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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte RAYMOND W. LAU and ERIC HAWES

Appeal 2024-003328
Application 16/929,475
Technology Center 1700

Before JEFFREY B. ROBERTSON, JON B. TORNQUIST, and
JANE E. INGLESE, *Administrative Patent Judges*.

INGLESE, *Administrative Patent Judge*.

DECISION ON APPEAL

The Appellant¹ requests review under 35 U.S.C. § 134(a) of the Examiner’s final rejection of claims 1, 2, 4–6, and 9–20.² We have jurisdiction over the appeal under 35 U.S.C. § 6(b).

We reverse.

¹ “Appellant” refers to the “applicant” as defined in 37 C.F.R. § 1.42. The Appellant identifies the real party in interest as Altria Client Services LLC. Appeal Brief filed April 2, 2024 (“Appeal Br.”) at 2.

² Final Office Action entered November 7, 2023 (“Final Act.”) at 1.

CLAIMED SUBJECT MATTER

Claim 1 illustrates the subject matter on appeal, and reads as follows:

1. A non-nicotine cartridge for a non-nicotine e-vaping device, comprising:
 - a housing defining a reservoir* containing a non-nicotine pre-vapor formulation;
 - a wick configured to transport the non-nicotine pre-vapor formulation by capillary action;
 - an integral heater-thermocouple* configured to heat the non-nicotine pre-vapor formulation in the wick to generate a non-nicotine vapor, the integral heater-thermocouple including a first segment made of a first alloy and a second segment made of a second alloy, the first segment being downstream from the second segment;
 - a first vapor channel; and
 - a second vapor channel, the first vapor channel and the second vapor channel spaced apart by the reservoir,
 - wherein *the housing has a first longitudinal axis, and the integral heater-thermocouple has a second longitudinal axis that intersects the first longitudinal axis to form an oblique angle.*

Appeal Br. 15–16 (Claims Appendix) (emphasis added).

Independent claim 17 recites a non-nicotine e-vaping device that includes a device body having a first longitudinal axis, and an integral heater-thermocouple having a second longitudinal axis that intersects the first longitudinal axis to form an oblique angle. *Id.* at 17–18.

REJECTIONS

The Examiner maintains the following rejections in the Examiner’s Answer entered May 10, 2024 (“Ans.”):

I. claims 1, 2, 4–6, and 9–18 under 35 U.S.C. § 103 as unpatentable over Boham³ in view of Moloney⁴ and Batista;⁵ and

II. claims 19 and 20 under 35 U.S.C. § 103 as unpatentable over Boham in view of Moloney, Batista, and Fraser.⁶

FACTUAL FINDINGS AND ANALYSIS

After considering the evidence relied upon in this appeal and each of the Appellant’s contentions, we reverse the Examiner’s rejections under 35 U.S.C. § 103 for reasons set forth in the Appeal Brief, the Reply Brief, and below.

We need address independent claims 1 and 17 only, which recite a non-nicotine cartridge for a non-nicotine e-vaping device that includes a housing or device body having a first longitudinal axis, and an integral heater-thermocouple having a second longitudinal axis that intersects the first longitudinal axis to form an oblique angle.

The Examiner rejects claims 1 and 17 as obvious over Boham in view of Moloney and Batista.

Boham discloses aerosol provision system 1, illustrated in Boham’s Figure 1:

³ Boham, WO2021009483 A1, published January 1, 2021.

⁴ Moloney, US 2022/0175042 A1, published June 9, 2022.

⁵ Batista et al., US 2017/0340003 A1, published November 30, 2017.

⁶ Fraser, US 2017/0224014 A1, published August 10, 2017.

