

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE PATENT TRIAL AND APPEAL BOARD

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LOGIC TECHNOLOGY DEVELOPMENT LLC,  
and  
JAPAN TOBACCO INTERNATIONAL U.S.A., INC.,  
Petitioners,

v.

SHENZHEN HAPPY VAPING TECHNOLOGY LIMITED,  
Patent Owner.

U.S. Patent No. 9,924,744

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*Inter Partes* Review of U.S. Patent No. 9,924,744

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*Inter Partes* Review No. IPR2024-00055

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**DECLARATION OF DOUG DEAN**

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**EXHIBIT LIST**

| <b>Exhibit #</b> | <b>Reference</b>                                         |
|------------------|----------------------------------------------------------|
| 1001             | U.S. Patent No. 9,924,744 (“the ’744 Patent”)            |
| 1003             | Doug Dean — Curriculum Vitae                             |
| 1004             | Prosecution History of U.S. Patent No. 9,924,744         |
| 1005             | U.S. Patent Publication No. 2015/0164141 (“Newton ’141”) |
| 1006             | U.S. Patent Publication No. 2013/0228191 (“Newton ’191”) |
| 1007             | U.S. Patent Publication No. 2013/0192617 (“Thompson”)    |
| 1008             | U.S. Patent Publication No. 2014/0060527 (“Liu ’527”)    |
| 1009             | U.S. Patent Publication No. 2014/0060556 (“Liu ’556”)    |
| 1010             | U.S. Patent Publication No. 2010/0242974 (“Pan”)         |
| 1011             | U.S. Patent Publication No. 2015/0189919 (“Liu ’919”)    |

I, Doug Dean, hereby declare and state as follows:

**I. INTRODUCTION**

1. My name is Doug Dean. I have been retained on behalf of Logic Technology Development LLC (“Logic”) and Japan Tobacco International U.S.A., Inc. (“JTI”) as an independent expert consultant for this proceeding before the U.S. Patent and Trademark Office Patent Trial And Appeal Board.

2. As part of my engagement, I have been asked to provide my analysis and expert opinions on the disclosure of U.S. Patent No. 9,924,744 (“the ’744 Patent”) (Ex.1001), and the validity of claims 1, 2, and 5 of the ’744 Patent (the “Challenged Claims”).

3. It is my opinion that the Challenged Claims are invalid in view of the prior art as discussed in my declaration. Specifically, it is my opinion that the Challenged Claims are rendered obvious by the prior art. The particular prior art references that invalidate the Challenged Claims, as well as the reasons for my opinion, are set forth below.

4. For time spent in connection with this matter, I am being compensated for my time at the rate of \$550 per hour, plus expense reimbursement. My compensation is not dependent on or conditional upon any expert opinions I provide, or do not provide, or the outcome of this matter.

5. In this declaration, I may discuss my own work, teachings, and knowledge of the state of the art in the relevant time period. I may rely on standards, handbooks, textbooks, technical literature, and the like to demonstrate the state of the art in the relevant period and evolution of relevant technologies.

6. This declaration describes my opinions in the matter named above. However, I respectfully reserve my right to alter or supplement my analysis in response to any criticisms or alternative opinions offered by the Patent Owner or any other matter that might cause me to alter my opinion.

7. I understand that discovery may occur in this proceeding. I reserve the right to modify or supplement my opinions, as well as the basis for my opinions, in light of any documents, testimony, or other evidence that may emerge during the course of this matter, including depositions that have yet to be taken.

8. In this declaration, I may refer to specific pages of patents or other technical documents. The citations are intended to be exemplary and are not intended to convey that the citations are the only source of evidence to support the propositions for which they are cited.

9. I am prepared to provide expert testimony regarding my opinions in this matter, resulting from my analysis of the issues considered in this declaration if asked to do so by the Board or related attorneys.

## **II. QUALIFICATIONS**

### **A. Education Background And Career History**

10. My qualifications are summarized below and my CV is also included as Exhibit 1003.

11. I received my Bachelor of Applied Science in Engineering Physics (specialty, fluid dynamics) from The University of British Columbia, Canada in 1978. I then received my PhD in Electrical Engineering (specialty, biomedical) from The University of British Columbia, Canada in 1985.

12. Since 2021 I have been a co-founder and Director of Engineering at Predictably Human (“PH”). PH was formed to develop advanced precision aerosol drug delivery systems for narrow therapeutic index active ingredients. The therapeutic indications on which the company focuses are related to psychiatric conditions, and substance abuse. In particular, PH is developing Precision Medicine-based systems for treatment of nicotine addiction from e-cigarette vaping systems and lit-end cigarettes. As Director of Engineering, I am leading the development of advanced aerosolization technologies and devices for the delivery of nicotine-containing aerosols.

13. For the past 30 years of my career, I have been involved in research, development and product engineering for both healthcare and tobacco products that

are regulated in the USA by the Food and Drug Administration, and in other countries around the world by similar regulatory agencies. My focus has been on the systems engineering of electronics, integrated circuits, power systems, drug delivery systems, precision monitoring sensors, and real-world data acquisition systems for healthcare applications. I have multiple patents related to medical device technologies, and to the management of risk and quality in complex production environments.

14. From 2014-2021, I acted as an independent consultant providing expertise to tobacco companies and vaping product developers on the topic of nicotine-containing aerosol creation, battery technologies, the design of hand-held devices, and the creation of nicotine liquid blends. I have consulted for Philip Morris International, British American Tobacco, RJ Reynolds, and Japan Tobacco International. I was interviewed extensively by a New York Times journalist on the topic of the evolution of the e-cigarette and vaping market in the US that began in the late 1990s.

15. From 2006-2014, I was the Senior Vice President of Global Research and Development for Philip Morris International. I led the creation of an R&D organization that had the capability to develop next-generation reduced risk tobacco products using processes and quality systems that were appropriate for creation of

reduced-risk products, and the accompanying mandatory minimum scientific data, assessments and human clinical trial dossiers that were required by the regulatory agency, the US FDA.

16. From 1986-2006, I held a variety of senior roles in companies that provided services related to new product development and new product introduction, to medical device, biopharmaceutical, and pharmaceutical manufacturers. I was variously a Vice President at IBM, a Senior Partner at PriceWaterhouseCoopers Consulting, and a Director at Rockwell International and Digital Equipment Corporation. In these roles I led service teams supporting clients with the design and development of new and innovative healthcare products, and with the creation of FDA submission dossiers associated with the approval and registration of these products. During this time I was invited by FDA to participate as a member of several advisory boards that were supporting the Agency as it implemented a new regulatory approach to ensuring the quality and safety of healthcare products.

17. From 1981 through 1986, I was a researcher at a Medical Engineering Resource Unit focused on development of new technologies for non-invasive optical sensing methods for biomechanics and prostheses. These technologies enabled new diagnostic and therapeutic regimes for treatment of spinal-cord pathologies such as lordosis, scoliosis, and kyphosis.

18. I currently am, or have been a Member of the Aerosol Society, a Member of FDA's PAT Advisory Committee to the Office of Pharmaceutical Science, a Member of the Parenteral Drug Association, a Member of the International Society of Pharmaceutical Engineers, a Member of the Institute of Electrical and Electronics Engineers ("IEEE"), a Member of the New York Academy of Sciences, a member of the Canadian Society of Theoretical Biologists, and a Member of the American Mathematical Society.

19. I have been a member of the IEEE, and its Biomedical Engineering Society since 1980, and have multiple peer-reviewed publications in the IEEE Biomedical Engineering Society Transactions. The IEEE is the world's largest association of technical professionals whose objectives include the educational and technical advancement of biomedical, and electrical and electronic engineering and related disciplines.

20. I have written 118 publications for peer-reviewed journals around the world, including the US, Canada, the UK, Germany, and Japan. On multiple occasions I have been invited to submit academic papers and publications to a variety of prestigious journals. I am the author of two book chapters on orthopedics and neurology/implantable electronic medical devices.

### **III. MATERIAL REVIEWED**

21. The opinions contained in this Declaration are based on the documents I reviewed, my professional judgment, as well as my education, experience, and knowledge.

22. In forming my opinions expressed in this Declaration, I reviewed the exhibits noted in the above Exhibit List, as well as any other materials referred to in my Declaration in support of my opinions.

### **IV. RELEVANT LEGAL STANDARDS**

23. In this section I describe my understanding of certain legal standards that I have relied upon in forming my opinions set forth in this declaration. I have been informed of these legal standards by Logic's and JTI's attorneys. I am not an attorney and have not researched the law on patent invalidity. I am relying on instructions from Logic's and JTI's attorneys for these legal standards.

#### **A. Person of Ordinary Skill In The Art (POSITA)**

24. I understand that a person having the ordinary skill in the art (POSITA) is a hypothetical person who is used to analyze the prior art without the benefit of hindsight. A POSITA is presumed to be one who thinks along the lines of conventional wisdom in the art and is not one who undertakes to innovate, whether by extraordinary insights or by patient and often expensive systematic research.

25. I understand that the hypothetical POSITA is presumed to have knowledge of all references that are sufficiently related to one another and to the pertinent art, and to have knowledge of all arts reasonably pertinent to the particular problem that the claimed invention addresses.

**B. Prior Art**

26. I understand that a patent or other publication must first qualify as prior art before it can be used to invalidate a patent claim.

27. I understand that a U.S. patent qualifies as prior art to a patent claim if the date of application and/or issuance of such patent is prior to the purported date of invention of the patent claim. I understand that a foreign patent qualifies as prior art to a patent claim if the date of issuance of such patent is prior to the purported date of invention of the patent claim.

28. I understand that a U.S. or foreign patent or patent application qualifies as prior art to a patent claim if the date of issuance or publication of the prior art patent or application is before the earliest asserted priority date of the patent claim.

29. I understand that a printed publication, such as an article published in a magazine or trade publication, qualifies as prior art to a patent claim if the date of publication is prior to the purported date of invention of the patent claim.

**C. Anticipation**

30. I understand that, once the claims of a patent have been properly construed, the second step in determining anticipation of a patent claim requires a comparison of the properly construed claim language to the prior art on a limitation-by-limitation basis.

31. I understand that a prior art reference “anticipates” a claim, and thus renders the claim invalid, if all elements of the claim are disclosed in that prior art reference, either explicitly or inherently (*i.e.*, necessarily present or implied).

32. I understand that a claimed invention is invalid for anticipation when all of the limitations of the claim are present in a single prior art reference. I understand, however, that all limitations of the claim need not be shown directly so long as all limitations are necessarily present in the single prior art reference and thus are inherent.

**D. Obviousness**

33. I have been instructed by counsel on the law regarding obviousness and understand that, even if a patent is not anticipated, it is still invalid if the differences between the claimed subject matter and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a POSITA.

34. I understand that a POSITA provides a reference point from which the prior art and claimed invention should be viewed. This reference point prevents one from using their own insight or hindsight in deciding whether a claim is obvious.

35. I also understand that an obviousness determination includes the consideration of various factors such as (1) the scope and content of the prior art, (2) the differences between the prior art and the Challenged Claims, (3) the level of ordinary skill in the pertinent art, and (4) the existence of secondary indicia of nonobviousness.

36. I understand that secondary indicia of non-obviousness may include (1) a long felt but unmet need in the prior art that was satisfied by the invention of the patent; (2) commercial success or lack of commercial success of processes covered by the patent; (3) unexpected results achieved by the invention and praise of the invention by others skilled in the art; (4) taking of licenses under the patent by others; and (5) deliberate copying of the invention. I also understand that there must be a relationship between any such secondary indicia and the invention. I further understand that contemporaneous and independent invention by others is a secondary consideration supporting an obviousness determination.

37. I understand that a proper obviousness analysis generally requires a reason that would have prompted a POSITA to combine the elements of multiple

items of prior art in the way the claimed invention does. I understand that the items of prior art themselves may provide a suggestion, motivation, or reason to combine, but other times the nexus linking two or more prior art references is simple common-sense. I further understand that an obviousness analysis recognizes that market demand, rather than scientific literature, often drives innovation, and that a motivation to combine references may be supplied by the direction of the marketplace.

38. I understand that if a technique has been used to improve one device, and a POSITA would recognize that it would improve similar devices in the same way, using such a technique is obvious unless its actual application is beyond the practitioner's skill.

39. I also understand that practical and common-sense considerations should guide a proper obviousness analysis, because familiar items may have obvious uses beyond their primary purposes. I further understand that POSITA looking to overcome a problem will often be able to fit the teachings of multiple prior art publications and/or the components or processes carried out by or included in various prior art systems together like pieces of a puzzle. I understand that an obviousness analysis therefore takes into account the inferences and creative steps that a POSITA would employ under the circumstances.

40. I understand that a particular combination may be proven obvious merely by showing that it was obvious to try the combination. For example, when there is a design need or market pressure to solve a problem and there are a finite number of identified, predictable solutions, a POSITA has good reason to pursue the known options within his or her technical grasp because the result is likely the product not of innovation but of ordinary skill and common-sense.

41. I understand that the combination of familiar elements according to known methods is likely to be obvious when it does no more than yield predictable results. When a work is available in one field of endeavor, design incentives and other market forces can prompt variations of it, either in the same field or a different one. I understand that if a POSITA can implement a predictable variation, 35 U.S.C. § 103 likely bars its patentability.

42. It is further my understanding that a proper obviousness analysis focuses on what was known or obvious to a POSITA, not just the patentee. Accordingly, I understand that any need or problem known in the field of endeavor at the time of invention and addressed by the patent can provide a reason for combining the elements in the manner claimed.

43. I understand that a patent claim can be obvious in light of a single item of prior art, without the need to combine multiple items of prior art, even if one or

more of the elements of that claim that are not found explicitly or inherently in the item of prior art, but could have been supplied by the common-sense of a POSITA at the time of the purported invention.

44. I understand that even if a claimed invention involves more than substitution of one known element for another or the application of a known technique to a piece of prior art ready for improvement, the invention may still be obvious. I also understand that in such circumstances courts may need to look to interrelated teachings of multiple patents, the effects of demands known to the design community or present in the marketplace, and the background knowledge possessed by a POSITA to determine if the claimed invention is obvious.

45. In sum, my understanding is that items of prior art and the teachings therein are properly combined where a POSITA having the understanding and knowledge reflected in the prior art and motivated by the general problem facing the inventor, would have been led to make the combination of elements recited in the claims. Under this analysis, the items of prior art themselves, or any need or problem known in the field of endeavor at the time of the invention, can provide a reason for combining the elements of multiple items of prior art in the claimed manner.

46. I understand that the obviousness analysis requires a comparison of the properly construed claim language to the prior art on a limitation-by-limitation basis.

**E. Claim Construction**

47. I understand that claim construction is a matter of law for the arbiter of law to decide. Further, I understand that for the purposes of an *inter partes* review, claim terms should generally be given their ordinary and customary meaning as understood by a POSITA at the time of filing of the patent application, after reading the patent and its prosecution history.

48. I also understand that claims must be construed in light of and consistent with the intrinsic evidence, which includes the claims themselves, the written disclosure in the specification, and the patent's prosecution history, including prior art considered by USPTO.

49. I understand that extrinsic evidence may also be considered when construing claims and may include, for example, technical dictionaries, technical publications and books, treatises, and expert testimony.

50. I also understand the analysis of whether of a preamble limits the claim is one involving claim construction, and that the basic rule of patent claim construction is that generally, the preamble does not limit the claims.

51. I understand that where a patentee defines a structurally complete invention in the claim body and uses the preamble only to state a purpose or intended use, the preamble is not limiting.

## **V. LEVEL OF ORDINARY SKILL IN THE ART**

52. I understand that there are multiple factors relevant to determining the level of ordinary skill in the pertinent art, including the educational level of active workers in the field at the time of the alleged invention, the sophistication of the technology, the type of problems encountered in the art, and the prior art solution to those problems.

53. I believe a person having the ordinary skill in the art (POSITA) relating to the '744 Patent at the time of the alleged invention (i.e., on or about the priority date of June 25, 2014) would have had a bachelor's or graduate degree in electrical engineering, physics, or mechanical engineering with course work in biomedical devices, and at least two years of industry experience working with electronic cigarettes or electronic aerosol-based drug delivery systems.

