

Paper No. ____
Filed: October 7, 2016

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

NU MARK LLC,

Petitioner,

v.

FONTEM HOLDINGS 1 B.V.,

Patent Owner.

Case **IPR2016-01303**

Patent No. **8,365,742**

**PATENT OWNER'S PRELIMINARY RESPONSE TO PETITION FOR
INTER PARTES REVIEW**

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Petitioner's Exhibits	
Exhibit	Description
Ex. 1001	U.S. Patent No. 8,365,742 (“the 742 Patent”)
Ex. 1002	Excerpts from the prosecution history of U.S. Patent No. 8,365,742
Ex. 1003	Declaration of John M. Collins (“Collins Decl.”)
Ex. 1004	U.S. Patent No. 6,155,268 (“Takeuchi”)
Ex. 1005	U.S. Patent No. 2,057,353 (“Whittemore”)
Ex. 1006	U.S. Patent No. 4,947,874 (“Brooks”)
Ex. 1007	Docket entry #65 from <i>Fontem Ventures, B.V., et al. v. NJOY, Inc., et al.</i> , 2:14-cv-01645 (C.D. Cal.) (“Rulings on Claim Construction”)
Ex. 1008	U.S. Patent Application No. 2006/0093977 A1 (“Pellizzari I”)
Ex. 1009	U.S. Patent No. 7,059,307 (“Pellizzari II”)
Ex. 1010	U.S. Patent No. 5,894,841 (“Voges”)
Ex. 1011	U.S. Patent No. 5,743,251 (“Howell”)
Ex. 1012	U.S. Patent No. 2,461,664 (“Smith”)
Ex. 1013	U.S. Patent No. 3,234,357 (“Eberhard”)
Ex. 1014	U.S. Patent No. 5,745,985 (“Ghosh”)
Ex. 1015	U.S. Patent No. 4,676,237 (“Wood”)
Ex. 1016	U.S. Patent No. 4,945,448 (“Bremenour”)
Ex. 1017	U.S. Patent No. 2,442,004 (“Hayward-Butt”)
Ex. 1018	U.S. Patent No. 3,200,819 (“Gilbert”)

Ex. 1019	U.S. Patent No. 6,501,052 (“Cox”)
Ex. 1020	U.S. Patent No. 6,491,233 (“Nichols”)
Patent Owner's Exhibits	
Exhibit	Description
Ex. 2001	<i>VMR Products LLC v. Fontem Holdings I B.V.</i> , IPR2015-00859, Paper 9, DECISION Denying Institution of <i>Inter Partes</i> Review (PTAB Sep. 16, 2015)
Ex. 2002	RESERVED
Ex. 2003	RESERVED
Ex. 2004	Declaration of Richard Meyst (“Meyst Decl.”)
Ex. 2005	RESERVED
Ex. 2006	<i>JT International, S.A., v. Fontem Holdings I B.V.</i> , IPR 2015-01587, Paper 12, Order Dismissing Petitions (PTAB Dec. 14, 2015)
Ex. 2007	U.S. Patent No. 4,735,217 (“Gerth”)
Ex. 2008	Office Action in U.S. Patent Application No. 14/244,376 dated 9/4/2014
Ex. 2009	Office Action in U.S. Patent Application No. 14/244,376 dated 8/20/2015
Ex. 2010	U.S. Patent No. 4,922,901 (“Brooks ‘901”)
Ex. 2011	Examiner Interview Summary of 12/1/2015 Interview in U.S. Patent Application No. 14/244,376, dated 12/4/2015
Ex. 2012	Statement of Related Applications in U.S. Patent Application No. 14/244,376, dated 12/22/2015
Ex. 2013	Notice of Allowance in U.S. Patent Application No. 14/244,376, dated 3/15/2016

Ex. 2014	Statement of Related Applications in U.S. Patent Application No. 13/740,011, dated 12/22/2015
Ex. 2015	Notice of Allowance in U.S. Patent Application No. 13/740,011, dated 6/21/2016
Ex. 2016	<i>NJOY, Inc. et al. v. Fontem Holdings I B.V.</i> , IPR2015-01299, Paper 15, DECISION Denying Institution of <i>Inter Partes</i> Review (PTAB Dec. 8, 2015)
Ex. 2017	Summary of Examiner Interview in U.S. Application No. 14/244,376, dated 12/22/2015

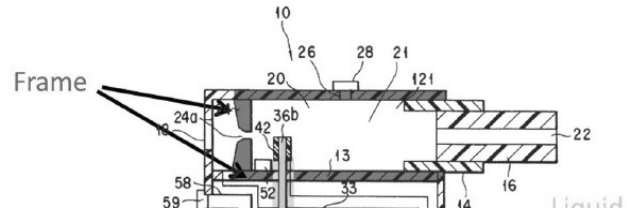
I. INTRODUCTION

Fontem Holdings 1 B.V. (“Patent Owner”) requests that NU MARK LLC’s (“Nu Mark” or “Petitioner”) Petition for *Inter Partes* Review of U.S. Patent No. 8,365,742 (the “’742 patent”) be denied because the Petition fails to establish “that there is a reasonable likelihood that the petitioner would prevail with respect to at least 1 of the claims challenged in the petition” under 35 U.S.C. § 314(a). The Petition challenges claims 2 and 3 and does not challenge claim 1.

Regarding claims 2 and 3, both claim electronic cigarettes that have an “atomizer assembly” that atomizes liquid to be inhaled by a user. The atomizer assembly includes a “porous component” and “a frame having a run through hole” with “a heating wire wound on a part of the porous component.” Claim 2 further requires that the “heating wire wound on a part of the porous component [be] in the path of airflow through the run-through hole,” and claim 3 similarly requires the “heating wire wound on a part of the porous component [be] substantially aligned with the run-through hole.” Claim 2 also requires that the frame “support[]” the porous component. The claimed configurations improve drawbacks found in prior art electronic cigarettes related to airflow and atomization efficiency.

The prior art cited by Petitioner suffers from those, and many other, drawbacks. So, Petitioner employs hindsight based on the claims to combine disparate portions of the prior art as claimed. For example, Ground 1’s proposed

combination of Takeuchi and Whittemore fails to disclose the claimed frame that “supports” the porous component. So, Petitioner cobbles together three separate portions of Takeuchi’s device unrelated to converting liquid into vapor, and labels them a “frame having a run through hole” that supports the “porous component,” shown right where the



blue portion is the alleged frame. But those portions do not “support” a porous component and do not convert liquid to vapor. Instead, those disparate portions receive the already-vaporized particles and thus cannot be part of the claimed “atomizer assembly.” Petitioner’s purported “frame” is simply part of Takeuchi’s housing and air flow path. As such, Takeuchi and Whittemore do not render obvious claims 2 or 3.

Ground 2’s combination of Brooks with Takeuchi requires a wholesale redesign of Brooks to eliminate Brooks’ primary advantage, that Brooks does not require a liquid storage container or the components necessary to transport liquid from that liquid storage container to a heater for vaporization. Instead, Brooks eliminates and teaches away from those features in favor of a disposable heating element directly impregnated with liquid sufficient to produce 6-10 puffs like a traditional cigarette. Petitioner provides no reason why one skilled in the art would have discarded that primary advantage of Brooks when combining Brooks with

Takeuchi to include a liquid storage container, let alone to include the claimed frame and porous component. And even when combined, Petitioner and its expert concede that the limitation of a heating wire wound on a porous component of claims 2 and 3 is missing.

For those and other reasons set forth herein, Patent Owner requests that the Board deny the Petition.

II. BACKGROUND

A. The '742 Patent

The '742 patent generally relates to an “aerosol electronic cigarette.” Ex. 1001, Title. The '742 Patent explains that the disclosed device can provide nicotine, without depriving the user of the “smoking habit,” meaning a user uses the device like a traditional cigarette so that the device simulates the feel and experience of smoking. Ex. 1001 at 1: 18-20. The problem to be solved is not just in the ability to efficiently deliver nicotine like the nicotine patch or gum. The rituals of smoking must be provided.

One of the problems the '742 patent addresses in prior art electronic cigarettes is the lack of atomizing efficiency: “The electronic cigarettes currently available on the market . . . are complicated in structure. They don't provide the ideal aerosol effects, and their atomizing efficiency is not high.” Ex. 1001 at 1: 21–24. The '742 patent focuses on this problem by addressing how air flows

through an electronic cigarette in combination with how liquid contacts a heater to be vaporized.

Air flow is a key concept in the '742 Patent. The resistance to air flow through the electronic cigarette during inhalation should generally simulate that of a real tobacco cigarette. If the air flow resistance is too high, the user's inhalation effort will be unduly high and the air flow rate through the e-cigarette (which entrains the nicotine vapor) will be too low. On the other hand, if the air flow resistance is too low, the user will inhale excessive air and the air flow rate will be too high. In either case, the ratio of air to atomized liquid will cause a user to inhale too much air and not enough atomized liquid or vice versa.

In one embodiment, the '742 patent discloses an improved atomizer configuration that address both airflow and vaporization. The '742 Patent states: "the atomizer assembly is an atomizer (8), which includes a frame (82), the porous component (81) set on the frame (82), and the heating wire (83) wound on the porous component (81). The frame (82) has a run-through hole (821) on it. The porous component (81) is wound with heating wire (83) in the part that is on the side in the axial direction of the run-through hole (821)." Ex. 1001 at 5:43–49 .

That embodiment is shown in Figures 17 and 18 (reproduced below), showing the heating wire (83) wound on a part of the porous component (81) in alignment with run-through hole (821).