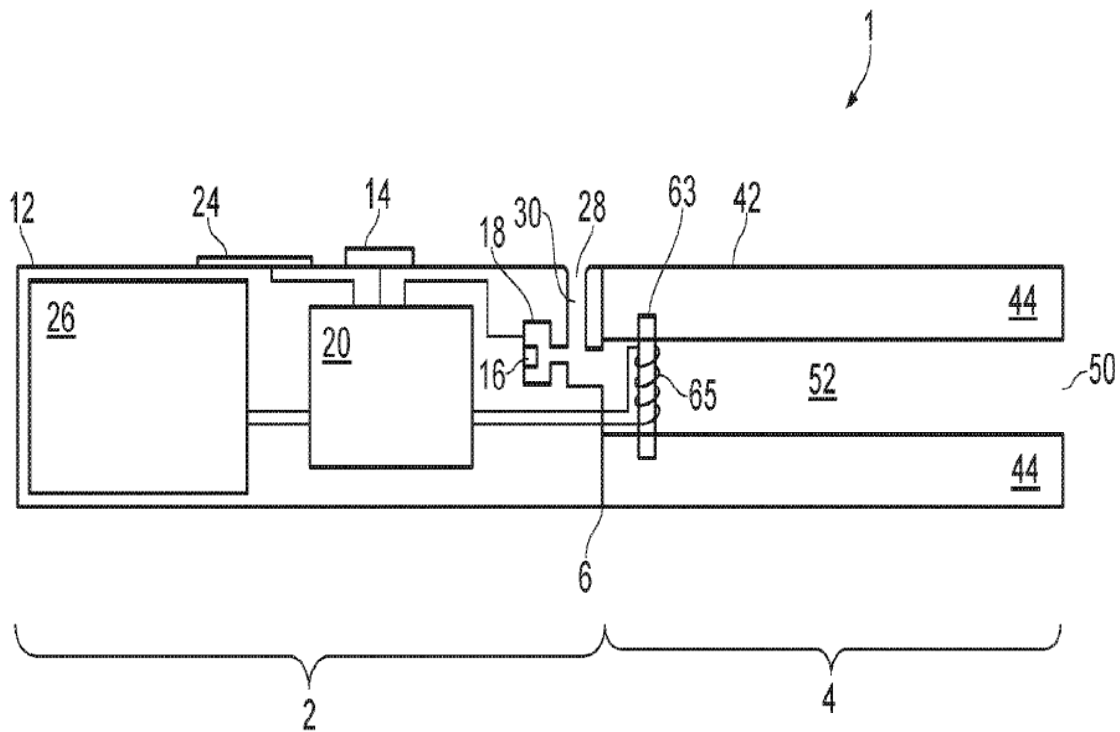


Figure 1 is a cross-sectional schematic representation of Boham's aerosol provision system. Boham 3:6–7.

As shown in Figure 1, aerosol provision system 1 includes reservoir 44 containing liquid aerosolizable material (e-liquid) within housing 42. Boham 5:21–22. Reservoir 44 has an annular shape defined by housing 42 and an inner wall that defines air path 52. *Id.* at 5:23–24. Aerosol provision system 1 further includes wick 63 and heater 65 formed of an electrically resistive wire coiled around wick 63. *Id.* at 5:31–32, 6:7–8. Wick 63 extends transversely across air path 52 and its ends extend into openings in the inner wall of reservoir 44. *Id.* at 5:33–34. In operation, electrical power is supplied to heater 65, which vaporizes aerosolizable material (e-liquid) drawn to the vicinity of heater 65 by wick 63. *Id.* at 6:10–12. Vaporised e-liquid then becomes entrained in air drawn along air path 52 to form a

condensation aerosol that exits the system through mouthpiece outlet 50 for user inhalation. *Id.* at 6:12–14.

The Examiner finds that Boham does not disclose first and second vapor channels spaced apart by a reservoir, and the Examiner turns to Moloney. Final Act. 3.

Moloney discloses a vapor provision system that includes housing 42 having interior wall 48 positioned within inner volume 100 so as to divide inner volume 100 into three regions: inner reservoir 50 for storing aerosolizable material, and two air flow passages 54 located on each side of reservoir 50. Moloney ¶ 79, Fig. 4. Each air flow passage 54 has a lower air inlet 52 to allow air carrying vapor to enter each flow passage 54, and upper air outlet 56 to allow air carrying vapor to exit each flow passage 54 for delivery of aerosol to a user via a mouthpiece. *Id.* ¶ 82, Fig. 4.

In view of these disclosures in Moloney, the Examiner concludes that it would have been obvious to one of ordinary skill in the art to modify Boham’s device to include two vapor channels spaced apart by a reservoir as taught in Moloney because “doing so would carry vapor to the exit for delivery to a user.” Final Act. 3 (citing Moloney ¶ 82).

The Examiner finds that neither Boham nor Moloney discloses a housing having a first longitudinal axis and an integral heater thermocouple having a second longitudinal axis that intersects the first longitudinal axis to form an oblique angle, and the Examiner turns to Batista. Final Act. 4.

Batista discloses an aerosol-generating device that includes electric heaters extending across an annular airflow passage formed by first and second hollow shaft portions. Batista ¶¶ 36, 50, Fig. 1. Paragraph 52 of Batista states that “[w]here one or more of the electric heaters extend across

the airflow passage, the longitudinal axis of one or more of the electric heaters may be perpendicular to the longitudinal axis of the hollow shaft portion.” The next sentence in paragraph 52 states that “[o]ne or more of the electric heaters extending across the airflow passage may be arranged such that its longitudinal axis is oblique to the longitudinal axis of the hollow shaft portion.”