## **VI. TECHNOLOGY BACKGROUND**

54. Electronic cigarettes provide an alternative to traditional cigarettes, by using electricity from an internal battery to power a heater that vaporizes liquid stored in a reservoir. The vapor is inhaled by a user and can carry nicotine and other flavoring components. Typically, the battery portion of the electronic cigarette can be reused and recharged for future use. The reservoir is often part of a cartridge that can be replaced with a new cartridge once the liquid is depleted. This provides a

user with the option to use the same battery component with cartridges offering a variety of flavors and/or intensities of nicotine. Some cartridges house the heater used to vaporize the liquid, which prevents the need to clean a heating device through the use of many reservoirs of liquid. Including the heater in the cartridge thus requires power to be transmitted from the battery component to the cartridge, which in turn requires electrical connections to be established between the battery compartment and the cartridge. The connectors that permit the battery component and the cartridge to connect and engage with one another must either embody or accommodate the electrical connections between the components. Moreover, while cartridges can be consumer facing components of the electronic cigarettes, some devices have reusable bodies in which the cartridges can be housed during use, so that the reusable bodies are consumer facing components hiding all or part of the cartridge during use. This in turn presents the need for the reusable body to connect with the battery component to permit use of the electronic cigarette.

## **VII. THE '744 PATENT**

### **A. Overview**

55. The '744 Patent is directed to “an electronic cigarette designed to have a vaporizer and a casing tube of the vaporizer as two separate parts and have a

simplified connection structure between the vaporizer and a battery stick.” (Ex.1001 col.1 ll.25-28.)

56. FIG. 1<sup>1</sup> of the '744 Patent shows an electronic cigarette including a battery stick 10, a vaporizer assembly having a vaporizer 20 and a casing tube 30, and a mouth-piece 40. (Ex.1001 col.4 ll.34-44.)

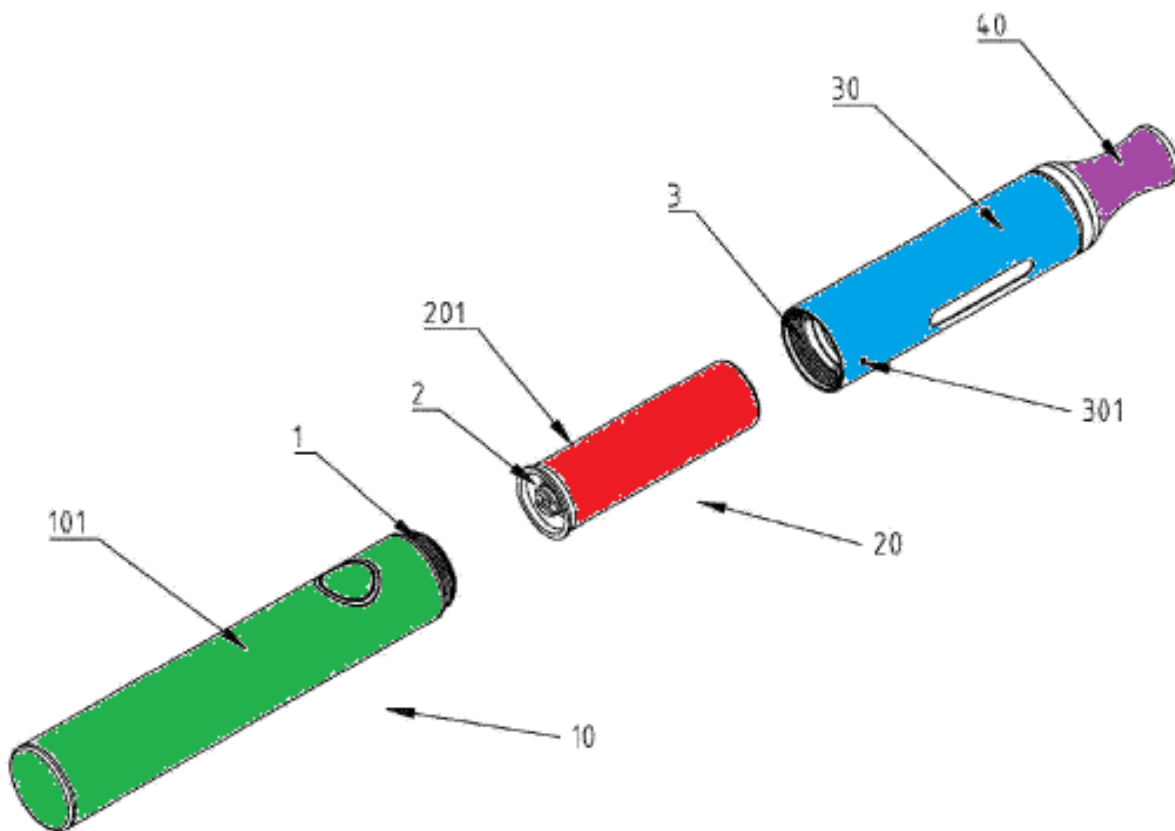


Figure 1

<sup>1</sup> All color and colored text is added to the figures herein.

57. As shown in FIGS. 1 and 2 of the '744 Patent, battery stick 10 includes a first connection portion 1 having a first connection seat 11, a first positive electrode 12, and a first insulation sleeve 13 adjacent to the vaporizer assembly.” (Ex.1001 col.4 ll.36-41, 54-62.) Vaporizer 20 includes a second connection portion 2 having a second connection seat 21, a second positive electrode 22, and a second insulation sleeve 23 adjacent to battery stick 10. (Ex.1001 col.4 ll.44-47, col.4 l.62-col.5 l.2.) Casing tube 30 of vaporizer 20 includes a third connection portion 3 adjacent to battery stick 10. (Ex.1001 col.4 ll.47-49.)

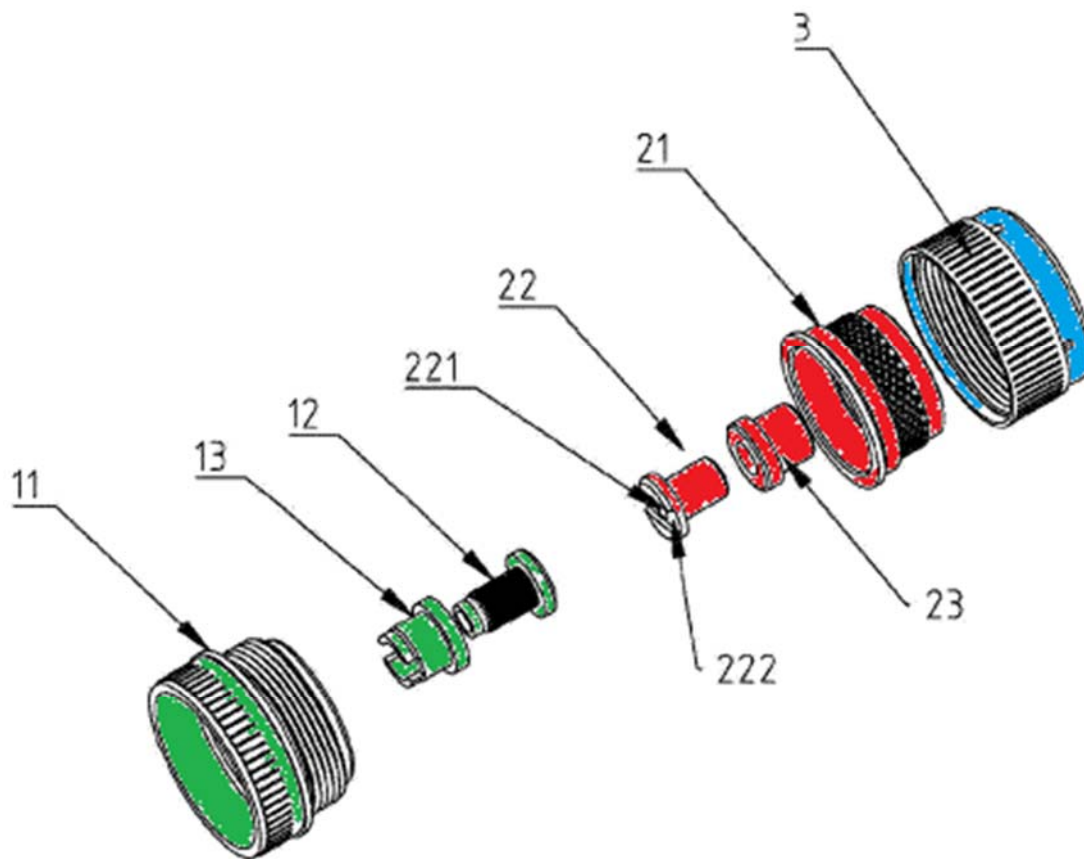
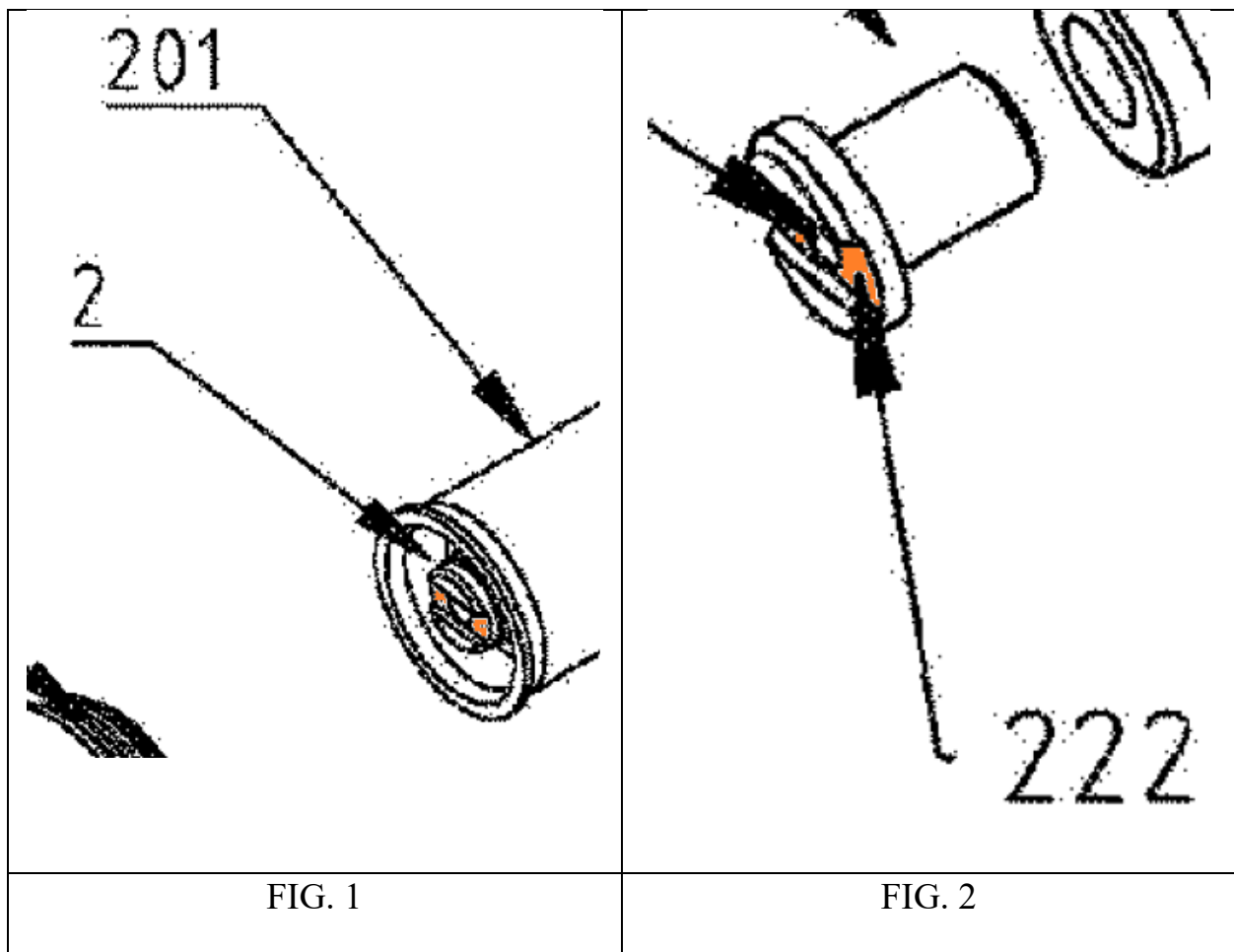


Figure 2

58. “The **second connection portion 2** and the **first connection portion 1** abut against each other to be connected, the **third connection portion 3** is detachably connected to the **first connection portion 1** by means of a screw thread. (Ex.1001 col.4 ll.49-53.) **Second connection seat 21** serves “as a negative electrode electrically connected to a heating coil of the vaporizer 20,” and **second positive**

electrode 22 is “electrically connected to the heating coil of the vaporizer 20.”  
(Ex.1001 col.4 l.62-col.5 l.2.)

59. As shown in enlarged FIGS. 1 and 2, “an end surface of the second positive electrode 22 has a transversal groove 222 along a radial direction of the end surface for intercommunicating with the central through hole 221” of second positive electrode 22. (Ex.1001 col.5 ll.6-9.)



**B. Prosecution History Of The '744 Patent**

60. The '744 Patent was filed on December 22, 2016, as a national phase entry of PCT/CN2014/093009 filed December 4, 2014, which claims priority to Chinese Patent Application No. 201420341430.5 filed June 25, 2014. On the same date, an Information Disclosure Statement was filed citing only two Chinese references and an International Search Report and written opinion to the related Patent Cooperation Treaty (“PCT”) application. (Ex.1004, 114-115.)

61. A first and only office action was issued on September 26, 2017, rejecting claims 1 and 2 as anticipated by Thompson (Ex.1008), claims 1 and 2 as anticipated by Liu '556 (Ex.1009), and claim 1 as anticipated by U.S. Patent Publication No. 2013/0319407 (“Liu '407”). Claims 3-12 were objected to as dependent upon a rejected base claim, but allowable if rewritten in independent form including all limitations of the base claim and any intervening claims. (Ex.1004, 86-91.) The examiner’s “reasons for the indication of allowable subject matter” quoted the text of originally filed claims 3 and 4, which issued as claims 1 and 2 of the '744 Patent. (Ex.1004, 91-92.)

62. In response, on November 29, 2017, Patent Owner amended claim 1 to include the language of claims 2 and 3 and acquiesced to the rejections by the examiner that all the limitations of originally filed claims 1 and 2 were invalid as

disclosed by Thompson, and separately by Liu '556, including the transversal groove in one of the electrodes, and that all of the limitations of originally filed claim 1 were disclosed by Liu '407. (*Id.* 71-79.)

63. A notice of allowance issued on December 27, 2017, allowing claims 1 and 4-12. (*Id.* 60-64.) Claim 4 was renumbered as claim 2 and claim 5 remained as claim 5.

## **VIII. CLAIM CONSTRUCTION**

64. In connection with the Challenged Claims, I believe that it is not necessary to construe the claims terms. Although I understand that claim terms can be found indefinite and therefore invalid under 35 U.S.C. § 112(b), I am informed that invalidity based on indefiniteness is not available in this IPR proceeding. The prior art that I have relied on for my opinions meets all of the claim terms as best understood under any reasonable or plain and ordinary construction.

## **IX. PRIOR ART REFERENCES**

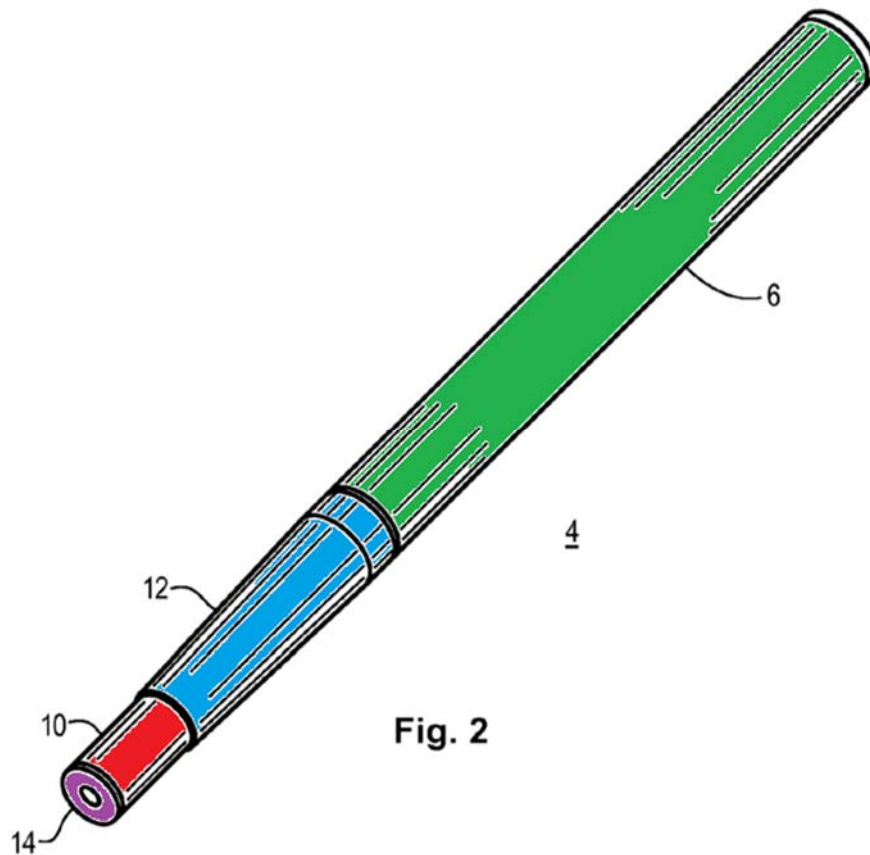
65. This section provides a high-level summary of each of the prior art references that I rely upon for my opinions.