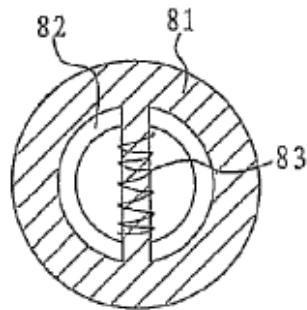


Figure 17

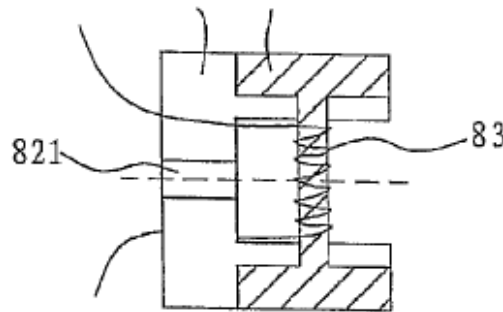


Figure 18

As shown in Figure 18, the run-through hole (821) is aligned with portion of the porous component (81) in contact with the heating wire (83) such that the line of sight to the run-through hole (821) is partially or fully blocked. This alignment may be visualized by the result of poking a hypothetical rod through run-through hole (821). The hypothetical rod will hit heating wire (83). The context of the '742 Patent shows that “substantially aligned with the run-through hole,” as recited in claim 3, means the porous body is in line with or in the path of the run-through hole.

In the embodiment shown in Figures 17 and 18, air flows into the atomizer through the run-through hole and is directed to the heating wire because the wire is

aligned with the run through hole. Those design elements help to improve the aerosol effects and atomizing efficiency of the claimed electronic cigarette.

The '742 patent claims recite an atomizer according to the above embodiments. Claims 2 and 3 of the '742 patent both require “a frame” having a “run-through hole” and “a heating wire wound on a part of the porous component.” Claim 2 further requires that the heating wire be “in the path of air flowing through the run-through hole” and claim 3 requires that the heating wire be “substantially aligned with the run-through hole.” Finally, claim 2 requires that the frame “supports” the porous component and claim 3 requires that the “porous component is between the frame and the outlet.”

B. The Prosecution History of the '742 Patent.

Section 5 of the Petition discusses the prosecution history. Two points there merit discussion. During the Examiner Interview, Brooks US Patent No. 4,947,875 was discussed whereas the Petition relies on Brooks US Patent No. 4,947,874. These patents have the same drawings and technical description, and are largely duplicates. Consequently, the Examiner was aware of the content of Brooks US Patent No. 4,947,874 as discussed during the Examiner Interview.

At section 5.1 the Petition paraphrases the Examiner's comment in a first Office Action on a reason for allowance. The Examiner's complete statement is:

“The following is an Examiner's statement of reasons for allowance: The Examiner believes that the closest prior art of record, namely the CN 2719043 reference, neither teaches nor reasonably suggests an aerosol electronic cigarette having the claimed combination of structural features, including ‘an atomizer, which includes a porous component and a heating body; the said heating body is heating wire...the heating wire is wound on the said porous component’. Hence, the claim is allowable over the prior art of record.”

Ex. 1002 at 7-8.

C. The Prior IPR Petitions on the '742 Patent.

A first petition was filed on March 10, 2015 by VMR Products LLC that relied on combinations of prior art including Whittemore, but not Takeuchi or Brooks. That petition was denied on the merits on September 16, 2015. Ex. 2001 at 31.

A second petition was filed against the '742 patent by JTI International S.A., on July 14, 2015 with eight grounds including combinations of Takeuchi, Brooks and Whittemore (i.e., the same references used in the present Petition). That second Petition was dismissed via agreement of the parties before any institution decision by the Board. Ex. 2006.

Two additional IPR petitions have been filed on the '742 patent. The Board has not issued a decision on institution for either IPR. Another petitioner, R. J.

Reynolds Vapor Company, filed IPR2016-01532 on August 5, 2016 against the ‘742 patent asserting the claims are invalid over the publication of its parent application (US2009/0095311) on the basis that the claims of the ‘742 patent are not entitled to a priority claim earlier than the actual filing date of the application for the ‘742 patent. R. J. Reynolds Vapor Company also filed IPR 2016-01268 on July 2, 2016 asserting obviousness based on combination of Hon ’043 and Whittemore.

D. A Person of Ordinary Skill in The Art.

A person of ordinary skill in the art at the time of the invention (a “skilled person”) would have had a mechanical or electrical engineering degree, industrial design degree, or similar technical degree, or equivalent work experience, and 5-10 years of working in the area of electromechanical devices, including medical devices. Ex. 2004 at ¶¶ 23-25. Petitioner argues a skilled person would have “3-5 years of experience in designing and developing handheld devices with thermal management and fluid handling technologies.” Petition at 24-25. Petitioner has not met its burden either way.

III. CLAIM CONSTRUCTION

A. Atomizer Assembly.

Patent Owner’s Construction	Petitioner’s Construction
“a component or components that convert(s) liquid into aerosol or vapor”	No construction.

Claims 2 and 3 require “an atomizer assembly.” The claims also expressly recite the components make up the atomizer assembly.

Claim 2 recites:

An electronic cigarette, comprising:

. . .

the atomizer assembly including a porous component supported by a frame having a run-through hole;

a heating wire wound on a part of the porous component in the path of air flowing through the run-through hole; and

the porous component substantially surrounded by the liquid storage component.

And claim 3 recites:

An electronic cigarette, comprising:

. . .

the *atomizer assembly* includes a frame having a run-through hole, and a porous component between the frame and the outlet;

a heating wire wound on a part of the porous component which is substantially aligned with the run-through hole; and

with the porous component in contact with a liquid supply in the housing.

In short the claimed atomizer assemblies include a “frame,” “a porous component,” and a “heating wire wound on part of the porous component.” Each

of those components is the portion of the claimed device that “converts liquid into aerosol or vapor.”

The frame 82 shown in Figs. 17 and 18 of the ‘742 patent is a part of the atomizer assembly as it supports the porous component 81 and also directs air flow to the heating wire 83 wound on the porous component 81 to convert liquid into aerosol.

Although claims 2 and 3 are directed to the atomizer embodiment of Figs. 17-18, the discussion of the embodiment of Figs. 5-8 is relevant to construction of “atomizer assembly.” The ’742 specification describes how the disclosed atomizers heat the liquid “for atomization.” Ex. 1001 at 4:25. The ’742 patent further describes that “as shown in FIGS. 5-8, the atomizer assembly is an atomizer (8), which includes a porous component (81) and a heating rod (82).” Ex. 1001 at 3:6-8. The porous component and the heating rod 82 or heating wire 83, are components directly involved in atomization. Each of those components is used to “convert liquid into aerosol or vapor.”

B. Other claim terms.

Petitioner proposes claim constructions for the terms “substantially,” “frame,” and “porous component.” Petition at 22-24. Patent Owner does not dispute the proposed construction for “substantially” to mean “in significant part or extent.”

Patent owner disagrees with the proposed construction for “frame” and “porous component.” But, because those constructions are not relevant to this response, Patent Owner does not dispute those constructions here. Patent Owner reserves its right to dispute those constructions if the IPR is instituted.

IV. GROUND 1: TAKEUCHI MODIFIED IN VIEW OF WHITTEMORE

Ground 1 proposes that claims 2 and 3 are obvious over the combination of Takeuchi (Ex. 1004) modified by Whittemore (Ex. 1005). The Petition at page 27 asserts that Takeuchi discloses all of the limitations of claims 2 and 3 except for the heating wire wound around a porous component. So, Petitioner relies on Whittemore for that limitation. Petition at 36 and elsewhere then argues that it would be obvious to modify Takeuchi by discarding the solid heater 42 of Takeuchi and replacing it with the wire of Whittemore wound around the protruding end of the pore structure of Takeuchi. Ex. 1004 at 9, Fig. 15 (302).

Even if Takeuchi is modified using Whittemore as proposed, Takeuchi as modified fails to disclose several limitations of both claims 2 and 3. Regardless, Petitioner provides no credible motivation why a person of ordinary skill would modify Takeuchi in view of Whittemore.

A. Claim 2: Limitations missing from the combination of Takeuchi and Whittemore.

1. The combination of Takeuchi and Whittemore does not disclose a porous component supported by a frame

Claim 2 recites “the atomizer assembly including a porous component supported by a frame having a run-through hole.” As shown in the embodiment of Figs. 17 and 18 of the '742 patent, the porous component is 81, the frame is 82 and the run-through hole is 821. Ex. 1001 at 5:42-49.

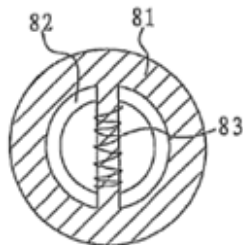


Fig. 17

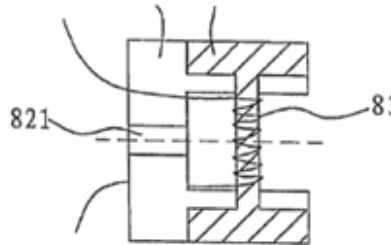


Fig. 18

At page 36 the Petition argues “that the heater 42 in Takeuchi could be embodied as a heating wire wound around the protruding end of the intercommunicating pore structure in the capillary tube 36.” Thus, in Ground 1 the presumptive porous component is the pore structure 302 in Figs. 14-15, moved into the capillary tube 36 in Fig. 1 of Takeuchi. The “porous component supported by a frame” limitation is discussed at pages 48-53 of the Petition and shown in the images below.

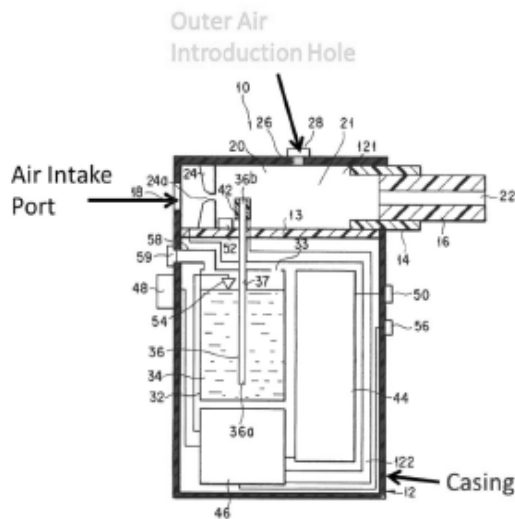


FIG. 1

Ex.1004, Takeuchi at Fig. 1 (annotated).