In the following paragraph (53), Batista describes, in general terms, embodiments of its device in which electric heaters are disposed as described in the first sentence of paragraph 52—their longitudinal axes are perpendicular to the longitudinal axis of the airflow passage (hollow shaft portion)—but the longitudinal axis of one or more of the heaters is rotated within the airflow passage relative to that of the other heaters. Batista later describes (and also illustrates) three embodiments of its aerosol-generating device in which the longitudinal axes of the electric heaters are perpendicular to the longitudinal axis of the airflow passage (hollow shaft portion) and either parallel to each other or rotated relative to each other, as described in paragraph 53. Batista ¶¶ 132, 154, 155, Figs. 1, 6A, 6B, 6C, 7A, 7B.

In the first embodiment, the longitudinal axes of electric heaters 400 are parallel and rotationally aligned within airflow passage 306. *Id.* ¶ 132, Fig. 1. In the second embodiment (illustrated below in Figures 6A and 6B), the longitudinal axis of central heater 403 is rotated by 90 degrees about the longitudinal axis of the airflow passage (hollow shaft portions 604, 624) relative to first 401 and second 405 heaters, such that the longitudinal axis of heater 403 is perpendicular to that of heaters 401, 405. *Id.* ¶ 154, Figs. 6A, 6B, 6C. In the third embodiment (illustrated below in Figures 7A and 7B),

the longitudinal axes of electric heaters 401, 403, 405 are each rotated about the longitudinal axis of the airflow passage (hollow shaft portions 702, 704) relative to each other. *Id.* ¶ 155 (“[t]he longitudinal axis of each electric heater 401, 403, 405 is rotated by a uniform amount of less than about 90 degrees from its adjacent electric heater or heaters”); *see also id.* Figs. 7A, 7B.

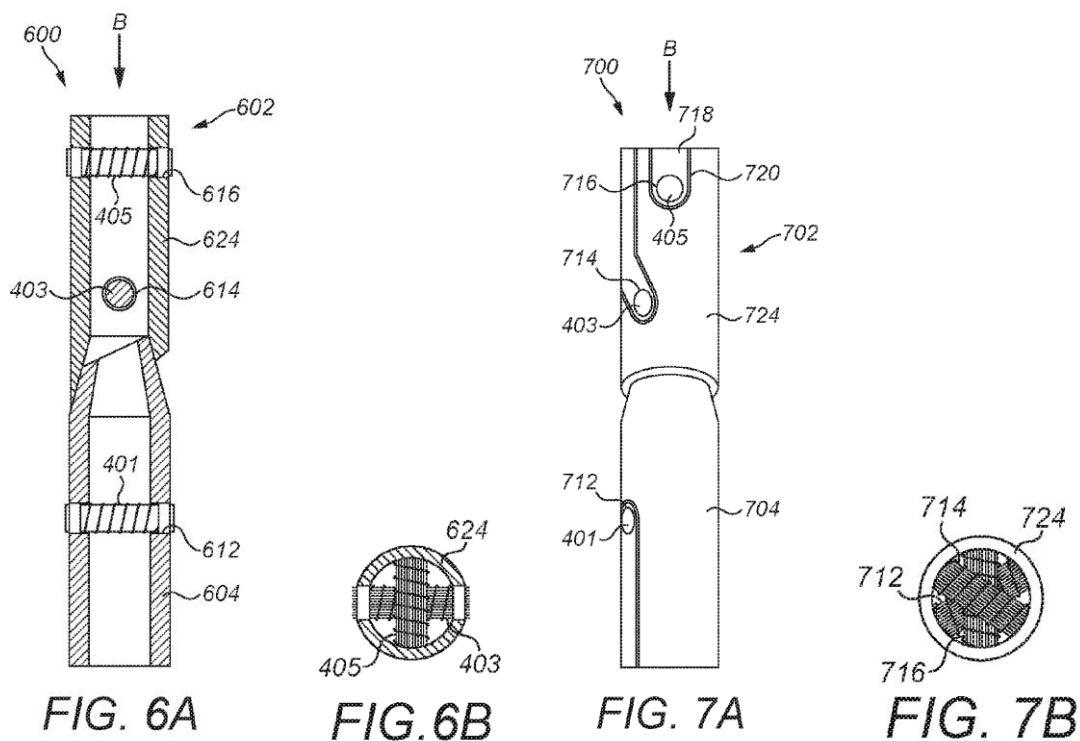


Figure 6A illustrates a longitudinal cross-section of a second embodiment of Batista’s heater, Figure 6B illustrates a distal end view of the heater assembly of FIG. 6A, Figure 7A illustrates a longitudinal cross-section of a second embodiment of Batista’s heater, and Figure 7B illustrates a distal end view of the heater assembly of FIG. 7A. *Id.* ¶¶ 16, 17, 19, 20.