### **1. Newton '141 (Ex.1005)**

66. Newton '141 (Ex.1005), was filed on December 13, 2013, was published June 18, 2015, and is prior art under at least 35 U.S.C. § 102(a)(2) to the '744 Patent. Newton '141 was not cited during the '744 prosecution.

67. As demonstrated below, Newton '141 discloses every limitation of claims 1 and 2 of the '744 Patent except a transversal groove in the second positive electrode. However, as also demonstrated below, an electrode with a traversal groove was a common feature in the art (*e.g.*, see Newton '191, Thompson, Liu '556, and Liu '527.)

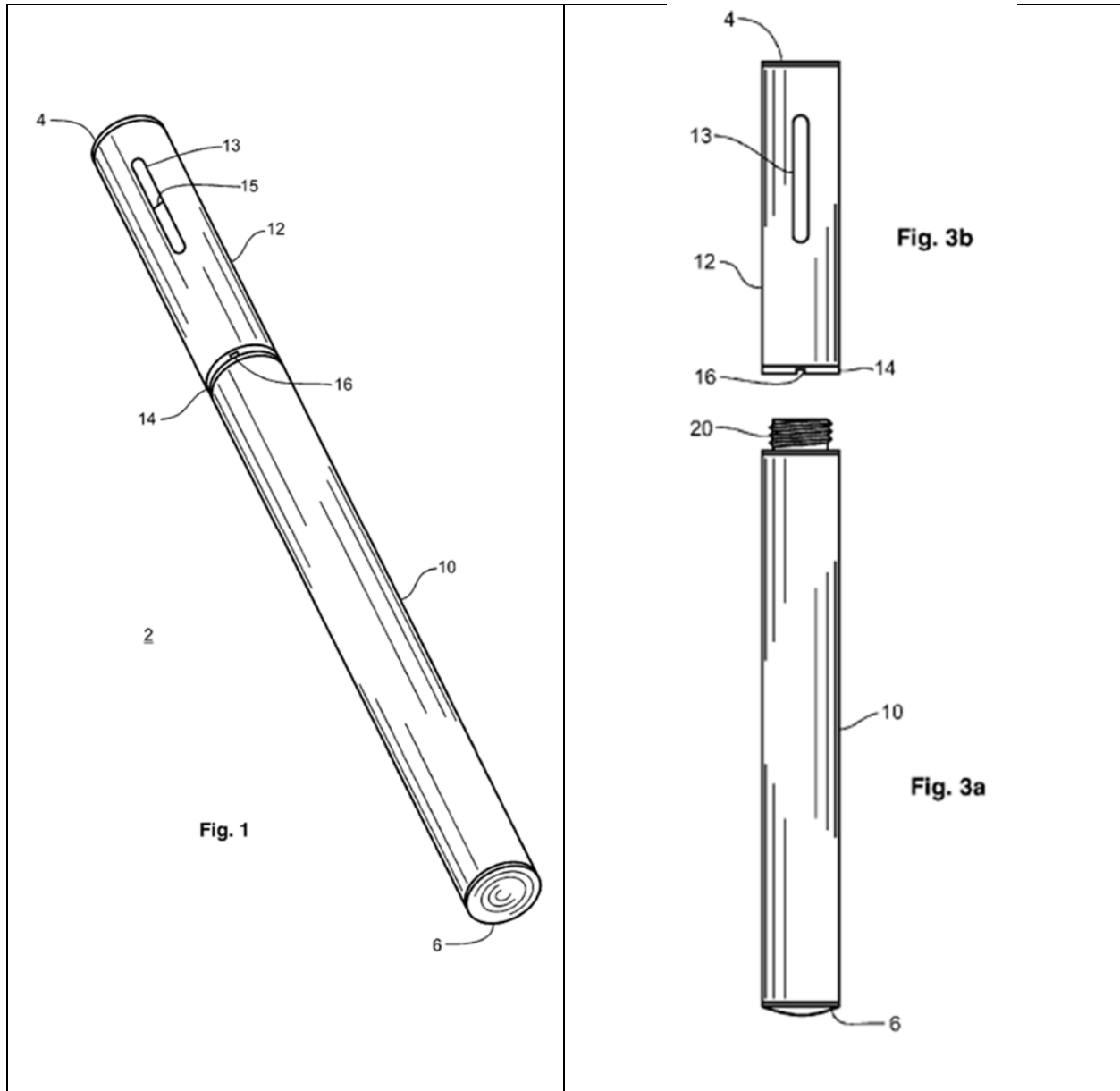
68. Newton '141 discloses an electronic cigarette 4 including “a connected large battery assembly 6, small atomizer assembly 10, and connector shroud 12” (Ex.1005 ¶[0044], FIGS. 2, 6-8.) Newton '141 also “includes a mouthpiece 14, which is presented at the exposed end of the small atomizer assembly 10.” (Ex.1005 ¶[0041], FIGS.2, 6-8.)



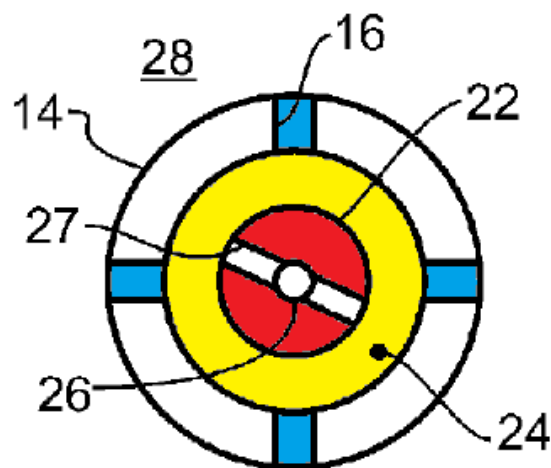
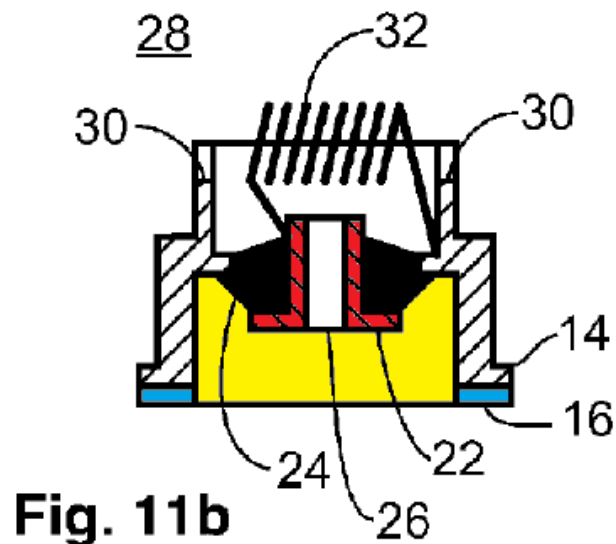
## 2. Newton '191 (Ex.1006)

69. Newton '191 (Ex.1006), was filed on June 28, 2011, was published September 5, 2013, and is prior art under 35 U.S.C. §§ 102(a)(1) and (2) to the '744 Patent. Newton '191 was not cited during the '744 prosecution.

70. Newton '191 discloses an electronic cigarette 2 including a power supply portion 10 having a storage battery 11 that couples to a cartridge portion 12 having an atomizer 32. (Ex.1006 ¶¶ [0032], [0034], [0037], FIGS. 1, 2a-c, 3a-b, 4a-c.)



71. Newton '191 also discloses an electrode (electrical coupler 22) having an end surface with a transversal groove (air recesses 27) along a radial direction of the end surface for intercommunicating with the central through hole (air inlet port), as shown below in annotated FIGS. 11a and 11b:



72. **Fig. 11a**

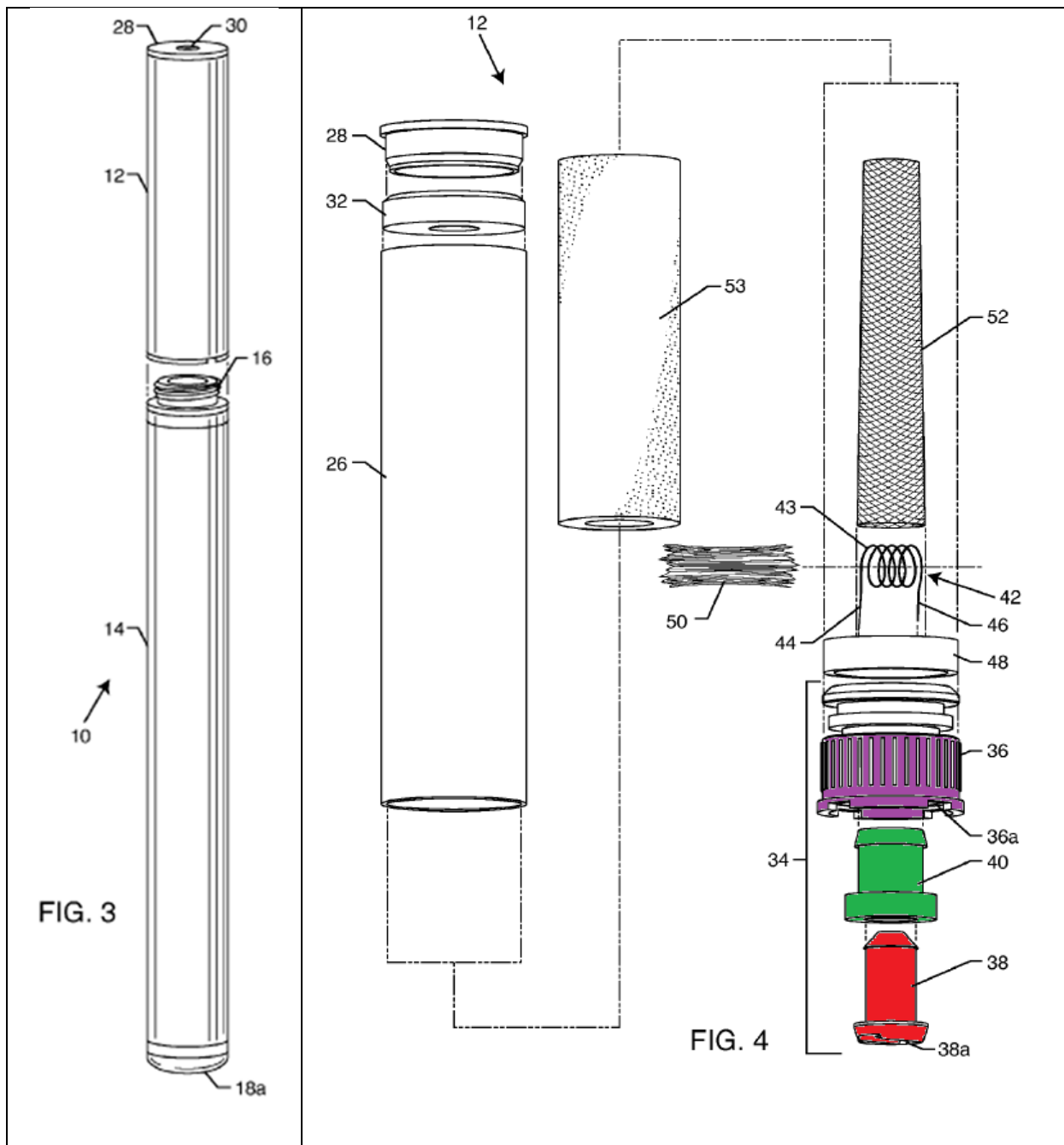
73. Newton '191 discusses that external air enters the electronic cigarette 2 through vent openings during use, and that it is a matter of design choice as to where the air enters the electronic cigarette: "Air is inlet to the electronic cigarette 2 at the vent openings 16 located at the coupler 14. The air inlet openings 16 can be located

elsewhere on the electronic cigarette 2, and is a matter of design choice.” (Ex.1006 ¶[0033], FIG. 4b.)

### **3. Thompson (Ex.1007)**

74. Thompson (Ex.1007), was filed on January 30, 2012, was published August 1, 2013, and is prior art under 35 U.S.C. §§ 102(a)(1) and (2) to the ’744 Patent. Thompson was cited by the Examiner in the sole office action to reject originally filed claims 1 and 2 of the ’744 Patent as anticipated. Patent Owner acquiesced to these rejections.

75. Thompson discloses an electronic cigarette including a cartomizer and a battery base 14. (Ex.1007 ¶[0022], FIGS. 3 and 4.) The cartomizer 12 includes an atomizing coil 42 electrically connected via positive and negative terminal leads 44, 46 to an outer terminal 36 and an inner terminal 38, with a silicone rubber gasket 40 concentrically disposed therebetween. (Ex.1007 ¶¶[0025]-[0027], FIGS. 4 and 9.) Air is inlet to the electronic cigarette at air intake vents 36a located at the outer terminal 36 and flows via a transversal groove 38a in the electrode 38 (Ex.1008, FIGS. 3-9.)

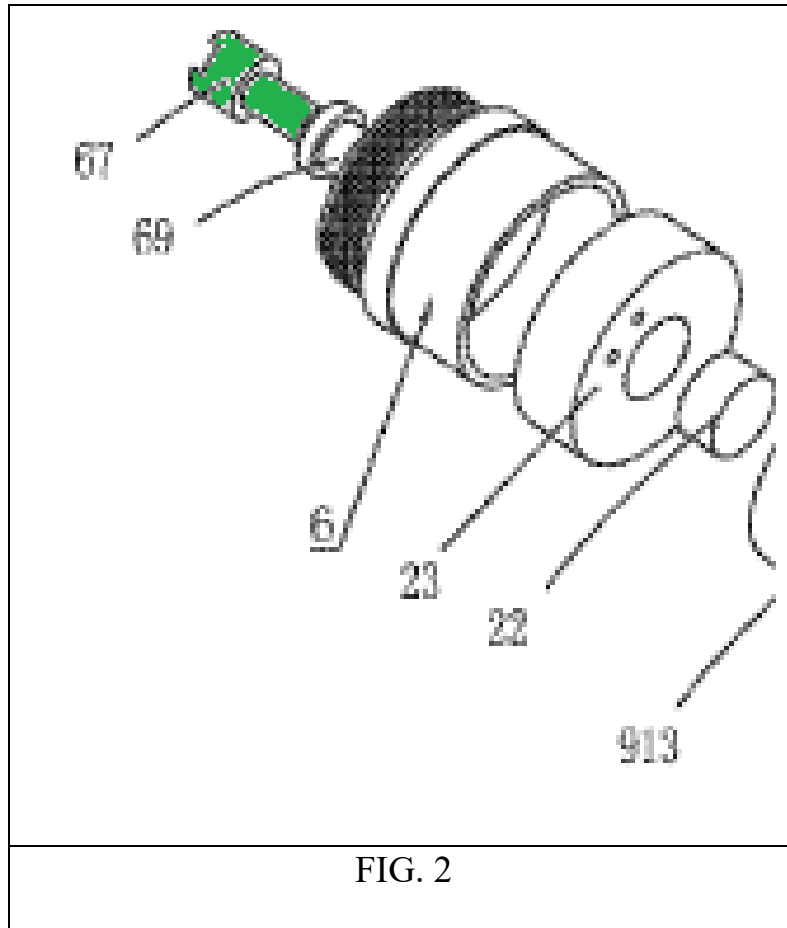


**4. State Of The Art: Transversal Groove In An End Surface Of An Electrode**

76. Like Newton '191 and Thompson, Liu '527 (Ex.1008) and Liu '556 (Ex.1009) evidence the state of the art in electronic cigarettes.

77. Liu '556 is a national phase application of a PCT application filed on August 31, 2012, was published March 6, 2014, and is prior art under 35 U.S.C. §§102(a)(1) and (2) to the '744 Patent. Liu '556 was cited by the Examiner in the sole office action to reject originally filed claims 1 and 2 of the '744 Patent. Patent Owner acquiesced to these rejections.