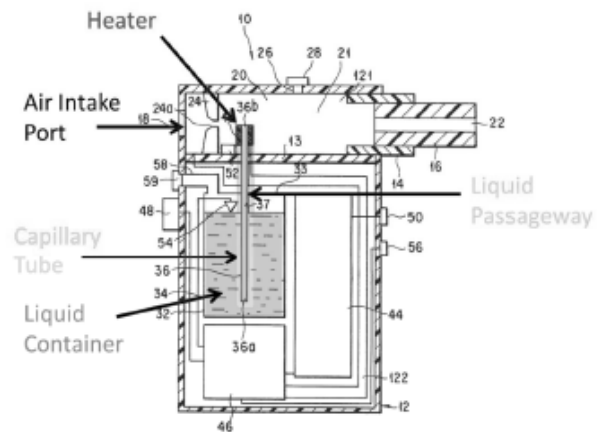
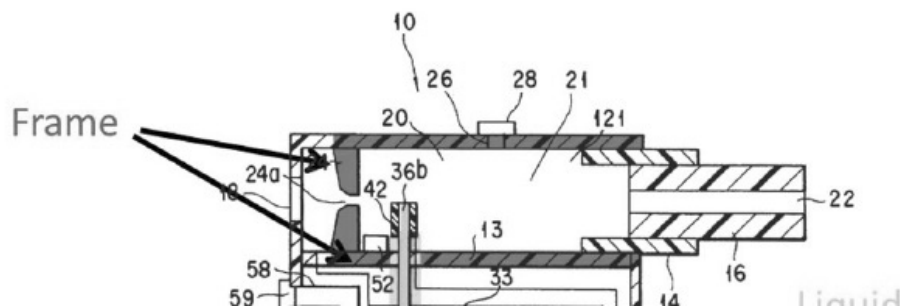


FIG. 1

Ex.1004, Takeuchi at Fig. 1 (annotated).

The Petition at page 45 equates the casing 12 shown in blue outline in the first image above to the claimed “housing.” At page 51 the Petition then argues that “[f]urther, as shown in Fig. 1, the capillary tube 36 is supported by a rigid structure (i.e., a frame) consisting of at least the partition wall 13, a squeeze plate 24, and the upper portion of the casing 12.” Ex. 1003 at ¶ 54 makes the same conclusion. The three components making up the alleged frame is shown in blue below.



But, neither Petitioner nor Dr. Collins provide any explanation why these disparate components together form a “frame.”

First, Takeuchi does not teach that the capillary tube 36 is attached to, let alone supported by, the partition wall 13. Rather, Takeuchi teaches “[t]he upper end portion of the capillary tube 36 **protrudes** into the upper chamber 121 of the casing 12 somewhat downstream of the squeeze plate 24 and is equipped with the heater 42 serving to gasify the liquid flavor source 34.” Ex. 1004 at 6:4-7 (emphasis added).

In other words, the capillary tube 36 protrudes through a clearance hole in the partition wall 13. The capillary tube 36 is not supported by the partition wall 13. The image on the right below is an enlargement of Figure 1 of Takeuchi.

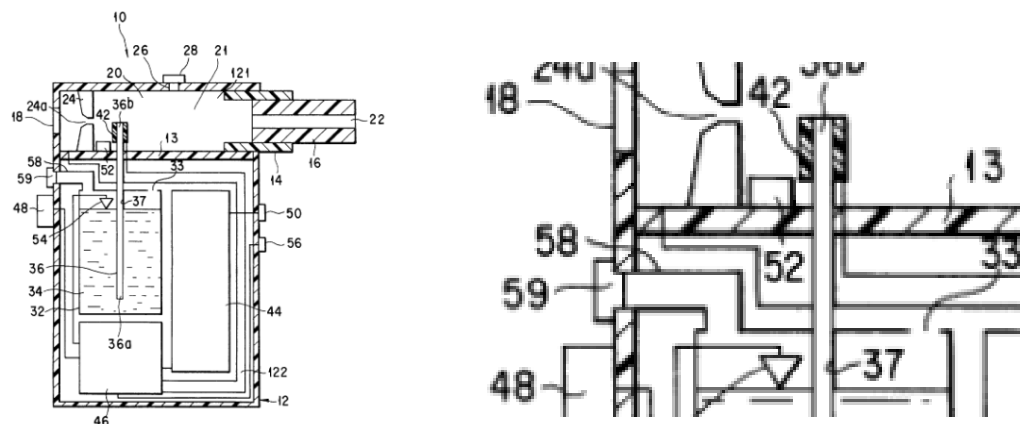


FIG. 1

An understanding of how the capillary tube 36 is supported is provided by Takeuchi's disclosure about preventing liquid from leaking out of the liquid container 32. Takeuchi states:

“It is desirable for the opening 33 to be formed at the highest position of the container 32 during the ordinary operation of the flavor-generating device and to have a sufficiently small diameter so that the liquid flavor source 34 may not leak to the outside therethrough even if the device is inadvertently turned upside down. For example, a pin hole extending through the wall of the container 32 satisfies the particular requirements of the opening 33.”

Ex. 1004 at 5:62-6:3.

To prevent leaking there must be a seal between the capillary tube 36 and the liquid container 32 at the top of the liquid container 32 where the capillary tube 36 extends out of the liquid container 32. Without a seal between the capillary tube 36 and the liquid container 32, liquid would leak out of the liquid container if the device was turned upside down. Ex. 2004 at ¶¶ 46-47.

If the capillary tube 36 is sealed to the liquid container 32, which it must be to avoid leaking, then the capillary tube 36 is necessarily attached to the liquid container 32, and thus supported on and by the liquid container 32. That is what Takeuchi means by “The upper end portion of the capillary tube 36 **protrudes** into the upper chamber 121...” as quoted above. The capillary tube protrudes through the partition wall 13, it is not supported by it.

Trying to support the capillary tube 36 with the partition wall 13 is not only not necessary, it would also be more difficult. Specifically, attaching the capillary tube 36 to the partition wall 13 would require precise alignment of the components. Misalignment resulting from mechanical tolerances would stress the capillary tube and the seal on the liquid container 32 around the capillary tube 36, which would increase risk of leaks. The person of ordinary skill, knowing these factors, would understand that the capillary tube 36 is supported by the liquid container 32, and that it is not supported by the partition wall 13. Ex. 2004 at ¶ 48.

Manufacturing the Takeuchi device with the capillary tube 36 supported on the partition wall 13, and not on the liquid container 32, would be difficult. Referring to Fig. 1 of Takeuchi above, this would require sealing the capillary tube 36 to the liquid container after the liquid container 32 is installed into the casing 12. A person of ordinary skill would understand that Takeuchi teaches sealing the capillary tube to the liquid container 32, to avoid this problem.

At page 52 the Petition states:

Further, the liquid container 32 does not support the as the [sic] capillary tube 36 and heater 42, because Takeuchi describes capillary tube 36 as being ‘inserted’ within the liquid container 32, and thus the liquid container 32 does not play a role in supporting or holding up the capillary tube 36.

Nonsense. Takeuchi anticipates the possibility of the device being inadvertently turned upside down and identifies opening 33 as the only possible point of leakage because capillary tube 36 is sealed into and supported by the liquid container 32.

Second, the disparate component that allegedly makes up the frame, squeeze plate 24, is entirely unrelated to the partition wall 13. There is no reason for viewing the two as a “frame.” Ex. 2004 at ¶52-54.

In relevant part, Takeuchi discloses:

“As shown in FIG. 1, the flavor-generating device 10 includes a casing 12 made of plastic, metal, ceramic, wood, etc. The inner space of the casing 12 is partitioned into an upper chamber 121 and a lower chamber 122 by a partition wall 13. As will be described herein later, the upper chamber 121 is used as a gas passageway 20 for forming a gaseous stream of a flavor which is to be inhaled by a user. On the other hand, the lower chamber 122 is used as a housing for housing a liquid container 32, a power source 44 and a control circuit.”

Ex. 1004 at 4:30-39.

Takeuchi makes no other mention of the partition wall 13.

On the squeeze plate 24, Takeuchi teaches:

“A squeeze plate 24 having a squeeze hole 24a formed in the central portion is arranged within the gas passageway 20 and positioned close to the air intake port 18. The squeeze hole 24a of the squeeze plate 24 act to regulate or direct the air introduced from the

intake port 18 selectively toward an outlet portion 36b of a capillary tube 36 described in detail below.”

Ex. 1004 at 4:61-67.

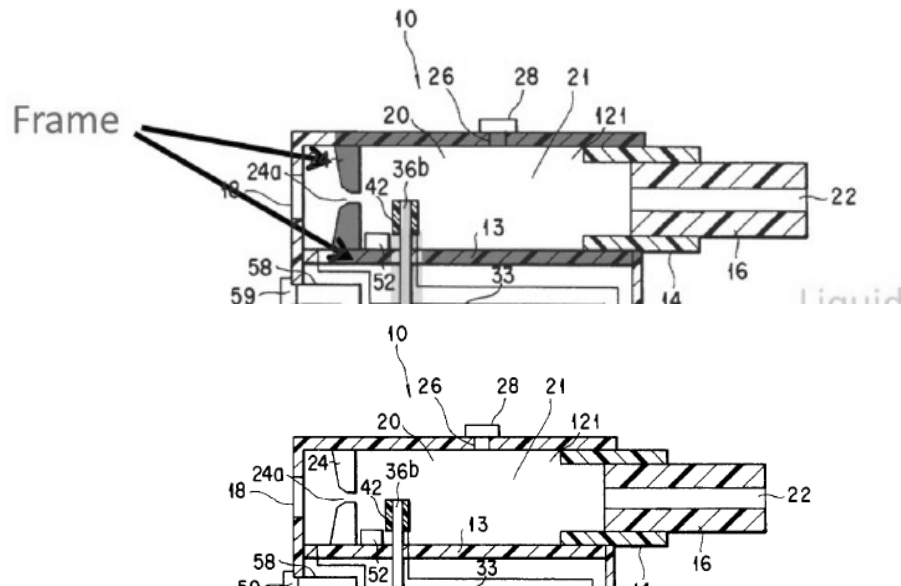
Takeuchi continues: “The upper end portion of the capillary tube 36 protrudes into the upper chamber 121 of the casing 12 somewhat downstream of the squeeze plate 24 and is equipped with the heater 42 serving to gasify the liquid flavor source 34.” Ex. 1004 at 6:4-7. In other words, the squeeze plate 24 in Takeuchi is entirely unrelated to the partition wall 13. Ex. 2004 at ¶54. The Petition provides no basis for grouping those components together as a frame. Petitioner’s conclusion is hindsight based on the claims. Ex. 2004 at ¶ 52.

