counts-962 Figs. 1-3, 6, 7, and 9; Deevi Decl. ¶¶ 263-267.

5. Limitation 27[d]: controller

Claim 27 next recites, “a controller within the tubular outer housing and adapted for regulating current flow through the electrical resistance heater.” Counts-962 discloses this limitation. Its smoking article has a “control system for regulating the temperature of the flavor-generating medium or the amount of power applied to the heating element.” Counts-962 1:54-56. Counts-962 describes its controller in detail, including how it “provides a predictable method for applying voltage and current to heating element 14, and thus for controlling the temperature of flavor-generating medium 12,” and shows that the controller is within the tubular housing. *Id.* 6:59-62; *see also id.* 4:42-46, 6:53-9:51, 10:56-11:36, Figs. 7 and 9 (control circuit 46/98); Deevi Decl. ¶¶ 268-274.

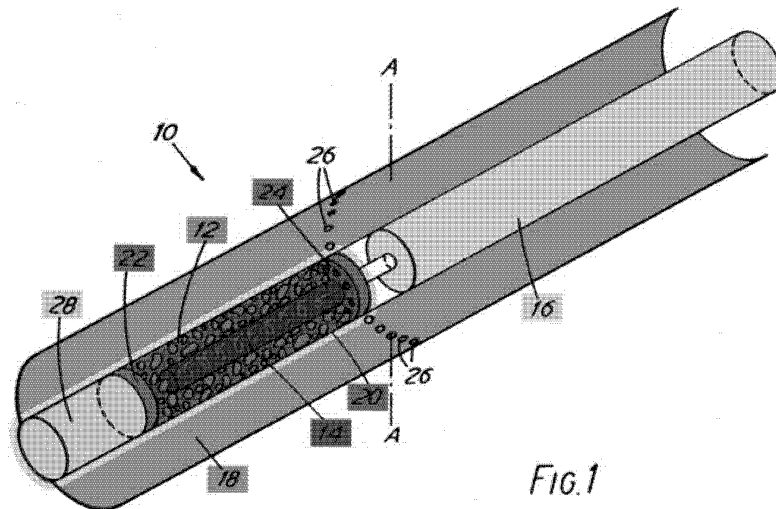
If the “controller” term of limitation 27[d] invokes § 112, ¶ 6 (and even if it does not), Brooks teaches the “controller” term and a POSA would have adapted a Brooks controller for use in Counts-962 for the reasons discussed in Ground 1. In short, and as the ’123 patent admits, Brooks teaches “control circuits and related wiring for preferred controllers” for electrically powered smoking articles, which provide “accurate and sophisticated current actuation and current regulati[on].” Brooks’s controllers perform the requisite function—regulating current flow through the heater (Brooks 12:41-46)—and Brooks’s controllers are the corresponding structures disclosed for performance of that function. Brooks 1:6-

10, 4:50-57, 7:5-7, Figs. 9-10, 12:39-16:31 (describing the Figure 9 and 10 circuits in detail), 20:55-58, 21:6-7, 21:38-41; Deevi Decl. ¶¶ 274-278; '123 patent 20:43-67; Claim Construction section above.

6. Limitation 27[e]: removably engaged cigarette-type device

Claim 27 next recites, “a cigarette-type device removably engaged with the mouth-end of the tubular outer housing and comprising a tobacco segment circumscribed by a wrapping material and comprising a tobacco material and an aerosol-forming material.” Counts-962 teaches this limitation.

First, Counts-962 discloses “a cigarette-type device removably engaged with the mouth-end of the tubular housing,” as shown below:



Counts-962 Fig. 1. A POSA would have understood that Counts-962’s tube 20, clips 22 and 24, flavor-generating medium 12 surrounding heater 14, and filter 28, which is attached to tube 20 (*id.* 1:61-67), constitute a cigarette-type device

positioned within the mouth-end of Counts-962's "outer tube or overwrapper 18." Counts-962 3:2-26; Deevi Decl. ¶¶ 109-112, 254-257, 279-285. Those components resemble a cigarette and include tobacco material, like a cigarette. Deevi Decl. ¶¶ 109-112, 254-257, 279-285. A POSA also would have known that these components are removable from their mouth-end position, locked inside the device until the user separates the device to remove the cigarette-like device. Specifically, Counts-962 teaches that its smoking article "is separable," *i.e.*, along line A-A in Figure 1, "to permit the consumer to replace expended flavor-generating medium and filter materials." Counts-962 3:34-37, Fig. 1, 7:30-32; Deevi Decl. ¶¶ 279-281.