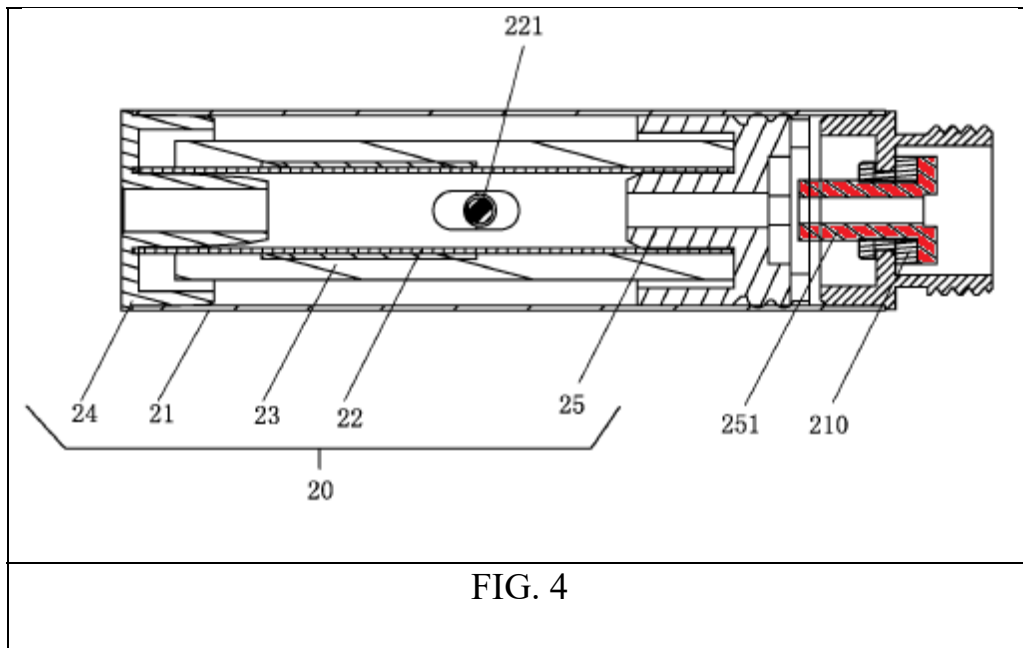
78. Liu '556 discloses an electronic cigarette 100 including a sucking rod 90 and a power rod 91 “connected by fastener, plug or screw.” (Ex.1009 ¶[0025], FIGS. 1 and 2.) Rods 90, 91 are screwed together by respective first and second connectors 5, 6. (Ex.1009 ¶[0025], FIGS. 1 and 2.) Connectors 5, 6 serve as electrodes with respective separate electrodes 57, 67 disposed therein. (Ex.1009 ¶[0035], [0037], FIGS. 1 and 2.) Electrode 67 is shown with a transversal groove at its end surface. (Ex.1009 FIG. 2.)



79. Liu '527 is a national phase application of a PCT application filed on August 31, 2012, was published March 6, 2014, and is prior art under 35 U.S.C. §§ 102(a)(1) and (2) to the '744 Patent. Liu '527 was not cited during the '744 prosecution.

80. Liu '527 discloses an electronic cigarette with a battery stick 200, a vaporizer assembly (atomizer 20 and nozzle 10), and a mouth-piece 30. (Ex.1008

¶[0028], FIGS. 1-4.) Liu '527 discloses that second electrode's (251) end surface, facing right, has a transversal groove.



## X. ANALYSIS

81. A summary chart of the grounds of invalidity based on obviousness (§ 103) is below:

| Ground | Claims  | Statute | Prior Art                              |
|--------|---------|---------|----------------------------------------|
| 1      | 1, 2    | § 103   | Newton '141 and Newton '191            |
| 2      | 5       | § 103   | Newton '141, Newton '191, and Thompson |
| 3      | 1, 2, 5 | § 103   | Newton '141 and Thompson               |

A listing of the challenged claims and claim elements is provided below:

| Element | Listing of Challenged Claims Of Patent No. 9,924,744                                                                                                                                                                                                                                                                                                                                                                                              |
|---------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| [1a]    | 1. An electronic cigarette comprising a battery stick, a vaporizer assembly and a mouth piece that are connected together, characterized in that                                                                                                                                                                                                                                                                                                  |
| [1b]    | the battery stick comprises a battery, a casing tube of the battery stick for sheathing the battery, and a first connection portion arranged at an end of the casing tube of the battery stick adjacent to the vaporizer assembly;                                                                                                                                                                                                                |
| [1c]    | the vaporizer assembly comprises a vaporizer, and a casing tube of the vaporizer for sheathing the vaporizer in an inner cavity of the casing tube;                                                                                                                                                                                                                                                                                               |
| [1d]    | the vaporizer comprises a vaporizer tube body, and a second connection portion arranged at an end of the vaporizer tube body adjacent to the battery stick;                                                                                                                                                                                                                                                                                       |
| [1e]    | a third connection portion is arranged at an end of the casing tube of the vaporizer adjacent to the battery stick;                                                                                                                                                                                                                                                                                                                               |
| [1f]    | the second connection portion and the first connection portion abut against each other to be connected, the third connection portion is detachably connected to the first connection portion by means of a screw thread;                                                                                                                                                                                                                          |
| [1g]    | the first connection portion comprises a first connection seat having an outer thread and serving as a negative electrode electrically connected to a negative electrode of the battery, a first positive electrode arranged at a center of the first connection seat and electrically connected to a positive electrode of the battery, and a first insulation sleeve placed between the first positive electrode and the first connection seat; |

| Element | Listing of Challenged Claims Of Patent No. 9,924,744                                                                                                                                                                                                                                                                                                                                                                    |
|---------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| [1h]    | the second connection portion comprises a second connection seat serving as a negative electrode electrically connected to a heating coil of the vaporizer, a second positive electrode arranged at a center of the second connection seat and electrically connected to the heating coil of the vaporizer, and a second insulation sleeve placed between the second positive electrode and the second connection seat; |
| [1i]    | the second positive electrode has a central through hole along an axial direction of the second positive electrode for intercommunicating with a vaporizing cavity of the vaporizer, an end surface of the second positive electrode has a transversal groove along a radial direction of the end surface for intercommunicating with the central through hole;                                                         |
| [1j]    | the third connection portion has an inner thread engaging with the outer thread of the first connection seat;                                                                                                                                                                                                                                                                                                           |
| [1k]    | the first positive electrode and the second positive electrode abut against each other to be electrically connected, the first connection seat and the second connection seat are electrically connected;                                                                                                                                                                                                               |
| [1l]    | the first connection seat has a step-like shape, a protruding step is formed at a middle portion of the first connection seat that has a maximum outer diameter;                                                                                                                                                                                                                                                        |
| [1m]    | one side of the protruding step is provided with a first cylindrical wall having an outer diameter smaller than that of the protruding step, the first cylindrical wall is sheathed with an inner wall of said end of the casing tube of the battery stick, the outer diameter of the protruding step equals an outer diameter of the casing tube of the battery stick;                                                 |
| [1n]    | the other side of the protruding step is provided with a second cylindrical wall having an outer diameter smaller than that of the protruding step and having the outer thread, one end of the second cylindrical wall is provided with a base wall having a central through hole, the central through hole is configured for installing the first positive electrode and the first insulation sleeve.                  |
| [2pre]  | 2. The electronic cigarette according to claim 1, characterized in that                                                                                                                                                                                                                                                                                                                                                 |

| Element | Listing of Challenged Claims Of Patent No. 9,924,744                                                                                                                                                                                                                                             |
|---------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| [2a]    | the second connection seat is a cylindrical body having a protruding platform at one end thereof;                                                                                                                                                                                                |
| [2b]    | an outer wall of the cylindrical body is sheathed with an inner wall of said end of the vaporizer tube body;                                                                                                                                                                                     |
| [2c]    | an inner wall at a lower portion of the second connection seat is provided with a base wall, a tubular body is protruded from a center of the base wall, the tubular body is provided with a central through hole for installing the second insulation sleeve and the second positive electrode. |
| [5]     | 5. The electronic cigarette according to claim 2, characterized in that the outer wall of the cylindrical body is provided with a circular groove configured for mounting a sealing ring.                                                                                                        |

**A. Ground 1: Claims 1 And 2 Are Obvious In View Of Newton '141 And Newton '191**

**1. The Combination Of Newton '141 And Newton '191**

82. It would have been obvious to modify Newton '141 with the teaching of Newton '191 of using a transversal groove in the electrode of claim element [1i] as explained below. Newton '141 and Newton '191 are analogous art, filed by the same inventor, from the same field of endeavor (e-cigarettes) as the '744 Patent, and are both pertinent to multi-component e-cigarettes with connection structures among the components, including a battery stick, vaporizer, and casing tube of the vaporizer.

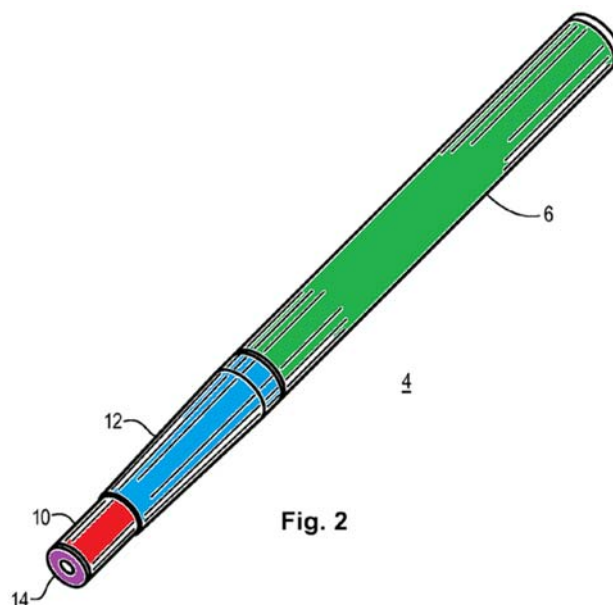
**2. Independent Claim 1**

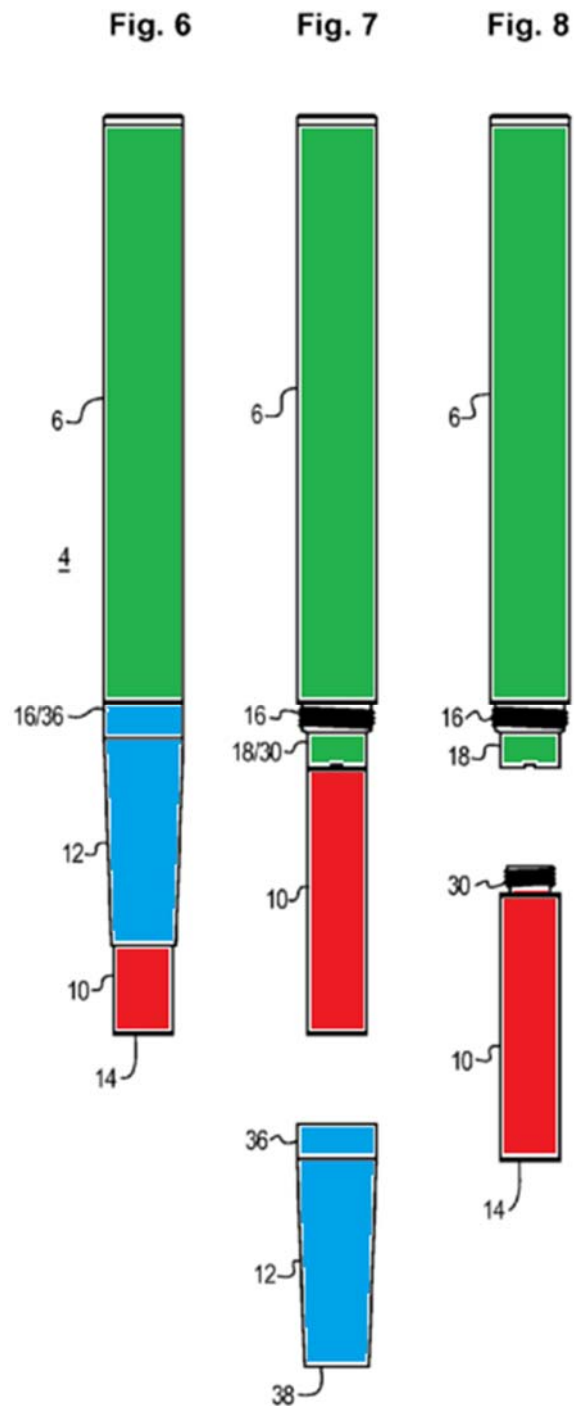
83. Claim 1 is obvious in view of Newton '141 and Newton '191.

a. [1a] 1. An electronic cigarette comprising a battery stick, a vaporizer assembly and a mouth piece that are connected together, characterized in that

84. The claimed electronic cigarette (or e-cigarette) has three connected parts: a battery stick, a vaporizer assembly (shown in red and blue below), and a mouthpiece. Newton '141 discloses all three parts, including “a connected large battery assembly 6, small atomizer assembly 10, and connector shroud 12, which result in an assembled electronic cigarette 4.” (Ex.1005 ¶[0044], FIGS. 2, 6-8.) Newton '141 also “includes a mouthpiece 14, . . . at the exposed end of the small atomizer assembly 10.” (Ex.1005 ¶[0041], FIGS.2, 6-8.)

85. Newton '141 thus discloses all elements of limitation [1a], as further shown in FIGS. 2 and 6-8, reproduced in color below.



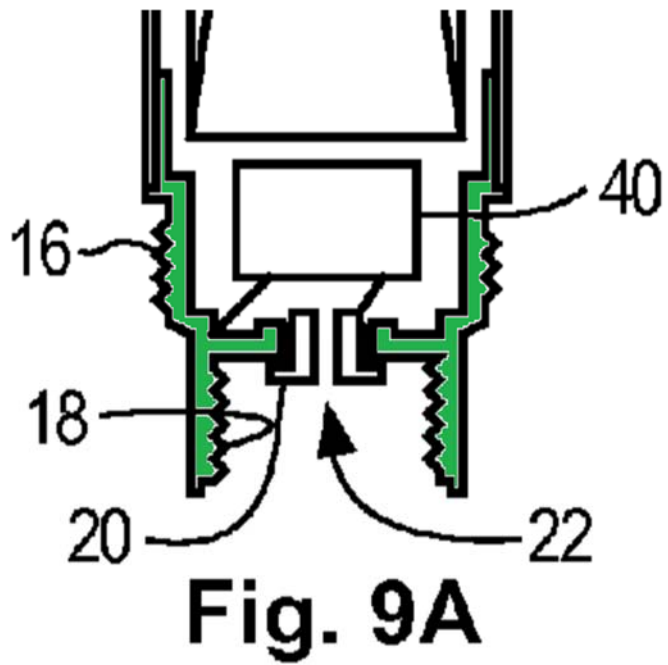
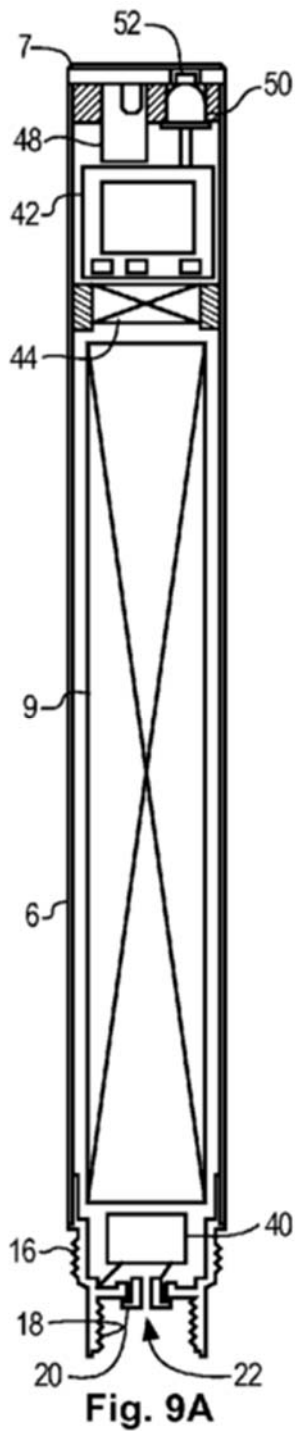


- b. [1b] the battery stick comprises a battery, a casing tube of the battery stick for sheathing the battery, and a first

**connection portion arranged at an end of the casing tube of  
the battery stick adjacent to the vaporizer assembly;**

86. Newton '141's battery stick includes a rechargeable storage battery 9 and a casing tube 6 sheathing the battery 9. (Ex.1005 ¶¶[0042] and [0046], FIG.9A.) The first connection portion comprises a threaded element including a first connector 16 and a second connector 18, electrical contact terminal 20, and an insulation sleeve disposed therebetween, as described further below in connection with limitation [1g].