Third, there is even less reason to include “the upper portion of the casing 12” as a piece of a frame, other than that Petitioner’s hindsight requires it. Ex. 2004 at ¶ 55. As in the quoted sections above, Takeuchi discloses a casing 12 having an upper chamber 121, a lower chamber 122, and a partition wall 13. Takeuchi does not speak of “an upper portion of the casing 12”.

The Petition does not say what or where “an upper portion of the casing 12” is, or where it starts or stops, why it is distinct from any other portion of the casing, or why a person of ordinary skill would view it as significant, apart from the casing as a whole.

How is the “upper portion of the casing 12” different from any other part of the casing 12? The first image below is from page 51 of the Petition. The blue

shading (indicating the presumptive “frame”) arbitrarily stops at 24. The second image below is from the original Fig. 1 of Takeuchi.



Why are the corners of the upper chamber 121 on the left side omitted from the presumptive frame? The answer is that including the corners, which form the air intake port 18, would result in the combination of Ground 1 lacking a “housing having one or more through-air-inlets”. In other words, the blue shading in the image above stops at 24 due to hindsight.

Ground 1 has an inherent conflict because the upper portion of the casing is either part of the “housing” or part of a “frame,” but not both. The upper portion

of the casing cannot be both because claims 2 and 3 require the “frame” to be within the “housing,” and the upper portion of the casing cannot be within itself. Ex. 2004 at ¶ 58.

Since the upper portion of the casing is an integral part of the casing and it encloses or houses the components in the upper chamber 121, Takeuchi discloses the upper portion of the casing is part of a housing and not part of a frame. The image on page 26 of the Petition (and also on page 29 of Exhibit 1003) shown below confirms that the upper portion of the casing is part of the housing, as the upper portion of the casing is shown in blue along with the rest of the casing.

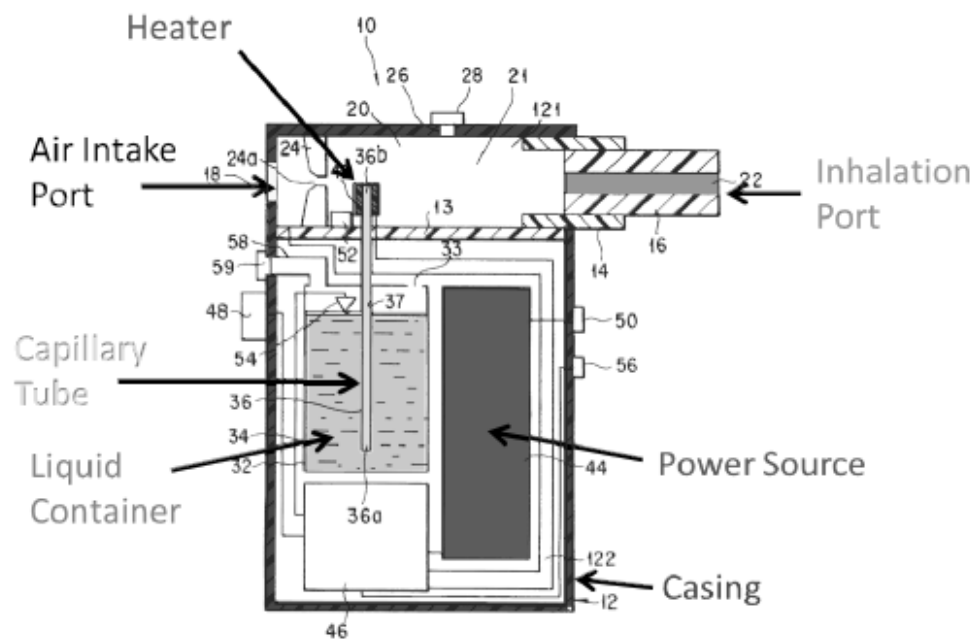


FIG. 1

Ex.1004, Takeuchi at Fig. 1 (annotated).

The position and function of the squeeze plate 24 relates to controlling air flow. Ex. 1004 at 4: 61-67. The squeeze plate 24 does not support anything so that it is not part of a “frame.” That leaves the partition wall 13 remaining. The partition wall 13 provides the floor of the upper chamber 121. Takeuchi discloses no other function of the partition wall 13 and makes no suggestion that the partition wall 13 is a “frame” or that it supports anything. Even if the partition wall 13 were a “frame,” it would have no “run-through hole” as required in the claim. The frame of claims 2 and 3 is shown as element 81 in Figs. 17 and 18 below of the ‘742 patent. Takeuchi discloses no equivalent structure.

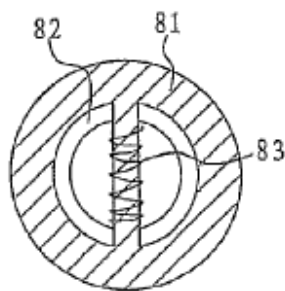


Figure 17

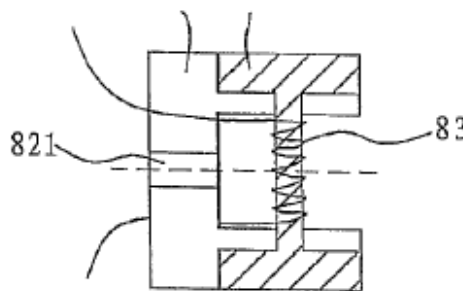


Figure 18

In summary, claim 2 includes “the atomizer assembly including a porous component supported by a frame having a run-through hole.” An atomizer assembly means components that convert liquid into aerosol or vapor. The partition wall 13, the squeeze plate 24, and the upper portion of the casing, alone or

together are not an atomizer because they are not components that convert liquid into aerosol or vapor. Even if one or more of these components could be considered to be a “frame,” they would still not be a “frame” that is included in an atomizer assembly. Takeuchi discloses no element comparable to the frame of claims 2.

2. The combination of Takeuchi and Whittemore does not disclose a atomizer assembly including a porous component supported by a frame having a run-through hole

An “atomizer assembly” is an assembly of components that convert liquid into aerosol or vapor. Ground 1 asserts that Takeuchi discloses a “frame” of at least the partition wall 13, a squeeze plate 24, and the upper portion of the casing 12. Yet none of these elements, alone or combined, is an atomizer assembly or is included in atomizer assembly. In Takeuchi the liquid would still gasify (via the heater 42) even if every one of those elements were removed. In other words, even if the partition wall 13, the squeeze plate 24 and the upper portion of the casing is a “frame”—they are not—, there is no “atomizer assembly includes a frame having a run-through hole” as claimed. Ex. 2004 at ¶ 58-59.

In addition, even if the capillary tube 36 was supported by the partition wall 13, the “frame” as proposed in the Petition at page 51 would then be the partition wall 13, without the squeeze plate 24 and upper portion of the housing because the squeeze plate 24 and upper portion of the housing do not support the capillary tube

36. The partition wall 13, however, has no run-through hole as recited in claims 2 and 3.

B. Claim 3: Limitations missing from the combination of Takeuchi and Whittemore.

1. The combination of Takeuchi and Whittemore does not disclose a porous component between the frame and the outlet

Claim 3 recites “the atomizer assembly includes a frame having a run through hole, and a porous component between the frame and the outlet.” Petitioner addresses this limitation at section 9.3.4 of its brief which is essentially a cut and paste copy of the argument set forth in section 9.2.5 of the brief which is directed to the claim 2 limitation of “the atomizer assembly including element of a porous component supported by a frame having a run-through hole.” Brief, pp., 48-53, 62-66. Petitioner’s expert addresses this limitation in the claim charts which correspond to the same claim limitations, and again repeats the arguments directed to the claim 2 limitation that requires the frame to support the porous component for the claim 3 limitation regarding the location of the porous component - between the frame and the outlet. Ex. 1003 at A-16 to A-26, A-52 to A-60. No explanation or analysis is provided regarding the porous component location by Petitioner or its expert.

The English idiom, a picture is worth a thousand words, is a particularly appropriate here. Below is Petitioner and its expert's depiction of this claim limitation.

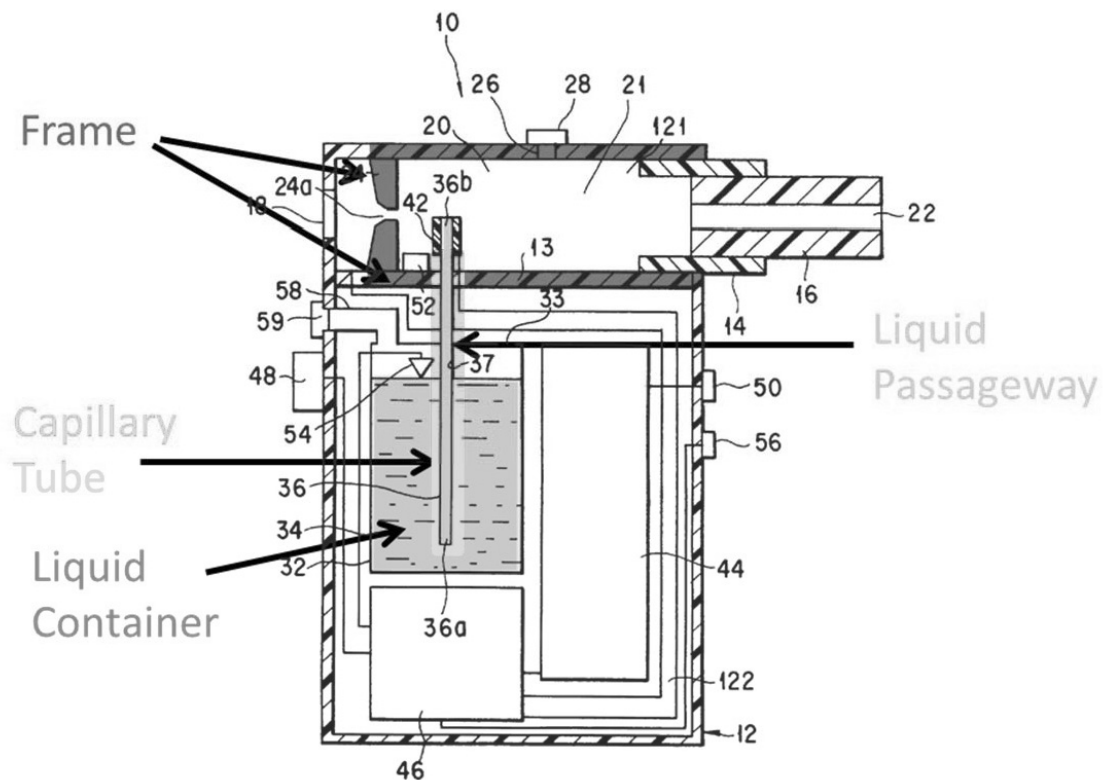


FIG. 1

As shown in Petitioner and its expert's annotated figure of Takeuchi shows above, the claim 3 limitation cannot be met because the frame (shown in blue) continues far past the purported porous component (shown in green) such that it

would be more correct to characterize the frame as between the porous component and the outlet (22).