Second, Counts-962's smoking articles have "a tobacco segment circumscribed by a wrapping material and comprising a tobacco material and an aerosol-forming material." Counts-962's articles are wrapped in foil, and designed to "generate/release designed flavors, vapors, **and aerosols**" (what Counts-962 refers to collectively as "flavor components") from a "[f]lavor-generating medium 12 [that] may include tobacco or tobacco-derived materials." Counts-962 1:21-25, 4:1-2; Deevi Decl. ¶¶ 282-285; *see also* '123 patent 24:57-25:27 (describing cigarettes wrapped in foil); Deevi Decl. ¶ 45.

A POSA would have understood that Counts-962's flavor-generating medium includes both tobacco and an aerosol precursor, the latter of which would be used to generate a suitable aerosol. In addition and in the alternative, a POSA

would have known and been motivated to include such an aerosol precursor, *e.g.*, glycerol, in Counts-962's flavor-generating medium, as it was conventional to use aerosol precursors with electrically powered smoking devices to deliver the smoking sensation and visible smoke-like aerosol that the consumer desires. Morgan 5:34-46 (adding glycerine to form a visible condensed aerosol to mimic the appearance of cigarette smoke); Ex. 1010 at 60, 122; Brooks 6:45-52; Ex. 1011 at 16:33-38; Ex. 1012 at 3:9-13; Deevi Decl. ¶¶ 70-76, 282-285; *see also* State of the Art section above.

Counts-962 also discloses that its tube 20, which contains the flavor-generating material, is wrapped in foil. *See* Counts-962 1:61-67 (“[A] nonburning article is formed by surrounding a positive temperature coefficient thermistor with the flavor-generating medium to be heated, capturing the material and heating element in a tube (which typically may be foil-lined), attaching a filter, and providing an outer wrapper for the article.”), 15:16-17 (claim 12) (“tube is foil-lined”).

Thus, Counts-962's foil-lined tube 20 and flavor-generating medium 12 teach the “tobacco segment circumscribed by a wrapping material” that includes “tobacco material and an aerosol-forming material,” as recited in limitation 27[e]. Deevi Decl. ¶¶ 279-285; '123 patent 18:9-12 (“The wrapping material used as a wrapper for containing the tobacco, and hence used for cigarette manufacture, can

vary.”), 18:25-30 (“Exemplary wrapping materials” include “laminates of paper and metal foil”), 25:17-27 (same).

7. Limitation 27[f]: elongated heater portion extends into the tobacco segment

Claim 27 next recites, “wherein the elongated portion of the resistance heating element extends into the tobacco segment when the cigarette-type device is engaged with the mouth-end of the outer housing.” Counts-962 discloses this limitation.

As illustrated by Counts-962’s figures, a portion of heating element 14 is elongated and extends into the tobacco flavor-generating medium that it heats. Counts-926 Figs. 1-3, 6, 7, and 9, 3:53-55 (“Flavor-generating medium 12 typically is **placed around** heating element 14.”); Deevi Decl. ¶¶ 280, 286-287. And Count-962’s flavor-generating medium includes tobacco and is, therefore, a “tobacco segment.” Counts-962 1:21-25, 4:1-2; Deevi Decl. ¶¶ 286-287.

8. Limitation 27[g]: visible mainstream aerosol

The final limitation of Claim 27 recites, “such that during draw, aerosol-forming material can be volatilized to produce a visible mainstream aerosol incorporating tobacco components or tobacco-derived components that can be drawn into the mouth of the user of the smoking article.” Counts-962 discloses this limitation.

A POSA would have understood, or at the very least it would have been obvious, that Counts-962's smoking articles produce a visible mainstream aerosol as claimed. As discussed, Counts-962's smoking articles "generate/release designed flavors, vapors, and **aerosols**" and "produce the taste **and sensation of smoking** without burning of tobacco." See Counts-962 1:9-16, 1:21-31, 1:57-61. Thus, a POSA would have understood Counts-962 as teaching the volatilization of aerosol-forming materials and the production of visible mainstream aerosol that can be drawn into the mouth of a user. Aerosol-forming materials are volatilized to "generate/release ... aerosols," as Counts-962 discloses, and the "sensation of smoking" Counts-962 seeks to achieve includes drawing a visible aerosol into a user's mouth. Counts-962 1:9-16, 1:21-31, 1:57-61, 3:31-34 ("The outside air mixes with the flavor components, and the mixture is drawn through front clip 22 and filter 28 when the consumer draws on the article."), 4:28-30 ("The mixture of heated air and flavor components is drawn through filter 28 for the consumer's use."); Deevi Decl. ¶¶ 288-292.

Moreover, as explained with respect to limitation 27[e], a POSA would have understood that Counts-962 uses glycerine, or it would have been obvious to use glycerine, to generate a suitable aerosol that delivers a smoking sensation including the visible smoke-like aerosol that consumers desire. Morgan 5:34-46 (glycerine added to facilitate formation of a visible condensed aerosol, to mimic the

appearance of cigarette smoke); Ex. 1010 at 60, 122; Brooks 6:45-52; Ex. 1011 at 16:33-38; Ex. 1012 at 3:9-13; Deevi Decl. ¶¶ 279-285, 288-292; *see also* State of the Art section above. As the '123 patent admits, conventional aerosol-forming materials, such as glycerin, were commonly used such as glycerin produced “smoke-like” visible aerosols. *See* '123 patent 13:57-14:24; Deevi Decl. ¶¶ 73, 279-285, 288-292.