87. The threaded element (16/18) is shown in enlarged FIG. 9A below.



The connector shroud 12 has a shroud connector 36, which engages **the first connector 16**. Note that the distal end 38 of the connector shroud 12 is open to allow clearance for the small atomizer assembly 10. The small atomizer assembly 10 is connected to **the second connector 18** of the large battery assembly 6 . . . .

(Ex.1005 ¶[0045], FIG. 9A.)

88. Newton '141 thus discloses all elements of limitation [1b].

**c. [1c] the vaporizer assembly comprises a vaporizer, and a casing tube of the vaporizer for sheathing the vaporizer in an inner cavity of the casing tube;**

89. As explained above for limitation [1a], Newton '141 discloses a vaporizer assembly as **atomizer assembly 10** and **connector shroud 12**. Newton '141 states:

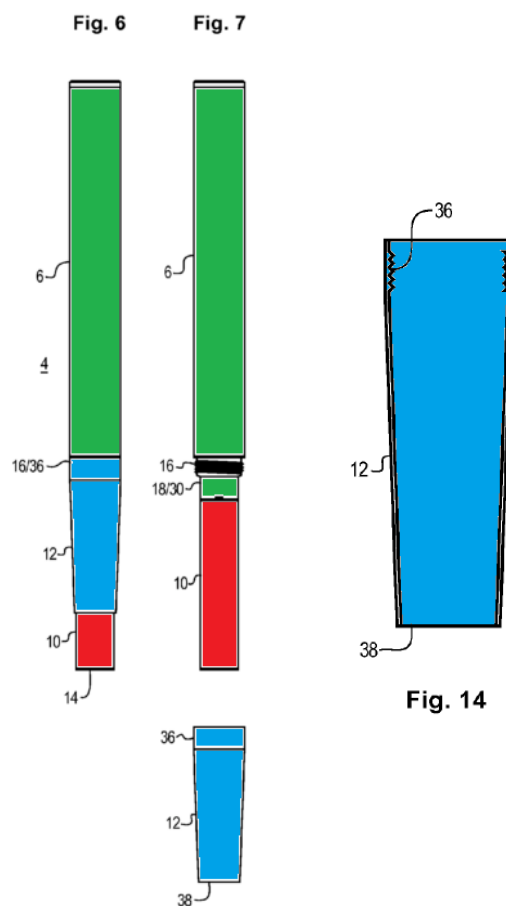
FIG. 6 illustrates a connected large battery assembly 6, small atomizer assembly 10, and connector shroud 12, which result in an assembled electronic cigarette 4. A mouthpiece 14 is presented at the distal end of the small atomizer assembly 10, and this extends beyond the end of the connector shroud 12.

(Ex.1005 ¶[0044], FIGS.6, 7, and 14.)

FIG. 14 is a cross section view of a connector shroud 12, which is tapered and hollow, open at both ends. A shroud connector 36, which is an internal machine thread, is located at one end of the connector shroud 12. The size of the connector shroud is selected to match the external size of the larger battery assembly 6 at the connector 36 end, and the size of the small atomizer assembly 10 at the other end.

(Ex.1005 ¶[0050], FIGS.6, 7, and 14.)

90. Atomizer assembly 10 is a vaporizer, and connector shroud 12 is disposed around atomizer assembly 10 as shown in FIGS. 6 and 7 and therefore is “a casing tube of the vaporizer for sheathing the vaporizer.” In other words, the inner cavity of the casing tube 12 sheaths the vaporizer 10.



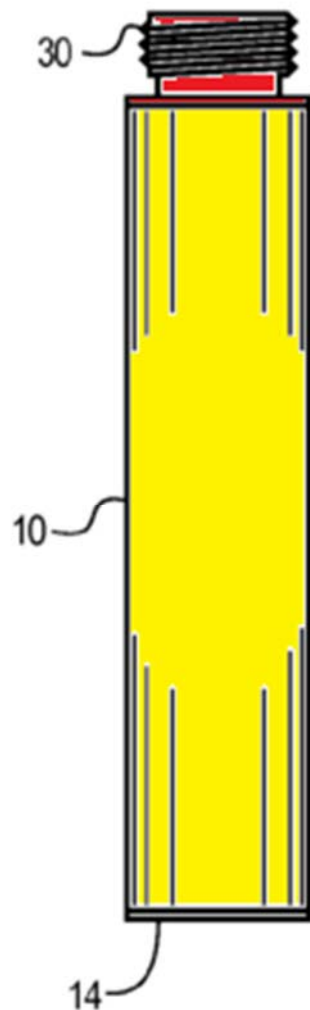
91. Limitation [1c] was rejected in view of the prior art during prosecution. Nonetheless, Patent Owner argued that the purported patentable distinction over the prior art related to the use of a vaporizer and a separate casing tube of the vaporizer.

(Ex.1004, 78-79.) However, Newton '141 was not before the examiner and discloses this alleged distinction of the '744 Patent -- the vaporizer and casing tube of the vaporizer as two separate parts.

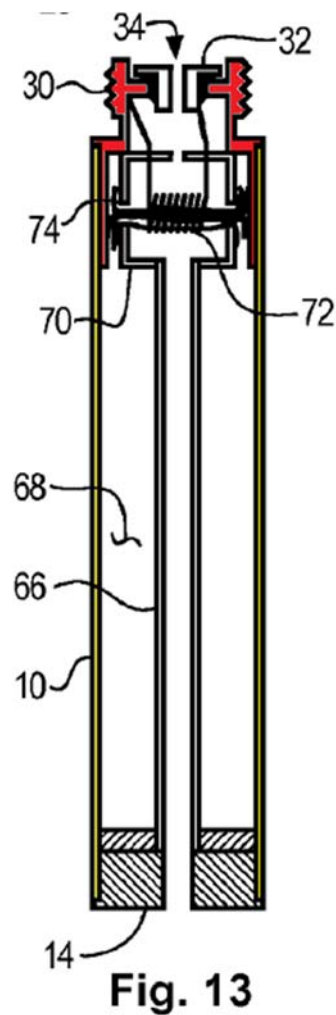
92. Thus, Newton '141 discloses all elements of limitation [1c].

**d. [1d] the vaporizer comprises a vaporizer tube body, and a second connection portion arranged at an end of the vaporizer tube body adjacent to the battery stick;**

93. Newton '141's vaporizer 10 comprises a vaporizer tube body 10 (shown in yellow) and a second connection portion (part of which is shown in red) arranged at an end of the vaporizer tube body 10 adjacent the battery stick 6:



Portion of FIG. 3



Portion of FIG. 13

Newton '141 explains:

FIG. 3 also presents a small atomizer assembly 10, which includes a mouthpiece 14 at a first end and a small connector 30 at a second end. Note that the small connector 30 connects to the second connector 18 on the large battery assembly 6.

(Ex.1005 ¶[0042], FIGS. 3 and 13.)

The small atomizer assembly 10 is connected to the second connector 18 of the large battery assembly 6 as it engages the small connector 30 on the small atomizer assembly 10. This arrangement is more plainly visible in FIG. 8, where all of these connectors 16, 18, and 30 are exposed.

(Ex.1005 ¶[0045], FIGS. 3, 8, and 13.)

94. Newton '141's second connection portion includes a **small connector 30**, an electrical contact terminal 32, and an insulation sleeve therebetween as discussed below in connection with limitation **[1f]**.

95. Thus, Newton '141 discloses all elements of limitation **[1d]**.

**e. [1e] a third connection portion is arranged at an end of the casing tube of the vaporizer adjacent to the battery stick;**

96. Newton '141 discloses all elements of limitation **[1e]**, including a third connection portion comprising a shroud connector 36 arranged at an end of the casing tube 12 of the vaporizer, adjacent to battery stick assembly 6:

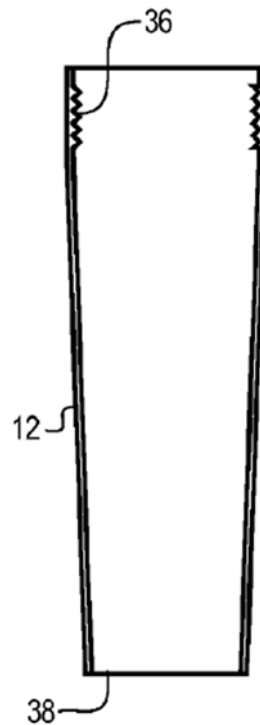


**Fig. 14**

FIG. 3 also presents a connector shroud 12, which has a shroud connector 36 at one end. The shroud connector 36 is adapted to connect to the first connector 16 on the large battery assembly 6.

(Ex.1005 ¶[0042], FIGS. 7, 14.)

The connection between the large battery assembly 6 and the connector shroud 12 is accomplished with the first connector 16 on the larger battery assembly 6 and a shroud connector 36 on the connector shroud 12. This is more clearly pictured in FIG. 7, where the connector shroud 12 has been removed from the large battery assembly 6.

(*Id.* ¶[0044], FIGS. 7, 14.)

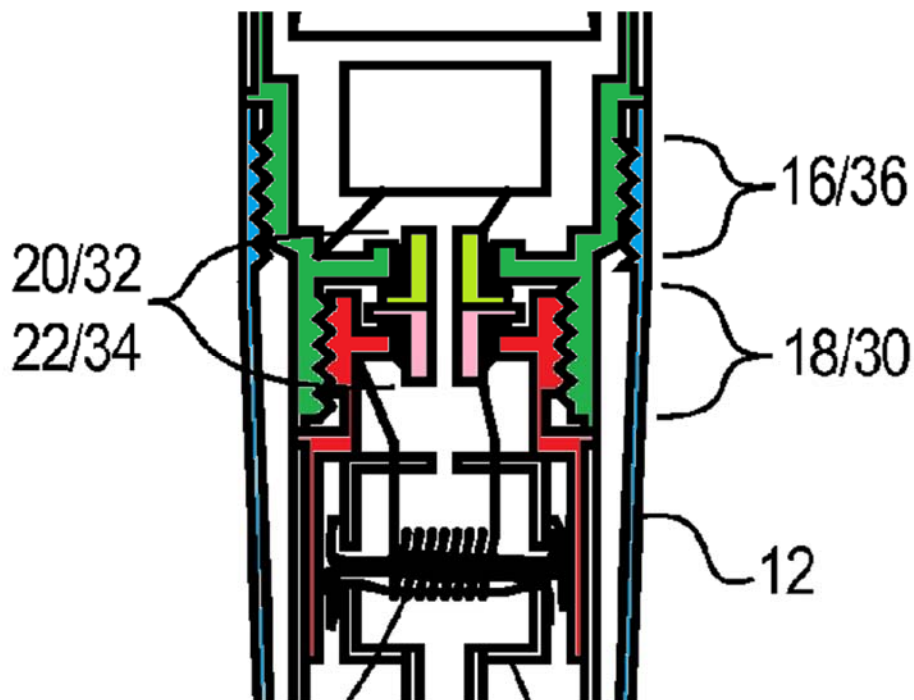
- f. [1f] the second connection portion and the first connection portion abut against each other to be connected, the third

**connection portion is detachably connected to the first connection portion by means of a screw thread;**

97. Newton '141 discloses this limitation.

- i. **“the second connection portion and the first connection portion abut against each other to be connected,”**

98. Newton '141 discloses all elements of limitation [1f](i), including a vaporizer 10 with a **second connection portion (30/32/insulation sleeve)**, and a battery stick 6 with a **first connection portion (16/18/20/insulation sleeve)**. The **second connection portion 30** is threadedly connected with **first connection portion 18** such that the portions abut one another when connected:



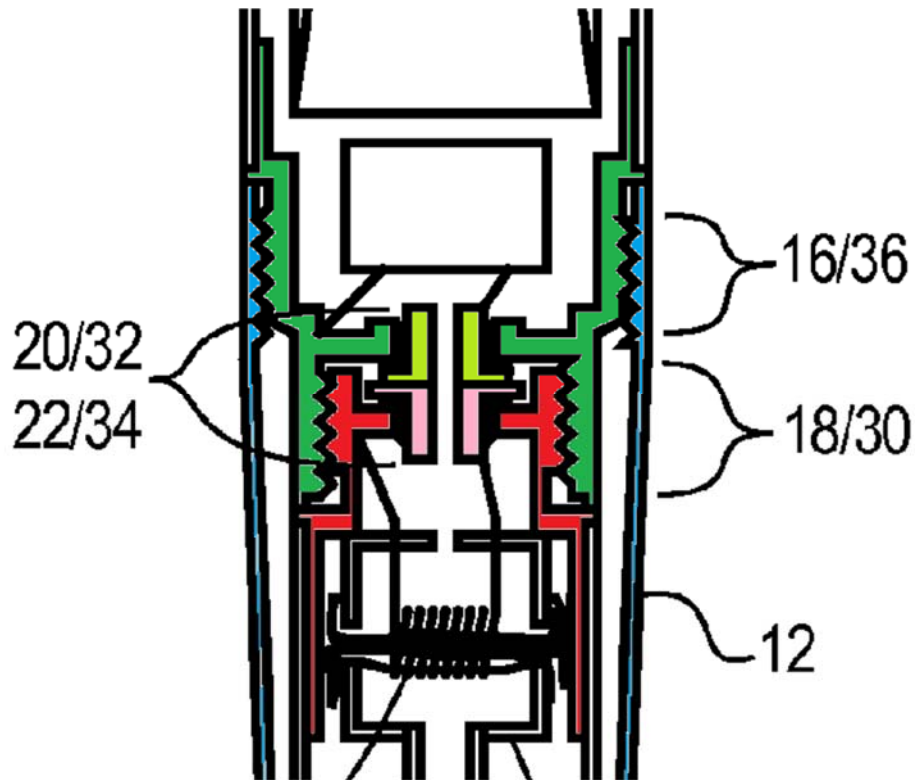
Portion of FIG. 15

Note that the **second connector 18** of the larger battery assembly 6 and the **small connector 30** of the small atomizer assembly 10 are engaged together **18/30**. This connection facilitates the electrical connection of the two central contact terminals **20/32**, respectively, and also facilitates the pneumatic port coupling 22/34.

(Ex.1005 ¶[0051], FIGS. 8 and 15.)

- ii. **“the third connection portion is detachably connected to the first connection portion by means of a screw thread;”**

99. Newton '141 discloses all elements of limitation **[1f](ii)** including, a **third connection portion 36** and a **first connection portion (16/18/20/insulation sleeve)**. **Third connection portion 36** is an internal machine thread connected to **first connection portion 16**:



Portion of FIG. 15

The connection between the large battery assembly 6 and the connector shroud 12 is accomplished with the first connector 16 on the larger battery assembly 6 and a shroud connector 36 on the connector shroud 12.

(Ex.1005 ¶[0044], FIG. 15.) “The first connector 16 is an external machine tread [sic] at one end of the large battery assembly 6.” (Ex.1005 ¶[0046], FIG. 15.) “A shroud connector 36, which is an internal machine thread, is located at one end of the connector shroud 12.” (Ex.1005 ¶[0050], FIG. 15.)