And, as explained above with respect to claim 2, Petitioner's proposed frame includes a portion of the housing. Since claim 3 requires an frame in an atomizer assembly, and an atomizer assembly in a housing, Takeuchi does not disclose this claim limitation.

2. The combination of Takeuchi and Whittemore does not disclose a heating wire wound on a part of the porous component which is substantially aligned with the run-through hole

Even assuming Takeuchi discloses a frame—it does not—the Ground 1 modification of Takeuchi does not disclose a “a heating wire wound on a part of the porous component which is substantially aligned with the run-through hole.” Takeuchi's squeeze hole is configured to direct air over the outlet of the capillary tube such that the tube is not “substantially aligned with the run-through hole” as required by claim 3. Ex. 2004 at ¶ 63-64.

Fig. 18 of the '742 patent on the left below shows a heating wire wound on a porous component in the path of air flowing through the run-through hole. The image on the right is a Ground 1 construction from page 55 of the Petition.

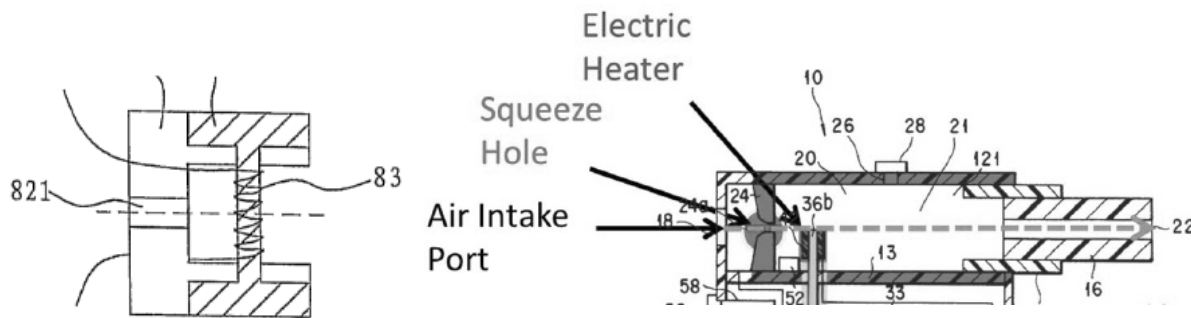


Figure 18

C. The Petition Fails to Provide Any Credible Reason to Modify Takeuchi in view of Whittemore.

1. Takeuchi teaches away from a wire coil

The Patent Owner agrees that heater coils were well-understood at the time of the invention, as stated at paragraph 41 of the Collins Declaration (Ex. 1003), and that they were also well understood at the time of the Takeuchi application. Yet Takeuchi describes only a solid heater. Why would a person of skill in the art reverse this disclosure of Takeuchi and replace the solid heater of Takeuchi with a wire coil?

The Petition at page 37 states the conclusion that:

“Because both Takeuchi and Whittemore teach the use of heaters provided on a porous wick or tube in devices for vaporizing liquid to be inhaled by a person, it would have been obvious to one of ordinary skill in the art to substitute the heater comprising a heater wire wound on a part of the porous component from Whittemore for the heater in Takeuchi, to achieve the predictable result of vaporizing

liquid from the liquid container that has been absorbed into the porous capillary tube.”

Takeuchi alone already achieves the result of instantly vaporizing liquid. Ex. 1004 at 7:61-62. The prior art is presumed to be operable and enabling. M.P.E.P. § 2121. The conclusion at page 37 of the Petition is entirely unsupported. Ex. 2004 at ¶ 66.

The Petition at page 38 argues:

“Using the known technique of a heating wire wound on a part of a porous wick as taught by Whittemore to improve a similar vaporization apparatus in the device of Takeuchi would have been obvious to one of ordinary skill in the art, as it improves the Takeuchi device in the same manner as the therapeutic vaporization device set forth in Whittemore.”

What is the improvement? There is no evidence this modification would improve Takeuchi. Indeed the evidence is that this modification would degrade Takeuchi. Ex. 2004 at ¶¶ 66-67, 69-70. A wire coil has less surface area to contact a porous wick; is more difficult to control relative to other heaters such as the solid heaters in Takeuchi, because the resistance of the wire changes with temperature and aging; the strength of the wire is degraded by thermal cycling and due to corrosion resulting from constant contact with liquid; the wire coil is less durable than a solid heater, and wire coil must be of a material that does not evolve undesired compounds while heating liquid flavor medium. Ex. 2004 at ¶ 67. A

solid heater avoids these problems due its geometry and because the actual heating elements do not come into direct contact with the liquid. Ex. 2004 at ¶ 67.

The Petition at page 39-40 argues:

Additionally, such a modification would have been obvious because Takeuchi recognizes the importance of constructing a device that is ‘small in size and light in weight.’ Ex.1004 at 1:65-67; Ex.1003 at ¶73. Takeuchi also expressly teaches the importance of providing a device ‘which can be driven with a low energy.’ Ex.1004 at 11:11-12; Ex.1003 at ¶73. Using the wound heating wire of Whittemore in the Takeuchi device achieves both of these objectives. A person of ordinary skill in the art would have recognized that by substituting a wire coil for a larger piece of metal, such as the ‘ring-shaped heater,’ ‘plate-like heater,’ and ‘rod-like heater’ devices discussed in Takeuchi, the device is made more lightweight because it requires less metal material, thereby achieving Takeuchi’s stated goal of providing a small and light device.

Consider the heater 42 in Fig. 1 of Takeuchi relative to the filament 3 of Whittemore:

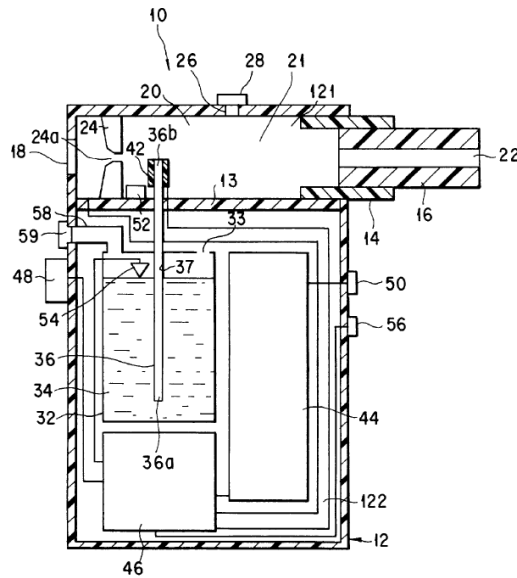
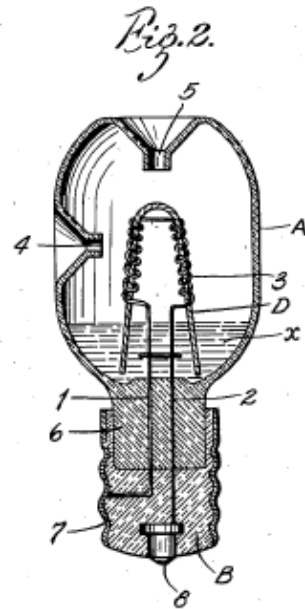


FIG. 1



Takeuchi's heater 42 is a small element relative to the Takeuchi device 10. In view of the advantages that a solid heater provides, a person of ordinary skill would not consider replacing the heater 42 to reduce size or weight, because the size and weight of the heater 42 are trivial to the overall device. Ex. 2004 at ¶ 69.

The filament 3 in Whittemore is a relatively large element. Moving the filament 3 into Takeuchi would either increase the size of the Takeuchi device, or result in a modified Takeuchi device with insufficient heating. Ex. 2004 at ¶ 69.

Relative to the argument at page 40 of the Petition about a wire coil using less energy, since the surface area contact between the wire coil and the pore structure 302 is less than in Takeuchi unmodified, the modified Takeuchi of

Ground 1 could require more electrical energy than the solid heater 42 disclosed by Takeuchi. Whittemore does not discuss energy consumption and Takeuchi refers only in passing to a device which can be driven with low energy consumption. It is therefore not possible to conclude that a wire coil of Whittemore would use less energy than the solid heater 42 of Takeuchi, with equivalent performance. Ex. 2004 at ¶¶ 69-70. The conclusion in the Petition and in the Collins Declaration to the contrary is a conclusion with no technical basis.

The Collins Declaration (Ex. 1003) at paragraph 72 states:

“Using the known technique of a heating wire wound on a part of a porous wick as taught by Whittemore to improve a similar vaporization apparatus in the device of Takeuchi would have been obvious to one of ordinary skill in the art, as it improves the Takeuchi device in the same manner as the therapeutic vaporization device set forth in Whittemore.”

But what is the improvement realized by the modification of Takeuchi? Collins does not say. The evidence is that the Ground 1 modification of Takeuchi would degrade the Takeuchi device. Ex. 2004 at ¶¶ 66-67, 69-70.