The longitudinal axes of the electric heaters of all three of Batista's embodiments thus extend across the airflow passage transverse (or perpendicular) to the airflow passage's longitudinal axis, and in the second and third embodiments, the longitudinal axes of one or two of the heaters is rotated about the longitudinal axis of the airflow passage relative to that of the other heaters.

Back to paragraph 53, Batista describes advantages of such rotated configurations of the electric heaters (the arrangements of the second and third embodiments) relative to an arrangement in which the longitudinal axes of electric heaters are aligned within the airflow passage (hollow shaft portions) (the first embodiment): (1) the heaters may more readily intercept air flowing through the devices, (2) the devices may more uniformly consume aerosol-forming substrate, reducing waste, and (3) leaked liquid may more readily be intercepted and absorbed into an adjacent electric heater, reducing liquid leakage. *Id.* ¶ 53.

In view of the disclosures in Batista's paragraphs 52 and 53, the Examiner determines that it would have been obvious to one of ordinary skill in the art to modify Boham's device as modified by Moloney "to provide wherein the housing has a first longitudinal axis, and integral heater thermocouple has a second longitudinal axis that intersects the first longitudinal axis to form an oblique angle," as disclosed in Batista. Final Act. 5 (citing Batista ¶¶ 52, 53). The Examiner reasons that "[a] person of ordinary skill in the art would obviously place the heater at an oblique angle to the housing because doing so would more readily intercept air flowing [through the device] allowing for the device to more uniformly consume aerosol-forming substrate thereby reducing waste." *Id.* (citing Batista ¶ 53).

As the Appellant correctly points out (Appeal Br. 10–11), however, and as discussed above, Batista discloses that these advantageous features result from disposing the longitudinal axes of Batista’s electric heaters perpendicular to the longitudinal axis of the airflow passage, but rotated relative to each other. Batista ¶ 53. Contrary to the Examiner’s findings, Batista does not disclose that these advantages stem from disposing the longitudinal axes of one or more of Batista’s electric heaters at an oblique angle relative to the longitudinal axis of Batista’s airflow passage.

The Examiner’s rationale for modifying the angle of the longitudinal axis of Boham’s heater 65 relative to that of Boham’s housing 42, therefore, lacks rational underpinning. Stated another way, the Examiner does not provide sound technical reasoning supported by objective evidence sufficient to persuasively explain why the relied-upon disclosures of Batista would have led one of ordinary skill in the art to modify the angle of the longitudinal axis of Boham’s heater 65 as the Examiner proposes.

Furthermore, as discussed above, the Examiner initially proposes modifying Boham’s system to include two vapor channels spaced apart by a reservoir as Moloney discloses. The Examiner does not explain where Boham’s heater would be disposed in this modified system. Nonetheless, the Examiner proposes further modifying Boham’s device in view of Batista to change the angle at which the longitudinal axis of Boham’s heater is positioned relative to the longitudinal axis of Boham’s housing (as discussed above). But because the Examiner does not explain in the first instance where Boham’s heater would be located in Boham’s device as initially modified in view of Moloney, the Examiner does not explain how Boham’s device would be further modified—while preserving the device’s intended

functionality—to position the longitudinal axis of Boham’s heater at an oblique angle relative to the housing’s longitudinal axis.

In particular, as the Appellant argues (Reply Br. 7–9), the Examiner’s proposed modification of Boham’s device in view of Moloney would apparently replace Boham’s inner air path 52 and outer reservoir 44 with an inner reservoir and outer air path, resulting in Boham’s heater 65 no longer extending across Boham’s inner air path 52. The Examiner does not explain where Boham’s heater 65 would be positioned after this modification.

Batista’s electric heaters, like Boham’s heater, function by extending across an airflow passage (as discussed above). The Examiner does not explain how the intended function of Boham’s heater 65, and Boham’s device as a whole, would be preserved if heater 65 no longer extended across an inner air path.

The Examiner, therefore, does not provide a sufficient factual basis to establish that the relied-upon disclosures of Boham, Moloney, and Batista would have suggested a non-nicotine cartridge having an integral heater-thermocouple positioned as recited in claims 1 and 17.

We, accordingly, do not sustain the Examiner’s obviousness rejection of claims 1, 2, 4–6, and 9–18 (Rejection I). We also do not sustain the Examiner’s obviousness rejection of claims 19 and 20 (Rejection II) because the Examiner does not rely on any disclosure in Fraser that remedies the deficiencies of the Examiner’s reliance on Boham, Moloney, and Batista.

DECISION SUMMARY

Claims Rejected	35 U.S.C. §	Reference(s)/Basis	Affirmed	Reversed
1–2, 4–6, 9–18	103	Boham, Moloney, Batista		1–2, 4–6, 9– 18
19, 20	103	Boham, Moloney, Batista, Fraser		19, 20
Overall Outcome				1–2, 4–6, 9– 20

REVERSED