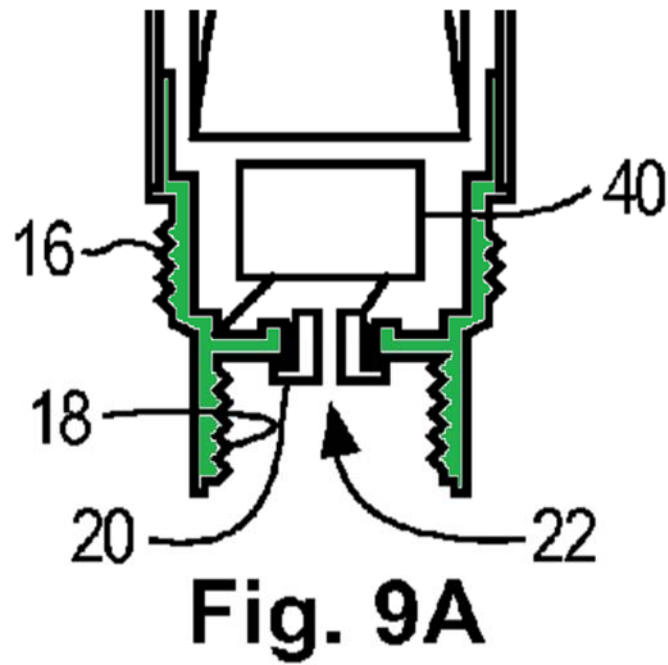
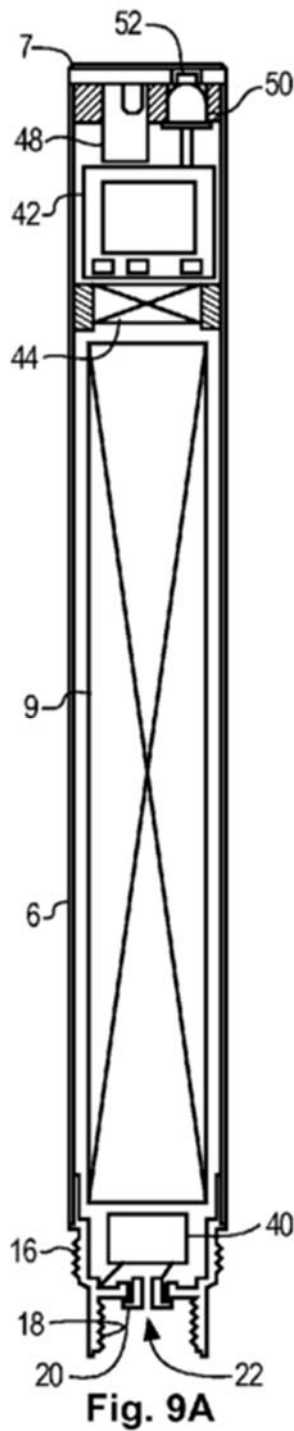
- g. [1g] the first connection portion comprises a first connection seat having an outer thread and serving as a negative electrode electrically connected to a negative electrode of the battery, a first positive electrode arranged at a center of the

**first connection seat and electrically connected to a positive electrode of the battery, and a first insulation sleeve placed between the first positive electrode and the first connection seat;**

100. Newton '141 discloses, inherently discloses, or renders obvious, or renders obvious in combination with Newton '191, limitation [1g] as explained below. Battery stick 6 of Newton '141 includes a first connection portion met by threaded element 16/18, electrical contact terminal 20, and an insulation sleeve disposed therebetween.

**i. “the first connection portion comprises a first connection seat having an outer thread”**

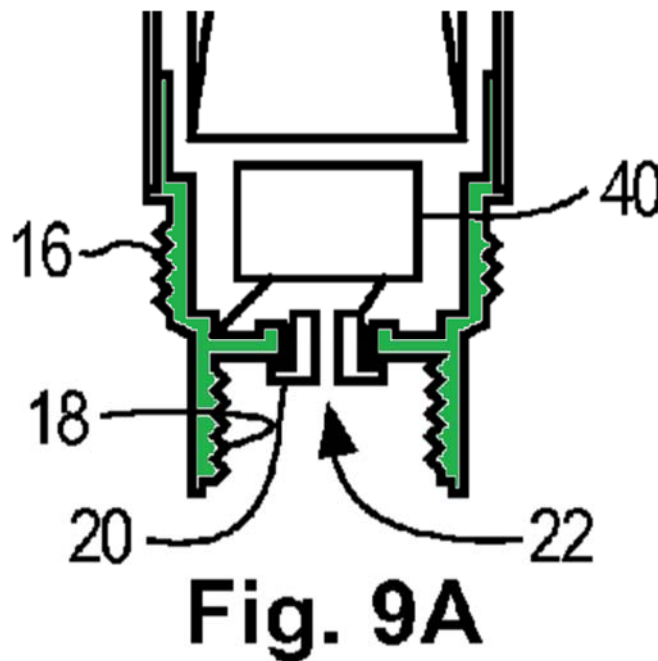
101. Battery stick 6 includes a first connection seat as a threaded element having a first connector 16 and a second connector 18. (Ex.1005 ¶¶[0042] and [0046], FIG.9A.) The **threaded element 16/18**, as shown in enlarged portion of FIG. 9A below, includes an outer thread at first connector 16:



“The large battery assembly 6 includes dual connectors, including a first, large, connector 16, and a second, small, connector 18.” (Ex.1005 ¶[0042], FIG. 9A.) “The first connector 16 is an external machine tread [sic] at one end of the large battery assembly 6. The second connector 18 is an internal machine thread that is concentric with the first connector 16.” (Ex.1005 ¶[0046], FIG. 9A.)

- ii. **“the first connection portion comprises . . . a first . . . electrode arranged at a center of the first connection seat”**

102. Battery stick 6 includes a first electrode as an electrical contact terminal 20, which is arranged at a center of first connection seat 16/18:



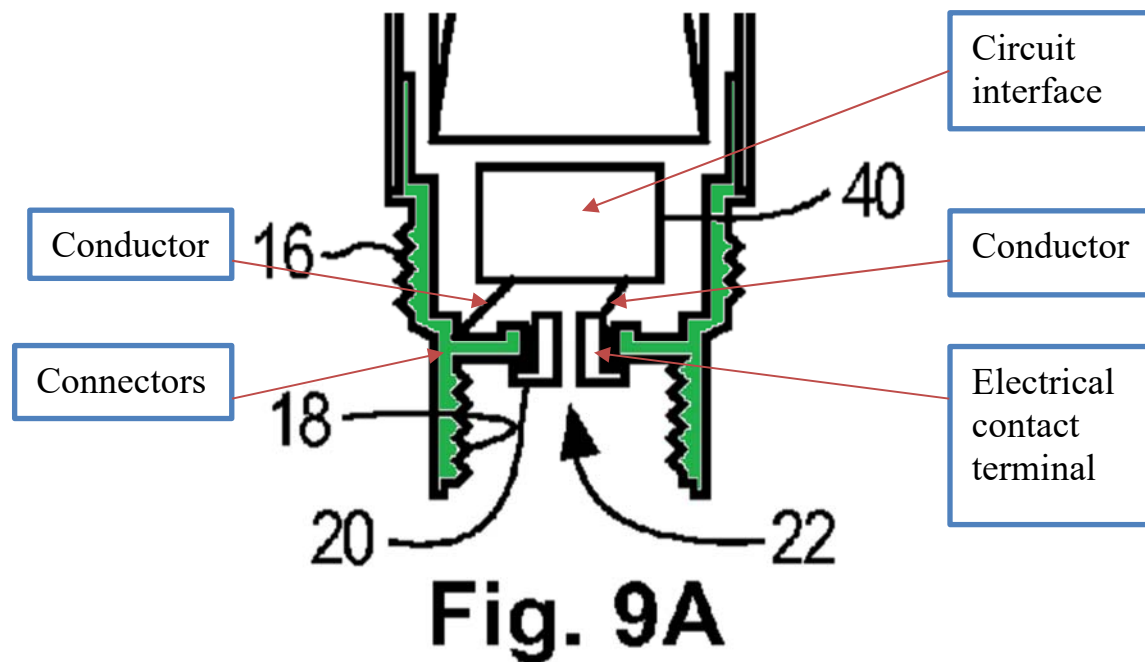
“At the center of the connector end is central electric contact terminal 20, which has a pneumatic port 22 formed there through.” (Ex.1005 ¶[0046], FIG. 15.)

- iii. **“first connection seat . . . serving as a negative electrode electrically connected to a negative electrode of the battery” / “a first positive electrode . . . electrically connected to a positive electrode of the battery”**

103. Newton '141 discloses that a circuit interface 40 is electrically connected via conductors (see annotated FIG. 9A below) to both threaded element 16/18 and electrical contact terminal 20, which are provided with electric power by battery 9:

A circuit interface 40 connects two conductors, one to the central electrical contact 20 and one to the connectors 16, 18. In this manner, the central electrical contact terminal 20 is shared with both the small and large connectors to provide a common electrical interface. . . . The pneumatic sensor 44 detects the draw, which causes a control circuit 42 to activate the atomizer electric power. The electric power is provided by an internal rechargeable storage battery 9.

(Ex.1005 ¶[0046], FIGS. 9A and 15.)



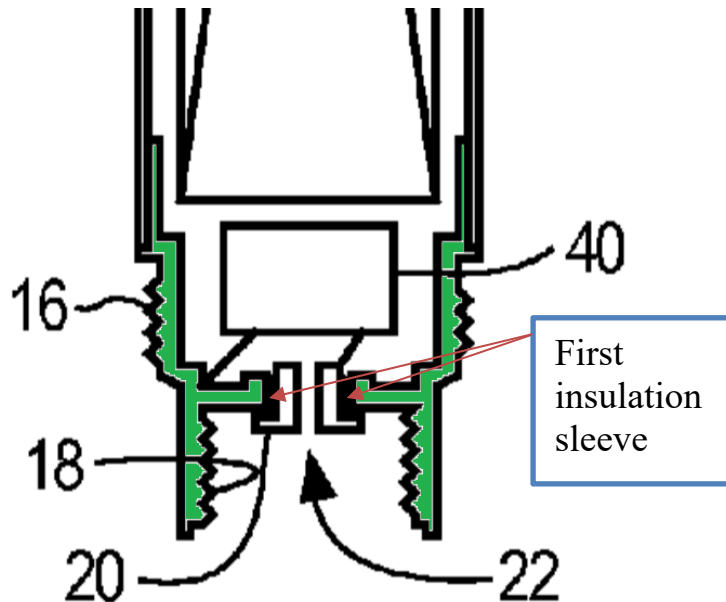
104. Accordingly, Newton '141 discloses a first connection seat 16/18 serving as an electrode electrically connected to an electrode of the battery 9, and a first electrode 20 electrically connected to an electrode of the battery 9. While Newton '141 does not mention the specific polarities of the electrical connections, the battery polarities can only be negative and positive. Thus, it is inherently disclosed and alternatively would have at least been obvious to a POSITA to make first connection seat 16/18 serve as a negative (or positive) electrode connected to a negative (or positive) electrode of the battery 9, and to make first electrode 20 a positive (or negative) electrode electrically connected to a positive (or negative) electrode of the battery 9. It would be a matter of design choice to use the polarities

of the battery electrodes in either order (negative/positive or positive/negative) for powering the circuit.

105. Further, connecting the first connection seat (serving as an electrode) to the negative electrode of the battery and connecting the other centrally arranged electrode to the positive electrode of the battery simply involves the use of known electrical battery connection techniques provided in battery-operated electronic devices in the same way to make electrical connection. A POSITA would have applied a known technique of connecting negative and positive battery electrodes to complete a circuit in such battery-operated devices to yield predictable results of powering the devices via the battery.

**iv. “the first connection portion comprises . . . a first insulation sleeve placed between the first positive electrode and the first connection seat;”**

106. Newton '141 discloses, or inherently discloses, a first insulation sleeve between first positive electrode 20 and first connection seat 16/18. The insulation sleeve is shown in FIG. 9A as the dark black lines separating (and insulating) the electrical contact terminal 20 from the threaded element 16/18, which lines are also illustrated as relatively thicker than the lines used to represent the other elements in the drawing:



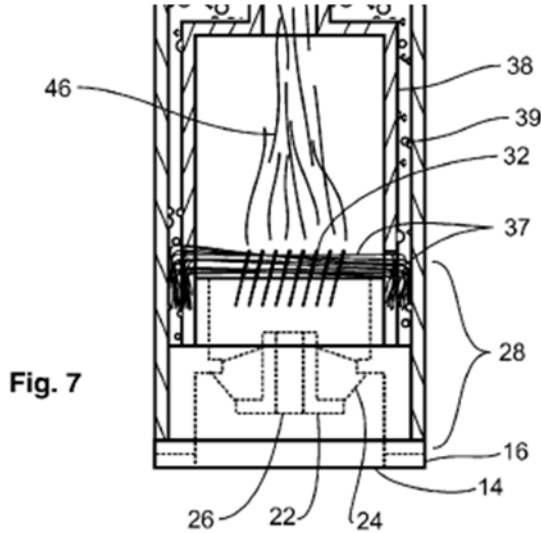
Portion of FIG. 9A

The insulation sleeve shown is also inherent given that both the threaded element 16/18 and the electrical contact terminal 20 of Newton '141 are connected by respective conductors to the circuit interface 40 and operate as electrodes, and they therefore must be insulated from one another to avoid a short circuit and enable completion of the circuit with the battery. Such insulator is shown as a “sleeve” since it encircles the electrical contact terminal 20 as shown in cross section in FIG. 9A.

107. Furthermore, it would have been obvious to a POSITA in view of Newton '141 to provide an insulation sleeve since both the threaded element 16/18 and the electrical contact terminal 20 of Newton '141 are connected by respective

conductors to the circuit interface 40 and operate as electrodes, they must be insulated from one another to avoid a short circuit. Use of an insulator sleeve would involve use of well-known elements of insulators according to known methods to insulate electrical components to yield predictable results of preventing short circuiting. Providing an insulation sleeve at the location of the dark black lines separating (and insulating) the electrical contact terminal 20 from the threaded element 16/18 would be obvious to a POSITA to avoid a short circuit.

108. The use of an insulation sleeve between the first positive electrode and the first connection seat is also rendered obvious by Newton '141 in view of Newton '191. As shown in FIGS. 7 and 11b of Newton '191, the metal atomizer assembly 28 includes an atomizer 32 electrically connected at each end respectively to a connection seat 30 and electrical coupler electrode 22, which is supported by an *insulative* support (sleeve) 24:



Portion of FIG. 7

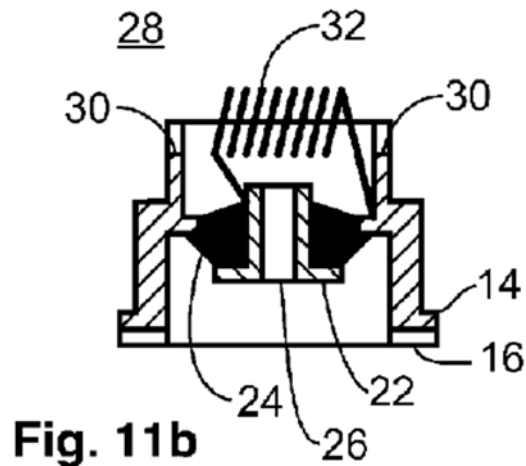


FIG. 11b

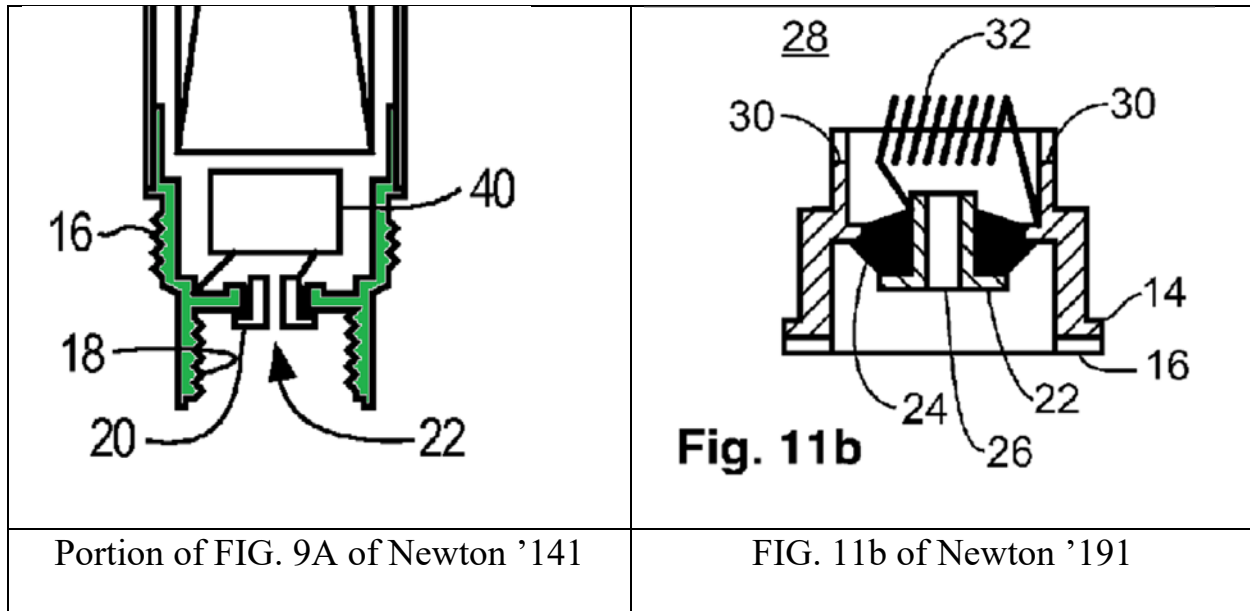
In FIG. 7, the atomizing assembly 28 is comprised of several components. . . . The atomizer assembly 28 is machined from a suitable metal and includes the mechanical couple 14, the **electrical coupler 22**, which is supported by an **insulative support 24**, and which has the air inlet port 26 formed therethrough. During operation, when there is a negative pressure imposed on the system by drawing air out of the aerosol outlet 5, and while **electric current is delivered to the atomizer [32]**, air enters the air inlet port 26 and carries aerosol of the liquid 46 away from the atomizer 32, up the chimney 36 and out the aerosol outlet 5. . . .