The Petition argues at pages 33-41 (Section 9.1) that the Ground 1 modification could be made, that it is obvious, that it is simple, that it provides a predictable result and that it uses known techniques. The Petition discusses how to make modification, but not why to make the modification. At page 38 the Petition states:

“Using the known technique of a heating wire wound on a part of a porous wick as taught by Whittemore to improve a similar vaporization apparatus in the device of Takeuchi would have been obvious to one of ordinary skill in the art, as it improves the Takeuchi device in the same manner as the therapeutic vaporization device set forth in Whittemore.”

What is the improvement? The Petition does not say.

At pages 39-40 the Petition argues that by substituting a wire coil for a larger piece of metal, the device is made more lightweight, and that a wire coil reduces power consumption, because a thin coil of wire requires less energy to heat than a larger piece of metal. That is all the Petition has to say as to why to make the Ground 1 modification. Neither reason is persuasive though because the presumptive weight savings is trivial and the presumptive energy savings is entirely without technical basis. Ex. 2004 at ¶¶ 66-67, 69-70. The heaters in Figs. 1-5 of Takeuchi are exceptionally small to begin with, and correspond with the preferred 0.1 to 0.8 mm diameter of the capillary tube 36 described at Col. 5, lines 53-56 of Takeuchi.

More is required to demonstrate a reasonable likelihood that the petitioner would prevail with respect to claims 2 or 3. In denying the VMR Petition filed against the ‘742 patent, the Board wrote:

A showing of obviousness must be supported by an articulated reasoning with rational underpinning to support a motivation to combine the prior art teachings. *KSR Int’l Co. v. Teleflex, Inc.*, 550 U.S. 398, 418 (2007) (*citing In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006)). Petitioner asserts that a person having ordinary skill in the art would be motivated to modify the Hon electronic cigarette to include a heating wire wound on a porous component “by the interest of providing more efficient, uniform heating” that “would enhance commercial opportunities and make the product more desirable by increasing the efficiency of atomization.” Pet. 23. Petitioner does not provide sufficient explanation as to why a person having ordinary skill in the art would have wanted to provide “more efficient, uniform heating” in the Hon cigarette. Petitioner does not direct us to, nor do we discern, statements in Hon or Susa with respect to the efficiency—or inefficiency—of atomization within the described articles. Petitioner’s unsupported, conclusory statements do not constitute articulated reasoning with rational underpinnings as to why one of ordinary skill in the art would modify Hon in view of Susa’s teachings to arrive at the claimed invention.

Ex. 2001 at 19.

The present Petition uses generalized arguments similar to those rejected in the VMR Petition, i.e., make it improved, more energy efficient, and lighter, with no credible factual explanations as to how the modification is improved in any way. It should be denied for the same reasons.

2. The Ground 1 modification changes the principle of operation of Takeuchi contrary to M.P.E.P. § 2143.VI

In Takeuchi, and in the modification of Takeuchi of Ground 1, atomization occurs without air flow, as shown e.g., in Fig. 2B and discussed at Takeuchi, Ex. 1004 at 7:60-63.

In Takeuchi, the atomized particles are ejected into an air flow stream. Specifically, Takeuchi discloses that “the liquid flavor source 34 is already transported to the outlet port 36a of the capillary tube 36 as shown in FIG. 2A. If the heater 42 is turned on under this

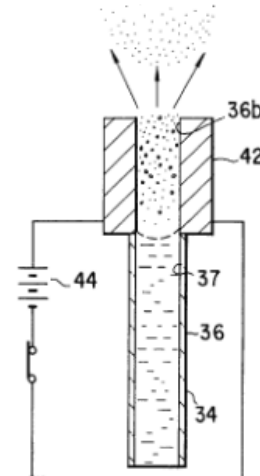


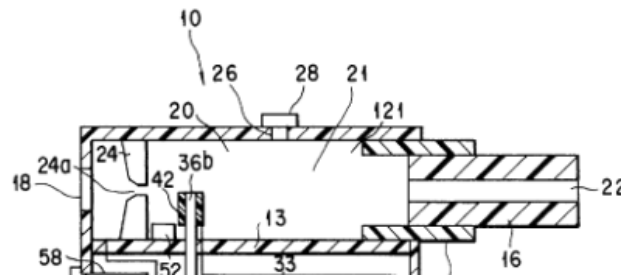
FIG. 2B

condition, the liquid flavor source 34 within the outlet port 36a is instantly gasified by the heat generated from the heater 42 as shown in FIG. 2B so as to be supplied into the gas passageway 20.” Ex. 1004 at 7:57-63.

Takeuchi continues, “[t]he gasified flavor source is mixed with the main air introduced through the air intake port 18 and the squeeze hole 24a into a region around the outlet port 36a of the capillary tube 36 in accordance with the inhaling action of the user and, then, the mixture is transferred into the inhalation port 22.” Ex. 1004 at 8:5-10.

As shown in Fig. 2B, as well as in Figs. 3-5, gasification in Takeuchi takes place within the heater, where there is no air flow. In Takeuchi, air flow is used only after the liquid is gasified. Ex. 2004 at ¶¶ 71-72, 75.

“A gas containing a flavor, which is formed by the heating of the liquid flavor source with a heater 42, is mixed with the outer air within the cooling chamber 21 so as to be cooled and, then, flows to reach the inhalation port 22.” Ex. 1004 at 5: 7-11.



In claim 2, on the other hand, the heating wire must be in the path of the air flow through the run-through hole 821, and in claim 3 the heating wire is wound on a part of the porous component which is substantially aligned with the run-through hole. As such, the air flow participates in atomization. Ex. 2004 at ¶ 72-73. These factors show that the Ground 1 modification of Takeuchi changes the principle of operation of this reference, contrary to *In re Ratti*, 270 F. 2d 810, 813 (CCPA 1959) as discussed in M.P.E.P. § 2143.01 I, V, VI.

V. GROUND 2: BROOKS IN VIEW OF TAKEUCHI

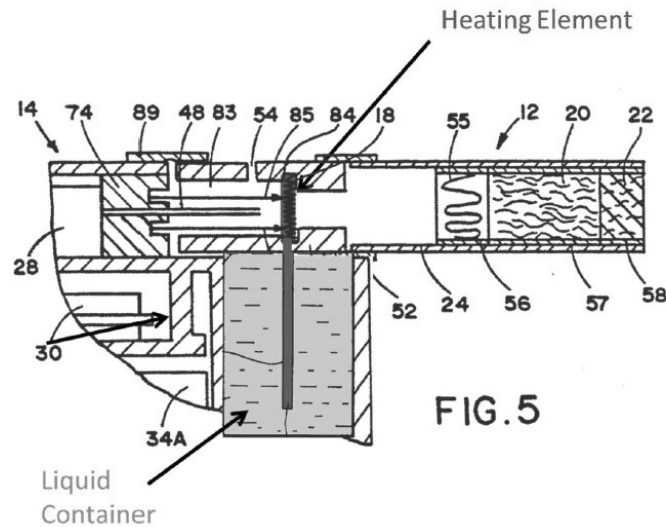
The Petition at pages 73-98 appears to assert that Brooks discloses all of the limitations of claims 2 and 3 except for the liquid storage component (at page 80) and the porous component substantially surrounded by the liquid storage component (at page 88), but that Takeuchi discloses these limitations. The Ground 2 argument fails because, even if Brooks is modified using Takeuchi as proposed, several limitations of both claims 2 and 3 are absent. Moreover, one skilled in the art would not have been motivated to modify Brooks in view of Takeuchi as claimed.

A. Limitations missing from the combination of Brooks and Takeuchi.**1. The combination of Brooks and Takeuchi does not disclose a heating wire wound on a part of the porous component**

Claims 2 and 3 include “a heating wire wound on a part of the porous component.”

Nowhere does Brooks or Takeuchi disclose or suggest “a heating wire wound on a part of the porous component.” Petitioner’s expert does not even suggest that the proposed combination results in a “heating wire wound on a part of the porous component.” Instead, he refers to this limitation as “contacting or surrounding a porous component of a heating element.” Ex. 1003, ¶ 78 (see Fig 5

below from ¶ 78). There is a complete failure of proof that the combination of Brooks and Takeuchi meets this claim limitation.



The discussion at pages 84-88 of the Petition appears to equate the heating element 18 of Brooks to this limitation. The heating element 18 of Brooks is a material which is adsorbent, porous and wettable (Ex. 1006 at 7:26-30) and it is impregnated with aerosol forming substance, which may be a liquid.

If the Petition is correct in asserting that the heating element 18 of Brooks is a “heating wire” and also the “porous component,” then it cannot also be a “heating wire wound on a part of the porous component,” because the heating element 18 is not, and cannot be, wound on itself. Indeed, Collins testimony reflects that conclusion. Ex. 1003, ¶ 78.

So, at page 85 the Petition argues:

“To the extent that Brooks does not disclose a heating element that comprises a heating wire wound on a part of a porous substrate or component, it would have been obvious based on the knowledge of a person of ordinary skill in the art to modify Brooks to include a heating wire wound on a part of a porous substrate or component.”

This statement is wrong as a matter of law because in a section 103 analysis, knowledge of a person of ordinary skill, or common sense, cannot substitute for a non-trivial claim limitation not found in the prior art. *See Arendi S.A.R.L v. Apple Inc., Google Inc., Motorola Mobility LLC*, __F.3d__, No. 2015-2073, 2016 WL 4205964, *4, *9 (Fed. Cir. Aug. 10, 2016).

Pages 84-86 of the Petition cite to a list of heating elements in Brooks including “porous substrates in intimate contact with resistance heating components” for the conclusion that one of ordinary skill would have understood this include a heating wire wound around a porous substrate. Based on the content of Brooks, this statement is incorrect because Brooks discloses achieving intimate contact only via impregnating the heating element 18 with aerosol forming substance. Ex. 1006 at 7:34-48, 8: 4-7, 17:6-7, 18:39-40, 19:21-22, 20:19-20.