* * *

For these reasons, claim 27 would have been obvious over Counts-962, alone or with Brooks.

C. Claims 28-30

Claims 28-30 of the '123 patent would have been obvious over Counts-962, alone with Brooks, for the same reasons as independent claim 27, and as further discussed below.

Claim 28 recites, “The smoking article of claim 27, wherein the cigarette-type device further comprises a filter element downstream from the tobacco segment.” As discussed with respect to claim 27, Counts-962’s cigarette-type device includes a filter (filter 28), which is located downstream from a tobacco segment (tube 20, with flavor-generating medium 12). Counts-962 Figs. 1, 5, 6, 7, 9; Deevi Decl. ¶¶ 279-285, 293-294.

Claim 29 recites, “The smoking article of claim 27, further comprising an

actuation mechanism in the form of a switching mechanism that can be manually operated by the user in order to heat the cigarette-type device.” Counts-962 teaches this claim element in the form of its power switch. Counts-962 at 7:16-17 (“To operate smoking article 44, the consumer sets power switch 48 to the ‘on’ position.... Flavor-generating medium 12 is quickly heated to its preferred, higher temperature, enabling the consumer to puff article 44.”); Deevi Decl. ¶¶ 268-278, 295-296.

Claim 30 recites, “The smoking article of claim 27, wherein the electrical resistance heating element provides surface region temperatures of at least 200° C and less than 600° C such that the tobacco material does not burn during use.”

Counts-962 discloses that “[t]he preferred temperature range for generating flavor components” is “between 120° C and 400° C, and the **most preferred range is between 200° C and 350° C.**” Counts-962 3:58-61, 4:1-2. Counts-962 uses these temperatures because its smoking article is designed to “produce the taste and sensation of smoking **without burning** of tobacco.” *Id.* 1:13-14, 1:58-62 (characterizing Counts-962’s smoking article as “non-burning”), 2:35, 2:38-39, 2:44-45, 2:51, 2:54-55, 2:62, 3:7 (same); Deevi Decl. ¶¶ 297-302 (also explaining that Counts-962’s heaters are about, but no cooler than these temperatures); Brooks 9:56-10:12 (using temperatures “often above 200° C” but not “substantially in excess of 550° C”); Ex. 1021 (explaining that heat-not-burn is an old idea).

Counts-962's values disclose the claimed ranges because a species (*i.e.*, single value in a range) anticipates a genus (*i.e.*, the range of values). *King Pharms.*, 616 F.3d at 1277; *Peterson*, 315 F.3d at 1329 (“even a slight overlap in range” presumptively teaches the claim element). Even if viewed as merely overlapping, this creates “a presumption of obviousness.” *E.I. DuPont*, 904 F.3d at 1006. To rebut that presumption, Patent Owner will need to show that the claimed range is critical, such as by showing that values in the range achieves unexpected results relative to the prior-art range, or that the art taught away from the claimed range. *Id.* at 1006-1007. Here, Counts-962 teaches a significant overlap, with its preferred ranges of 200-350° C, and further disclosure of a range of up to 400° C, and the prior art is replete with examples within the claimed range. Deevi Decl. ¶¶ 254-257, 297-302. Accordingly, Counts-962 discloses, or at least renders obvious, the claimed range.

VIII. Secondary Considerations

There are no secondary considerations known to Petitioner that affect—let alone overcome—the strong cases of obviousness set out above. Should Patent Owner proffer any relevant evidence of secondary considerations in its preliminary response, Petitioner should be given leave to file a reply.

IX. Conclusion

For the reasons set forth above, Petitioner respectfully requests *inter partes* review of the challenged claims of the '123 Patent.

Respectfully submitted,

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CERTIFICATE OF COMPLIANCE WITH 37 C.F.R. § 42.24

I hereby certify that this petition complies with the word count limitation of 37 C.F.R. § 42.24(a)(1)(i) because the petition contains a total of 13,909 words, as calculated by Microsoft Word's word-count feature. This total excludes the cover page, signature block, and the parts of the petition exempted by 37 C.F.R. § 42.24(a)(1).

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CERTIFICATE OF SERVICE

The undersigned certifies that a complete copy of this Petition for *Inter Partes* Review of U.S. Patent No. 9,901,123 and all Exhibits and other documents filed together with this Petition were served on the official correspondence address for the patent shown in PAIR via Priority Express Mail and a courtesy copy to Patent Owner's current litigation counsel via FEDERAL EXPRESS next business day delivery on May 8, 2020:

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