(Ex.1006 ¶[0040], FIGS. 7, 11b, and 15 (emphasis added).)

109. It would have been obvious to a POSITA to use an insulation sleeve between the first positive electrode and first connection seat in Newton '141 based on the teachings of Newton '191 for multiple reasons. Namely, both Newton '141 and Newton '191 are disclosures by the same inventor in the same field of electronic

cigarettes dealing with the same purpose of connecting an atomizer to a battery. Both require insulation of positive/negative electrodes from one another to prevent short circuiting during operation of the circuit. Further, Newton '191 expressly teaches use of a supporting insulation sleeve to insulate the electrodes of coupler 22 and connection seat 30. Thus, it would have been obvious to use an insulation sleeve between the first positive electrode and first connection seat in Newton '141 since it would involve combining well-known prior art elements (insulators) according to known methods to yield predictable results and needed insulation. While Newton '191's disclosure relates to the atomizer of its electronic cigarette, and the first positive electrode and the first connection seat in Newton '141 are on the battery stick 6 of its electronic cigarette, a POSITA would be motivated to employ an insulator since the electrical operation of the seats, electrodes, and insulators with respect to one another are the same irrespective of whether the arrangement is on an atomizer or a battery stick. Based on the described electrical operation of Newton '141, including the operation of its electrical contact terminal 20 and threaded element 16/18, and the relatively thicker black lines illustrated in FIG. 9A, a POSITA would have been motivated to provide an insulation sleeve (like insulative support 24 of Newton '191) at the locale of the thicker black lines to engage/support

electrical contact terminal 20 and insulate it from electrical contact with threaded element 16/18 to prevent a short circuit and enable operation of the circuit.



110. Thus, Newton '141 itself discloses, inherently discloses, or renders obvious, or renders obvious in combination with Newton '191, all elements of limitation [1g](i-iv).

- h. [1h] the second connection portion comprises a second connection seat serving as a negative electrode electrically connected to a heating coil of the vaporizer, a second positive electrode arranged at a center of the second connection seat and electrically connected to the heating coil of the vaporizer, and a second insulation sleeve placed between the second positive electrode and the second connection seat;**

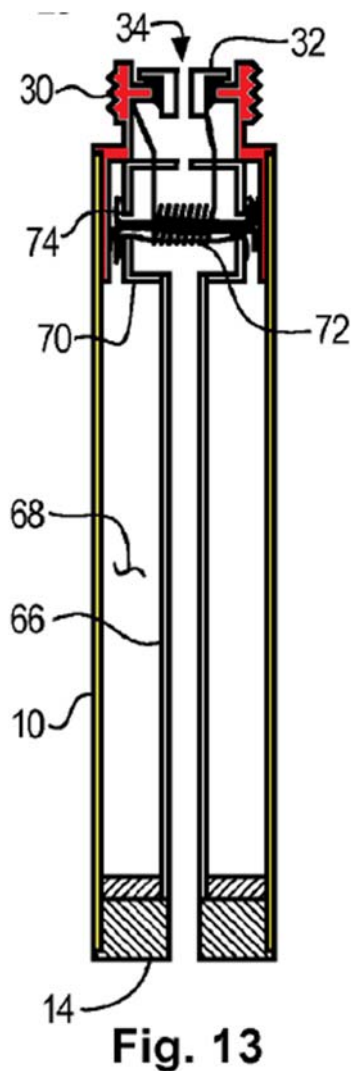
111. Newton '141 discloses, inherently discloses, or renders obvious, or renders obvious in combination with Newton '191, limitation [1h] as explained

below. As explained above in connection with limitation **[1d]**, the vaporizer 10 of Newton '141 includes a second connection portion met by small connector 30, electrical contact terminal 32, and an insulation sleeve therebetween.

**i. “the second connection portion comprises a second connection seat”**

112. Newton '141 discloses limitation **[1h](i)**.

113. Vaporizer 10 includes a second connection seat as **small connector 30**:



Portion of FIG. 13

FIG. 3 also presents a small atomizer assembly 10, which includes a mouthpiece 14 at a first end and a small connector 30 at a second end. Note that the small connector 30 connects to the second connector 18 on the large battery assembly 6.

(Ex.1005 ¶[0042], FIGS. 3 and 13.)

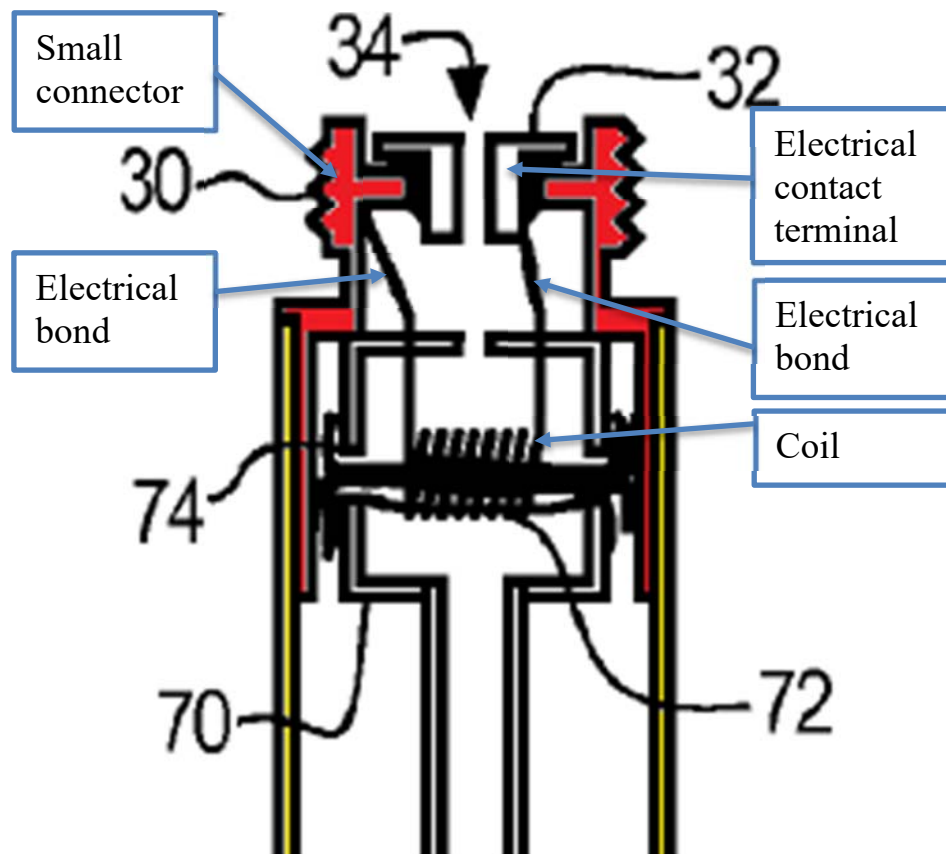
**ii. “the second connection portion comprises . . . a second . . . electrode arranged at a center of the second connection seat”**

114. As shown in FIG. 13 above and described in the written specification, vaporizer 10 includes a second electrode as an electrical contact terminal 32, which is arranged at a center of small connector 30: “Central to the small connector is an electrical contact terminal 32, which as a pneumatic port 34 formed there through.” (Ex.1005 ¶[0049], FIGS. 3 and 13.)

115. Thus, Newton ’141 discloses all elements of this limitation.

**iii. “second connection seat serving as a negative electrode electrically connected to a heating coil of the vaporizer,” / “a second positive electrode . . . electrically connected to the heating coil of the vaporizer,”**

116. Newton ’141 discloses all elements of this limitation and explains how both its second connection seat 30 and its second electrode 32 electrically connect to a heating coil 72 of the vaporizer 10: “The atomizer 72 is a coil of nickel-chromium wire that is electrically bonded to both the electrical contact terminal 32 and the small connector 30.” (Ex.1005 ¶[0049], FIG. 13.)



Portion of FIG. 13

117. Newton '141 also explains how second connection seat 30 is electrically connected to first connection seat 16/18:

Note that the second connector 18 of the larger battery assembly 6 and the small connector 30 of the small atomizer assembly 10 are engaged together 18/30. This connection facilitates the electrical connection of the two central contact terminals 20/32, respectively, and also facilitates the pneumatic port coupling 22/34. Also, note that the first connector 16 of the large battery assembly 6 is connected to the shroud connector 36 of the connector shroud 12, labeled as 18/30.

(Ex.1005 ¶[0051], FIGS. 9A and 15.)

118. Although Newton '141 does not mention the specific polarities of the electrical connections, the battery polarities can of course only be negative and positive. Functioning of the vaporizer coil is independent of connection polarity. Thus, as explained above in limitation **[1g](iii)**, this feature is inherently disclosed in Newton '141 and, alternatively, it would have been obvious to a POSITA to make second connection seat 30 (which is connected to coil 72) serve as a negative (or positive) electrode, particularly since it is connected to first connection seat 16/18 as a negative (or positive) electrode per the discussion above in limitation **[1g](iii)**. Likewise, it would have been obvious to a POSITA to make second electrode 32 (which is also connected to coil 72) serve a positive (or negative) electrode, particularly since it is connected to first electrode 20 as a positive (or negative) electrode per the discussion above in limitation **[1g](iii)**. It would be a matter of routine and obvious design choice to use the polarities of the battery electrodes in either order (negative/positive or positive/negative) for powering the circuit.

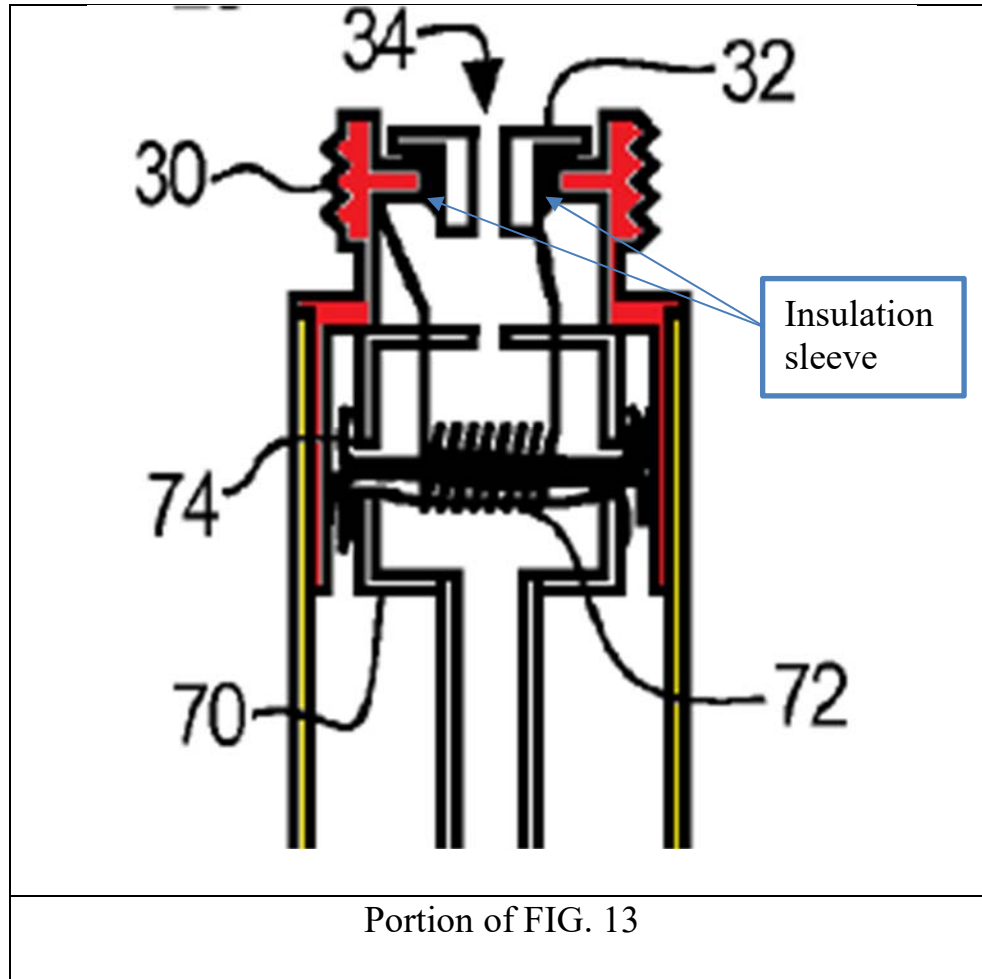
119. Further, connecting the first connection seat (serving as an electrode) to the negative electrode of the battery and connecting the other centrally arranged electrode to the positive electrode of the battery simply involves the use of known electrical battery connection techniques provided in battery-operated electronic devices in the same way to make electrical connection. A POSITA would also have

applied a known technique of connecting negative and positive battery electrodes to complete a circuit in such battery-operated devices to yield predictable results of powering the devices via the battery.

120. Thus, Newton '141 meets all elements of this limitation, either inherently or through obviousness.

**iv. “the second connection portion comprises . . . a second insulation sleeve placed between the second positive electrode and the second connection seat;”**

121. Newton '141 discloses, or inherently discloses, or renders obvious all elements of this limitation, including, a second insulation sleeve between second positive electrode 32 and second connection seat 30. The insulation sleeve is shown in FIG. 13 as the dark black lines separating (and insulating) the electrical contact terminal 32 from the small connector 30, which lines are also illustrated as relatively thicker than the lines used to represent the other elements in the drawing.



The insulation sleeve shown is also inherent given that both the small connector 30 and the electrical contact terminal 32 of Newton '141 are electrically connected to heating coil 72 as well as to threaded element 16/18 and electrical contact terminal 20 and operate as electrodes, and they therefore must be insulated from one another to avoid a short circuit and enable completion of a circuit with the battery. Such insulator is shown as a “sleeve” since it encircles the electrical contact terminal 32 as shown in cross section in FIG. 13.

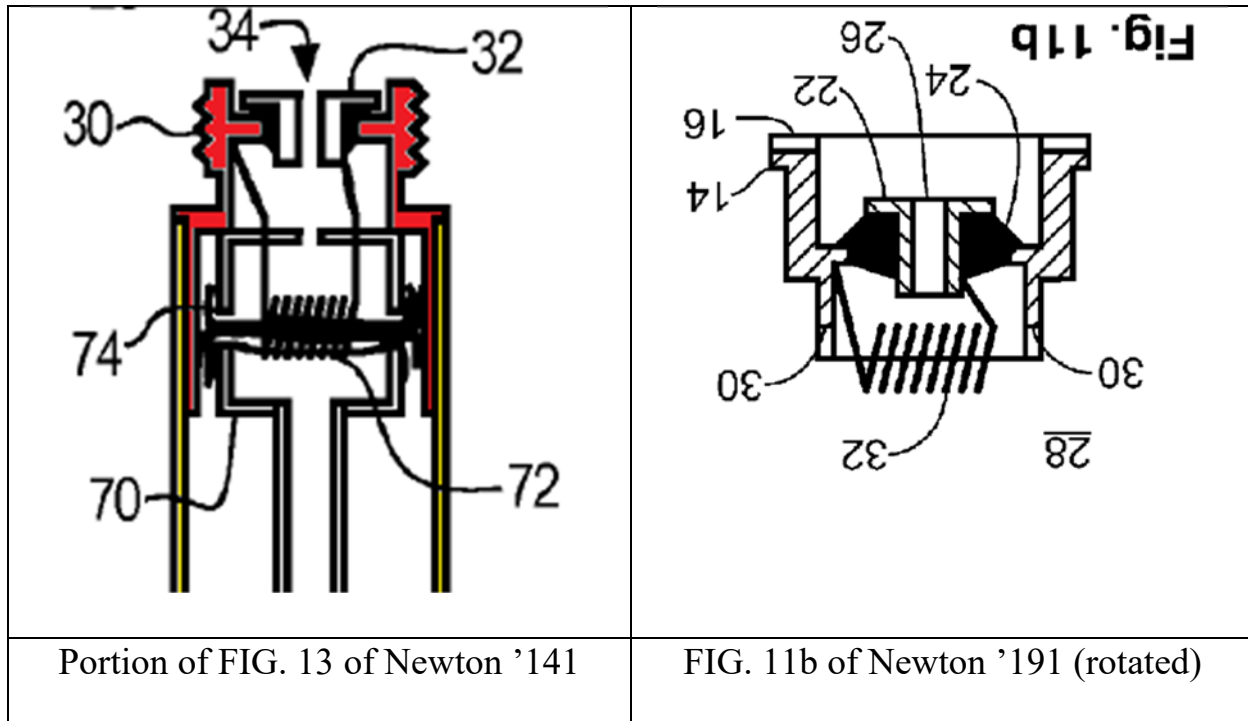
122. Furthermore, it would have been obvious to a POSITA in view of Newton '141 to provide an insulation sleeve since both the small connector 30 and the electrical contact terminal 32 of Newton '141 are connected to heating coil 72 as well as to threaded element 16/18 and electrical contact terminal 20 and operate as electrodes, they must be insulated from one another to avoid a short circuit. Use of an insulator sleeve would involve use of well-known elements of insulators according to known methods to insulate electrical components to yield predictable results of preventing short circuiting. Providing an insulation sleeve at the location of the dark black lines separating (and insulating) the electrical contact terminal 32 from the small connector 30 would be obvious to a POSITA as also simple substitution of one known electrical element to obtain predictable and required results of insulating, and also involve use of known technique of insulating to improve similar devices in the same way so that they operate without short-circuiting.