Brooks also discusses patents in the Background of the Invention at Cols. 1-2 which use a wire coil, e.g., McCormick at 1:62-66 describing a resistance coil wound on an insulating and heat resistance material; Kovacs at 2:40-43 and

Nilsson at 3: 1-6, both disclosing a heating coil. Brooks concludes at 3:49-55, Ex. 1006, that:

“Despite many years of interest and effort, none of the foregoing articles employing electrical energy has ever realized any significant commercial success, and it is believed that none has ever been widely marketed. Moreover, it is believed that none of the foregoing electrical energy articles is capable of providing the user with the sensations of cigarette or pipe smoking.”

A person of ordinary skill in the art, in view of this discussion in Brooks, would understand that Brooks teaches away from using a heating coil. Ex. 2004 at ¶¶ 81-82.

The mention in Brooks to “porous substrates in intimate contact with resistance heating components” refers to substrates. In the context of Brooks a substrate is an element that holds (but does not move or wick) the aerosol forming substance (a liquid impregnated into the substrate in each of the Examples of Brooks). A substrate is not a wick. Claims 2 and 3 on the other hand include a porous component, not a substrate, with the porous component moving liquid from a liquid storage component--a function absent from Brooks and not performed by a substrate. Ex. 2004 at ¶ 83.

Page 86 of the Petition refers to Whittemore and McCormick, yet these references are not part of the Ground 2 prior art. And, even Petitioner’s expert does

not suggest that that winding a coil around a part of the porous component is obvious in light of Brooks in view of Takeuchi.

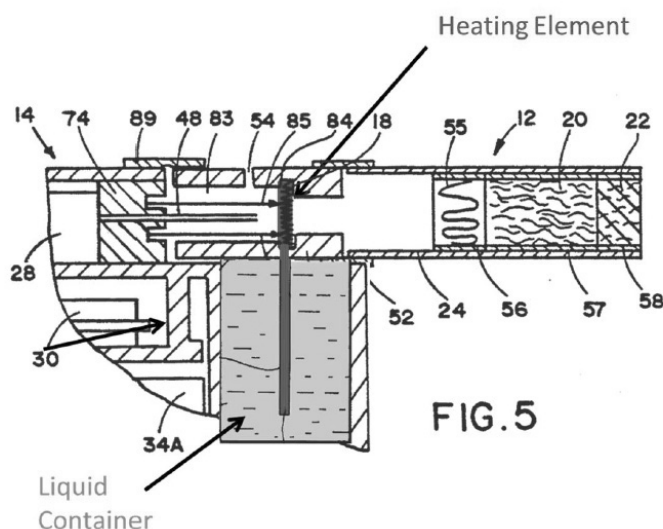
B. The Petition Fails to Provide Any Credible Reasons to Modify Brooks in view of Takeuchi.

1. A person of skill in the art would not be motivated to modify Brooks in light of Takeuchi in accordance with Petitioner's proposed combination

The Petition at page 89 asserts that:

“In the proposed combination of Brooks with Takeuchi, the porous substrate of the resistance heating element 18 taught in Brooks would be extended into the liquid container 32 of Takeuchi, in the same manner as Takeuchi teaches inserting its capillary tube 36 into the liquid container 32.”

Fig. 5 from page 75 of the Petition is useful to consider.



This modification requires the following steps:

AA. Take the liquid container 32 of Takeuchi and add it to Brooks.

BB. Discard the capillary tube 36 from the liquid container 32 of Takeuchi.

CC. Make a hole in the collar 49 of Brooks and extend the heating element 18 of Brooks through the hole and into the liquid container 32 of Takeuchi.

DD. Add a seal around the heating element 18 to try to prevent leaking from the liquid container 32 added from Takeuchi.

EE. Redesign the electrical system, air openings and flow characteristics of Brooks to operate with a heating element 18 now constantly resupplied with, and saturated with, liquid from the liquid container.

A person of ordinary skill would not take these steps, for the following reasons:

On step AA, Brooks uses a heating element which also stores the flavor medium. The Brooks device provides 6-12 puffs, which is the puff life of a typical cigarette. Ex. 1006 at 3:15-29. Nothing in Brooks suggest a need to provide for more than 6-12 puffs from each cartridge 12. Nothing in Brooks suggests providing more than 6-12 puffs outweighs the disadvantages of adding a liquid container (i.e., more components, weight, size, risk of leaks, etc.). Step AA also converts the cartridge or cigarette 12 of Brooks from a disposable component into a permanent component of the device 10--again changing the principle of operation of Brooks. Ex. 2004 at ¶¶ 86-92.

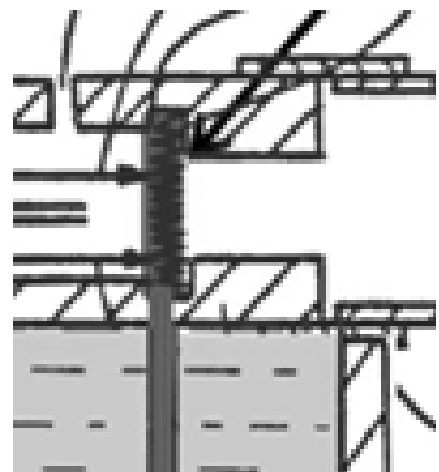
On step BB, all of the embodiments of Takeuchi use the capillary tube 36. Nothing in Takeuchi suggests using the liquid container alone. Ex. 2004 at ¶ 93.

Step CC transforms the heater 18 of Brooks into a wick. Nothing in Brooks suggests that the heater 18 could operate as a wick. Ex. 2004 at ¶ 94. Rather Brooks specifies that “[t]he heater 18 is an air permeable high surface area electrical resistance heating element that carries aerosol forming substances.” Ex. 1006 at 4:7-12.

If the heater/wick of Takeuchi as modified extends into the liquid container and is thus constantly saturated with liquid, it would not be air permeable as specified by Brooks.

Holding a flavor medium formed initially from a liquid on a substrate is different from wicking a liquid. In view of the divergent functions between the heater 18 of Brooks and the capillary tube 36 of Takeuchi (with or without the pore structure 302), a person of ordinary skill would not be led to extend the heater 18, and then substitute it for a capillary tube. There is simply no need to “wick” liquid from a separate liquid supply in Brooks.

Relative to step DD above, and referring to the detail of Fig. 5 from page 75 of the Petition (right), extending the heater 18 of Brooks into the liquid container added from Takeuchi would require



adding a hole in the collar 49 for the extended heater to pass through, which in turn would require a seal around the extended heater 18, to try to prevent leaking. Even with an effective seal however, excess liquid might collect inside of the collar 49, via liquid moving via capillary action through the extended heater 18 into the collar 49. A person of ordinary skill would not be led to the modification of Brooks proposed at pages 88-89 of the Petition for this reason as well. Ex. 2004 at ¶ 96.

On step EE above, Brooks uses a specific electrical system (discussed at 9:50-65; 10:13-33; 13:7-15:53) to operate a heating element 18 having a specific electrical resistance (18 or 20 ohms in the Examples) and a specific and fixed amount of aerosol forming substance (35 mg, 47 mg and 38 mg in the Examples). The Ground 2 modification of Brooks changes these parameters because the heating element 18 is constantly saturated with liquid. Consequently the electrical system would require redesign to match whatever the resistance of the constantly saturated heating element 18. Ex. 2004 at ¶ 97.

2. Takeuchi teaches away from a replaceable atomizer assembly

Brooks uses an atomizer assembly having liquid impregnated into a heating element in a replaceable cartridge or cigarette 18. By design, the heating element provides controlled production of aerosol throughout the puff, over 6 to 10 puffs, which is the puff life of a typical cigarette. Brooks Col. 4, lines 2-6, Ex. 1006.

Takeuchi uses bulk liquid storage moved in a capillary tube to a heater. At 1:32-38, Takeuchi, Ex. 1004, discussing a prior art reference observes:

“In this flavor-generating device, the solid flavor material and the heating element collectively constitute an integral flavor-generating means. It follows that, after consumption of the flavor material, it is necessary to replace or discard the heating element together with the flavor material. This may be expensive and give rise to an environment problem.”

This teaching by Takeuchi would discourage combining Takeuchi with a device such as Brooks which uses a replaceable cartridge. Ex. 2004 at ¶ 100.

3. The reasoning in the petition for modifying Brooks in view of Takeuchi is illusory

The Petition at pages 73-76 argues that it would be obvious to modify Brooks to include the selected elements from Takeuchi, because Brooks as modified would avoid the need for frequently replacing the cartridge and reduce the waste resulting from replacing the cartridge. Yet Takeuchi alone already achieves those advantages. The modification of Brooks in Ground 2 has no advantages over Takeuchi alone, and it adds disadvantages. Adding the liquid container adds size, weight and cost. Adding the liquid container also creates risks of leaking where the wick passes out of the liquid container. Ex. 2004 at ¶ 104. The Petition and the Collins Declaration do not explain how the Ground 2

modification of Brooks might overcome that problem, or why a person of ordinary skill would modify Brooks in a way that creates that problem.

The only reason Petitioner's expert offer for combining Brooks and Takeuchi is to "reduce[s] the need to swap disposable cartridges." Ex. 1003 ¶ 77. Of course, being able to provide 6-10 puff of aerosol with a disposable cartridge that avoids the need for a separate liquid container seems to be the point of Brooks. Adding Takeuchi's liquid container to Brooks would add significant weight to Brooks, and according to Petitioner's expert reducing weight is the purported reason to combine Whittemore with Takeuchi. This contradiction underscores that Petitioner's combinations are driven by hindsight.

Brooks describes very specific objectives for its preferred heating elements stating that they must have "low mass, low density, and moderate resistivity," be "thermally stable at the temperatures experience during use," "heat and cool rapidly," use energy efficiently, provide "almost immediate volatilization of the aerosol forming substance," prevent waste of the aerosol forming substance, and permit "precise control of the temperature range experienced by the aerosol forming substance." Brooks Col. 7, lines 34-47, Ex. 1006. Modifying Brooks by replacing its heating element with a liquid tank-fed pore structure of Takeuchi ignores these specific objectives of Brooks.

4. Takeuchi is not reasonably pertinent to Brooks

The problem faced by Brooks is stated concisely as:

“However, it is believed that it would not be possible to coat a Nichrome heating element, of the type described by Gerth et al, with enough vaporizable liquid material to deliver sufficient volatile material to the user, over the 6 to 10 puff life of a typical cigarette.”

Ex. 1006 at 3:30-34.

Gerth et al, U.S. Patent No. 4,735,217 discloses:

“It is also believed feasible to coat the heating element 72 with a nicotine-containing compound in lieu of using a vaporizable pellet 40. Such easily replaceable, coated heating elements could be used as an alternative to vaporizable pellets and a non-disposable heating element, as disclosed herein.”

Ex. 2007 at 8:57-63.

Those four lines are all Gerth says about coating a heating element, with the rest of the disclosure of Gerth directed to heating a vaporizable pellet. While Gerth is silent on the number of puffs a coated heating element may provide, the vaporizable pellet in Gerth was tested for 50 puffs. Ex. 2007 at 8:31-42.

Brooks discusses other prior art in Columns 1-2 capable of delivering large numbers of puffs by using a vaporizable pellet (Gerth) or a liquid supply container (Whittemore), and others. Yet Brooks rejects those approaches in favor of the suggestion in Gerth of using an impregnated heating element 18 which serves as

both the liquid source and the heating element. That allows Brooks to volatilize the aerosol forming material almost immediately, to better simulate a cigarette.

“Preferred articles can produce aerosol almost immediately upon commencement of a puff, as well as provide the controlled production of aerosol throughout the puff and over the 6 to 10 puff life of a typical cigarette.”

Ex. 1006 at 4:2-6.

Brooks further recites that:

“Depending upon factors such as the wattage generated by the power source and the resistivity of the heating element, preferred current regulating means of the invention are capable of producing almost immediate aerosol generation upon puffing, preferably within about 0.5 second, more preferably within about 0.1 second.”

Ex. 1006 at 5: 27-33.

Even with limited puffs between changing cartridges, Brooks has the advantages of immediate aerosol generation (5:27-33); rapid cooling to prevent waste of the aerosol forming substance (7:36-44); controlled production of aerosol throughout the puff (4:2-6); precise temperature control (7:43-47); and no detectable carbon monoxide (18:30-34). Swapping out the Brooks heating element 18 for a constantly wetted wick would eliminate those advantages. Ex. 2004 at ¶ 109.

Given Brooks' focus on an impregnated heating element as suggested by Gerth, Takeuchi, which uses a liquid container, is not reasonably pertinent to Brooks. "In order for a reference to be 'reasonably pertinent' to the problem, it must 'logically have commended itself to an inventor's attention in considering his problem.'" M.P.E.P. § 2141.01(a)I (citations omitted). "In determining whether a reference is reasonably pertinent, an examiner should consider the problem faced by the inventor, as reflected - either explicitly or implicitly - in the specification." *Id.*

The problem addressed by Brooks is whether it is possible to coat a heating element with enough vaporizable liquid material to deliver sufficient volatile material to the user, over the 6 to 10 puff life of a typical cigarette. Ex. 1006 at 3:30-34.

Providing more than 12 puffs is not a problem considered by Brooks. A person of ordinary skill in the art would not take the liquid container of Takeuchi and add it to Brooks, because Takeuchi is not reasonably pertinent to Brooks.

Takeuchi is also not reasonably pertinent to Brooks for additional reasons. In Brooks the heating element 18 is porous to allow impregnation of the flavor medium. The flavor medium is static. It does not move. In Takeuchi, on the other hand, the pore structure 302 is used to transport liquid from a liquid container to a

heater. These would not be viewed as equivalents by a person of ordinary skill in the art.

The heating element 18 in Brooks holds a precise and fixed amount of flavor medium.

“The heating element was impregnated, dropwise, with 35 mg of a liquid aerosol forming substance comprising a mixture of 31 parts propylene glycol, 62 parts glycerin and 7 parts of a tobacco extract.”

Ex. 1006 at 17:6-9.

Connecting the heating element 18 of Brooks to the liquid container of Takeuchi as in Ground 2 would create a continuous flow of liquid to the heating element--not what Brooks contemplates.

Brooks avoids the complications of having a liquid container and the attendant risk of leaks, and the weight and space requirements of a liquid container the additional components to transport liquid from the liquid container to a heater. The Ground 2 modification negates those advantages.

5. The Ground 2 modification changes the principle of operation of Brooks contrary to M.P.E.P. § 2143.VI

Brooks uses a heater 18 that carries the aerosol forming substance. This single element provides for both holding and heating of the aerosol forming substance. The aerosol forming substance is vaporized in place. There is no wicking. Adding a liquid container from Takeuchi onto Brooks, and changing the

heater 18 into a wick cooperating with the liquid container changes the principle of operation of Brooks from a combined hold and heat in place device, to a wick and heat device. The Ground 2 modification also changes the disposable cartridge or cigarette 12 of Brooks into a permanent part of the Brooks device 10, which also changes the principle of operation of the device 10. Ex. 2004 at ¶ 112.

C. The Petition provides no motivation for the Ground 2 modification.

At pages 73-98 the Petition argues about how to make the Ground 2 modification. The only statement in the Petition as to **why** to make the modification is at page 74-75, where the Petition argues that the Ground 2 modification of Brooks increases the number of puffs that Brooks can provide. Yet Brooks does not recognize or disclose any problem with providing 6-10 puffs. Where the prior art does not recognize an alleged problem, there is no reason for one of ordinary skill in the art to attempt to improve upon that prior art. *Leo Pharm. Prod, Ltd. v. Rea*, 726 F.3d 1346, 1354-57 (Fed. Cir. 2013). The modification of Ground 2 is improper because it is based on solving a problem in Brooks that does not exist.

In IPR2015-01299 relating to another electronic cigarette patent, the Board denied the Petition, writing:

“Petitioner asserts that a person having ordinary skill in the art, considering together the teachings of Higgins, Ingebrethsen, and

Haglund, ‘would have had reason to surround the coil of Higgins with a tube made of a fiber material, to efficiently transfer sufficient heat from the coil to the liquid tobacco flavor medium to cause a vapor (and ultimately an aerosol) to form.’ Pet. 23. Petitioner, however, does not provide sufficient explanation as to why a person having ordinary skill in the art would have wanted to provide more efficient heat transfer in the Higgins electronic smoking article. Petitioner does not direct us to, nor do we discern, statements in Higgins with respect to the efficiency—or inefficiency—of heating within the described article.... Higgins, however, is not concerned with inefficient heat transfer with respect to power consumption. . . .”

Ex. 2016 at 11-12.

Similarly, in the present Petition, Brooks is not concerned with providing more puffs, and the Petition does not provide any explanation as to why a person of ordinary skill in the art would have wanted to provide Brooks with more puffs.

VI. SUBSEQUENT USPTO EXAMINATION RELEVANT TO GROUNDS 1 AND 2

U.S. Application 14/244,376 is a continuation of the ‘742 patent. In a 09/04/2014 Office Action in 14/244,376, the Examiner wrote:

“A reading of the claims indicates the presence of allowable subject matter. Independent claims 1, 8 and 10 each disclose subject matter which does not appear to be taught or suggested by the prior art of record. Namely, the Brooks (US Pat. No. 4,947,874) and Counts et al (US. Pat. No. 5,144,962) references fail to teach or suggest an electronic cigarette having a battery assembly connected to/with an

atomizer assembly, wherein said atomizer assembly includes a porous component having a through hole with a heating element in an airflow path in the through hole, and the porous component being in contact with a liquid storage component.”

Ex. 2008 at 5.

In an 08/20/2015 Office Action in 14/244,376 (Ex. 2009 at 7) the Examiner rejected claims as being unpatentable over EP845220 in view of Brooks U.S. Patent No. 4,922,901 (Ex. 2010), which has the same drawings and detailed description as Brooks U.S. Patent No. 4,947,874 (Ex. 1006).

During a 12/01/2015 interview in 14/244,376 with the Examiner and the Examiner’s supervisor, Brooks ‘901 was discussed along with IPR Petitions including IPR2015-01587 filed by JTI and relying on five prior art references including Takeuchi, Brooks and Whittemore. Ex. 2011 at 2; Ex. 2017 at 1. The grounds of this Petition were further cited in a separate paper filed 12/22/2015. Ex. 2012 at 3.

In a 03/15/2016 Notice of Allowance in 14/244,376 the Examiner wrote:

“None of the prior art of record teaches nor reasonably suggests an electronic cigarette which includes a heating wire coil would around a porous component (set on a frame having a run-through hole), provided in an air flow path, wherein the heating wire coil is oriented perpendicularly to the longitudinal axis of the housing of the electronic cigarette.”

Ex. 2013 at 6.

US Application 13/740,011 is another continuation of the '742 patent 13/740,011. In this Application, the grounds in IPR2015-01587 filed by JTI relying on five prior art references including Takeuchi, Brooks and Whittemore were cited in a separate paper filed 12/22/2015. Ex. 2014 at 3.

The reasons for allowance in the 6/21/2016 Notice of Allowance in 13/740,011 are:

“The closest prior art neither teaches nor suggests a vaporizing device including a housing having within it an atomizing chamber within which is placed a wire coil heater wound on a porous component connected to a battery.”

Ex. 2015 at 7.

VII. CONCLUSION

Patent Owner requests that the Petition be denied because the Petition fails to establish that there is a reasonable likelihood that the petitioner would prevail with respect to at least one of the claims challenged in the Petition under 25 U.S.C. § 314(a).

Respectfully submitted,

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CERTIFICATE OF COMPLIANCE

The undersigned certifies that this brief complies with the type-volume limitations of 37 CFR § 42.24. This brief contains 10,638 words as calculated by the "Word Count" feature of Microsoft Word 2010, the word processing program used to create it.

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CERTIFICATE OF SERVICE

The undersigned hereby certifies that service on Petitioner was made as follows, in accordance with 37 CFR 42.6(e):

Date of service: October 7, 2016

Manner of service: 1. Electronic submission through the USPTO Patent Trial and Appeal Board End-to-End System
2. Electronic mail

Document(s) served: **PATENT OWNER PRELIMINARY RESPONSE TO PETITION FOR *INTER PARTES* REVIEW**

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