123. In addition, use of an insulation sleeve between the second positive electrode and the second connection seat is also rendered obvious by Newton '141 in view of Newton '191. As indicated above, Newton '191 teaches such an insulative support (sleeve) 24 between metal atomizer assembly 28 and electrical coupler 22.

124. For the same reasons set forth above, it would have been obvious to a POSITA to use an insulation sleeve between the second positive electrode 32 and second connection seat 30 in Newton '141 based on the teachings of Newton '191. Namely, both Newton '141 and Newton '191 are disclosures by the same inventor in the same field of electronic cigarettes dealing with the same purpose of connecting an atomizer to a battery. Both require insulation of positive/negative electrodes from one another to prevent short circuiting during operation of the circuit. Further, Newton '191 expressly teaches use of a supporting insulation sleeve to insulate the electrodes of coupler 22 and connection seat 30. Thus, giving this express teaching of using an insulator support sleeve 24 in Newton '191 for supporting the insulating coupler 22, it would have been obvious to use an insulation sleeve between the second positive electrode and second connection seat in Newton '141 since it would involve combining well-known prior art elements (insulators) according to known methods to avoid a short circuit and yield predictable results.

125. Further, based on the described electrical operation of Newton '141, including the operation of its electrical contact terminal 32 and small connector 30, and the relatively thicker black lines illustrated in FIG. 13 of Newton '141, a POSITA would have been motivated to provide an insulation sleeve (like insulative support 24 of Newton '191) at the locale of the thicker black lines to engage/support

electrical contact terminal 32 and insulate it from electrical contact with small connector 30 to prevent a short circuit and enable operation of the circuit.



126. The above is reinforced by the disclosure of Newton '191, which explicitly calls out an insulative support 24 between the same elements.

127. Thus, Newton '141 discloses, inherently discloses, or renders obvious, either alone or in combination with Newton '191, all elements of limitation [1h](i)-(iv).

- i. [1i] the second positive electrode has a central through hole along an axial direction of the second positive electrode for intercommunicating with a vaporizing cavity of the vaporizer, an end surface of the second positive electrode has a transversal groove along a radial direction of the end

**surface for intercommunicating with the central through hole;**

128. All elements of this limitation are disclosed in Newton '141 except for a transversal groove in the second positive electrode. However, as demonstrated below, an electrode with a traversal groove was a common feature in the art (e.g., see Newton '191, Thompson, Liu '556, and Liu '527) such that this limitation would have been obvious based on the combination of Newton '141 with either Newton '191 or Thomson, or in view of the well-known state of the art. For clarity, Limitation **[1i]** is discussed in subparts **[1i](i)-(ii)** below.

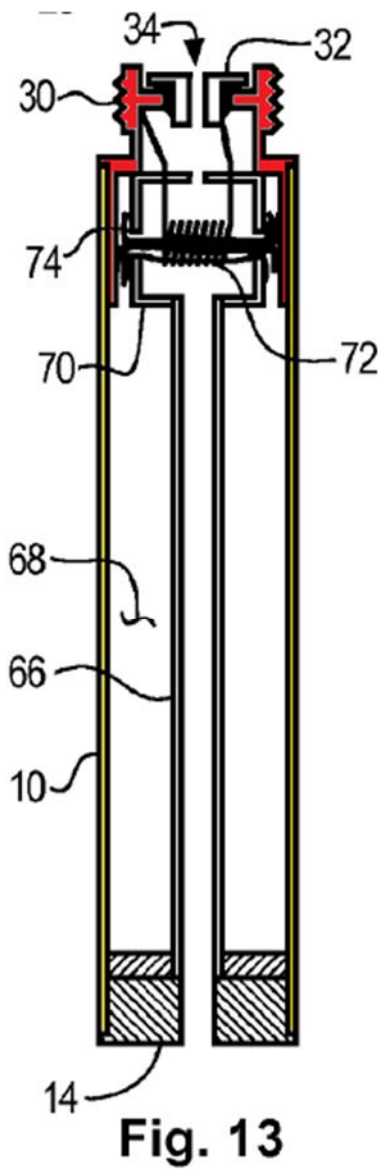
**i. “the second positive electrode has a central through hole along an axial direction of the second positive electrode for intercommunicating with a vaporizing cavity of the vaporizer,”**

129. As explained above in limitation **[1h]**, Newton '141 discloses a second positive electrode 32, and further shows that such electrode 32 has a central through hole as a pneumatic port 34 for intercommunicating with a vaporizing cavity as an atomizing chamber 70:

Central to the small connector is an electrical contact terminal 32, which as [sic] a pneumatic port 34 formed there through. . . . The pneumatic port 34 serves as the entry point for air to enter the atomizing chamber 70, for flow out through the chimney 66 and mouthpiece 14.

(Ex.1005 ¶[0049], FIGS. 3 and 13.)

130. Central through hole 34 extends in an axial direction of second positive electrode 32, which is vertical in the image:



Portion of FIG. 13

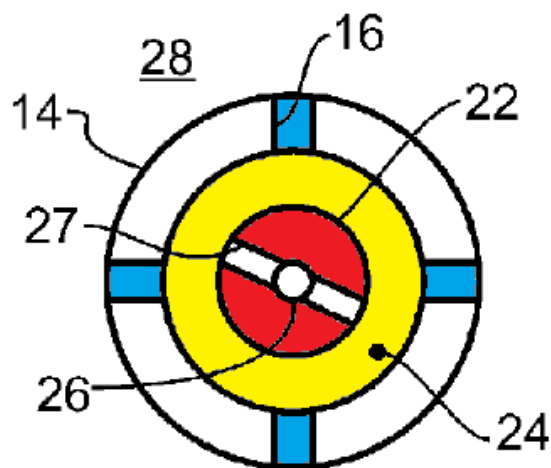
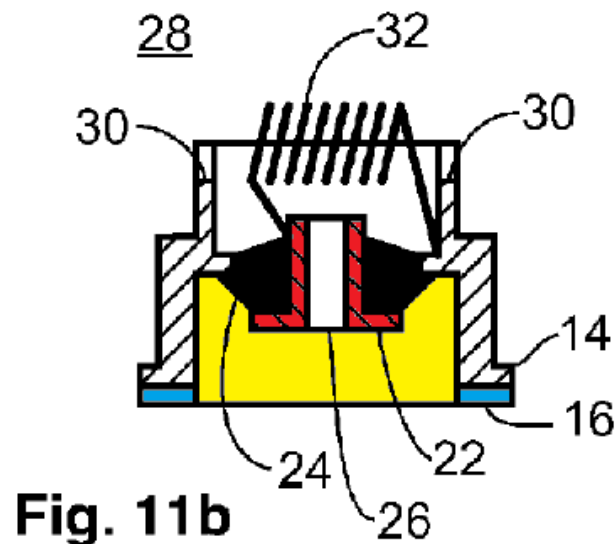
131. Thus, Newton '141 discloses all elements of this limitation.

- ii. **“an end surface of the second positive electrode has a transversal groove along a radial direction of the end surface for intercommunicating with the central through hole;”**

132. It would have been obvious to a POSITA to modify Newton '141 to use the electrical coupler 22 with a transversal groove disclosed in Newton '191 in place of electrical contact terminal 20 of Newton '141. Such a modification would have been obvious to a POSITA for the following reasons: (1) it was a well-known design choice and a simple substitution to use such an electrode design, (2) the use of such electrodes and air flow techniques yield predictable results, (3) Newton '141 and Newton '191 are in the same field of e-cigarettes, (4) there is express teaching, suggestion, and motivation to combine Newton '141 with Newton '191 to use an electrode with a transversal groove, and (5) Patent Owner already conceded during prosecution that a second positive electrode with a transversal groove is a known feature in the art and is thus unpatentable.

133. As discussed above, Newton '141 discloses electrical contact terminal 32 in small atomizer assembly 10 having a pneumatic port 34 to allow air to enter atomizing chamber 70. (Ex.1005 ¶[0049], FIG. 15.) “The pneumatic port 34 serves as the entry point for air to enter the atomizing chamber 70, for flow out through the chimney 66 and mouthpiece 14.” (Ex.1005 ¶[0049], FIGS. 13, 15.)

134. Newton '191, by the same inventor as Newton '141, discloses the well-known state of the art design choice of using an electrode having an end surface with a transversal groove. Newton '191 discloses an electrode (electrical coupler 22) having an end surface with a transversal groove (air recesses 27) along a radial direction of the end surface for intercommunicating with the central through hole (air inlet port), as shown in the annotated FIGS. 11a and 11b:



The assembly is based on a metal body 28 that has a electrical coupler 22 insulatively supported 24 therein. The electrical coupler 22 has an air inlet port formed therethrough. The electrical coupler has a pair of air recesses 27 machined on its face so that an air channel is created when the cartridge is engaged with the power supply portion of the electronic cigarette. In this manner, the air path is from the exterior, through the air inlet vents

16, through the air recesses 27, through the air inlet port 26 of the electrical coupler and u [sic] to the atomizer 32.

(Ex.1006 ¶[0043], FIGS. 3a, 3b, 11a, 11b.)

135. Using such a design of Newton '191 in place of electrical contact terminal 32 of Newton '141 would be a matter of obvious design choice and a simple substitution of one part for another. It was known in the art, particularly by the common inventor of Newton '141 and Newton '191, to use an electrode with a transversal groove in its end surface to accommodate the entry of external airflow, as explained in Newton '191. Designs such as that of Newton '191 were also used in other prior art electronic cigarette designs as discussed in paragraphs 76-80 above.

136. To a POSITA, in Newton '141, it is clear that airflow is required for the operation of electronic cigarette 4. The positions for the air inlet openings in an electronic cigarette amount to only a finite number of solutions, i.e., locations along the electronic cigarette, for air to enter. Newton '191 discloses the design choice that air is inlet to the electronic cigarette at vent openings 16 located at the coupler 14 and flows via a transversal groove 27 into electrode 22. (Ex.1006 Abstract, FIGS. 11a, 11b.) Notably, Newton '191 specifically states that it is a matter of design choice where the air enters the e-cigarette: "Air is inlet to the electronic cigarette 2 at the vent openings 16 located at the coupler 14. The air inlet openings 16 can be

located elsewhere on the electronic cigarette 2, and is a matter of design choice.”  
(Ex.1006 ¶[0033], FIG. 4b.)

137. Using electrical coupler 22 of Newton '191 in the electronic cigarette of Newton '141 would also provide predictable results of permitting electrical connection from the battery to the atomizer while also providing an entrance for airflow into the internal port of the electrode. Not only were both the electronic cigarette disclosures of Newton '141 and Newton '191 known in the art, they were known by the same person.

138. Since Newton '191 discloses electrical coupler 22 having a transversal groove (air recesses 27) for permitting access by air to its central through hole, a POSITA would be motivated to use electrical coupler 22 so that air can be accommodated into the electronic cigarette of Newton '141 to facilitate its use in the same way. A POSITA would have understood the significant similarities between the disclosures of Newton '141 and Newton '191, which include the same inventor in the same field of electronic cigarettes dealing with the same purpose of connecting an atomizer to a battery, and therefore found it obvious to utilize electrical coupler 22 of Newton '191 in place of electrical contact terminal 20 of Newton '141.

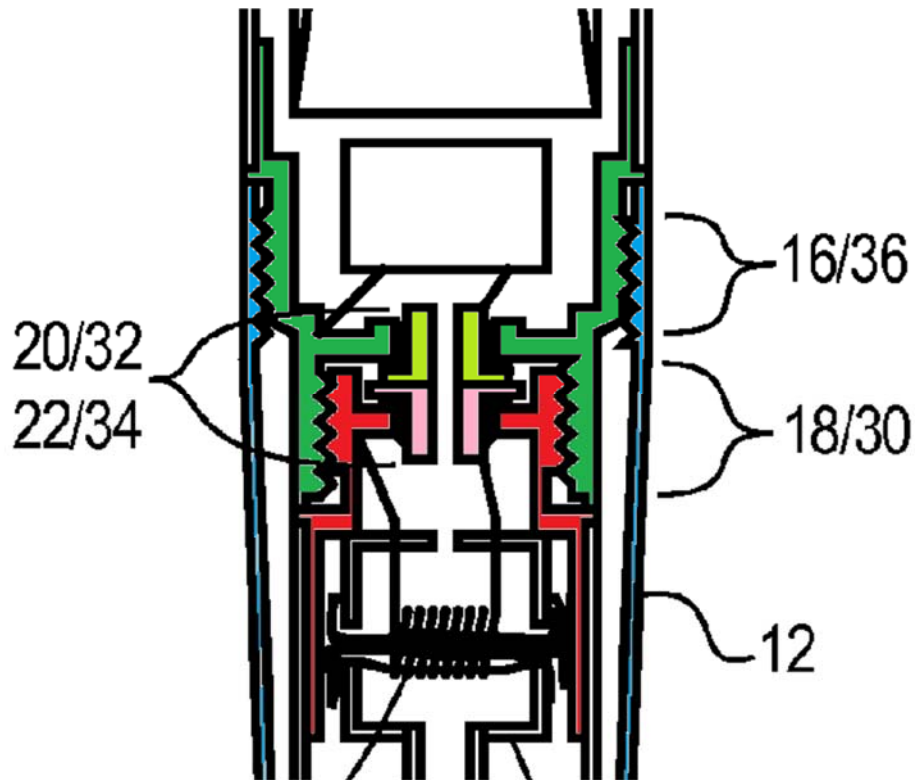
139. In addition to being disclosed in Newton '191, this claimed transversal groove of limitation [1i] was rejected in view of Thompson or Liu '556 during

prosecution (Ex.1004, 86-90), both of which disclose use of this groove. (See groove (air vents 38a) in Thompson, Ex.1008 ¶[0025], FIG. 4b; see groove in first electrode 57 in Liu '556, Ex.1009 ¶[0035], FIG. 2.) Both Thompson and Liu '556 evidence the state of the art for electrodes used in e-cigarettes. The Patent Owner did not offer any response to those rejections, but rather pursued other language deemed allowable by the examiner and did not mention the claimed transversal groove of limitation [1i] in its arguments for patentability. (Ex.1004, 78-79.) Thus, even the Patent Owner conceded that the claimed transversal groove was a known design choice and was disclosed by the prior art.

140. Thus, in view of the foregoing, Newton '141 in view of Newton '191 renders obvious an end surface of a second positive electrode having a transversal groove 27 along a radial direction of the end surface for intercommunicating with the central through hole 26.

**j. [1j] the third connection portion has an inner thread engaging with the outer thread of the first connection seat;**

141. As discussed above in connection with limitation [1f], and shown below, Newton '141 discloses a **third connection portion 36** as an internal thread connected to an outer thread of **first connection portion 16**:



Portion of FIG. 15

The connection between the large battery assembly 6 and the connector shroud 12 is accomplished with the first connector 16 on the larger battery assembly 6 and a shroud connector 36 on the connector shroud 12.

(Ex.1005 ¶[0044], FIG. 15.)

The first connector 16 is an external machine tread [sic] at one end of the large battery assembly 6.

(Ex.1005 ¶[0046], FIG. 15.)

A shroud connector 36, which is an internal machine thread, is located at one end of the connector shroud 12.

(Ex.1005 ¶[0050], FIG. 15.)

142. Thus, Newton '141 discloses all elements of limitation [1j].

- k. **[1k] the first positive electrode and the second positive electrode abut against each other to be electrically connected, the first connection seat and the second connection seat are electrically connected;**

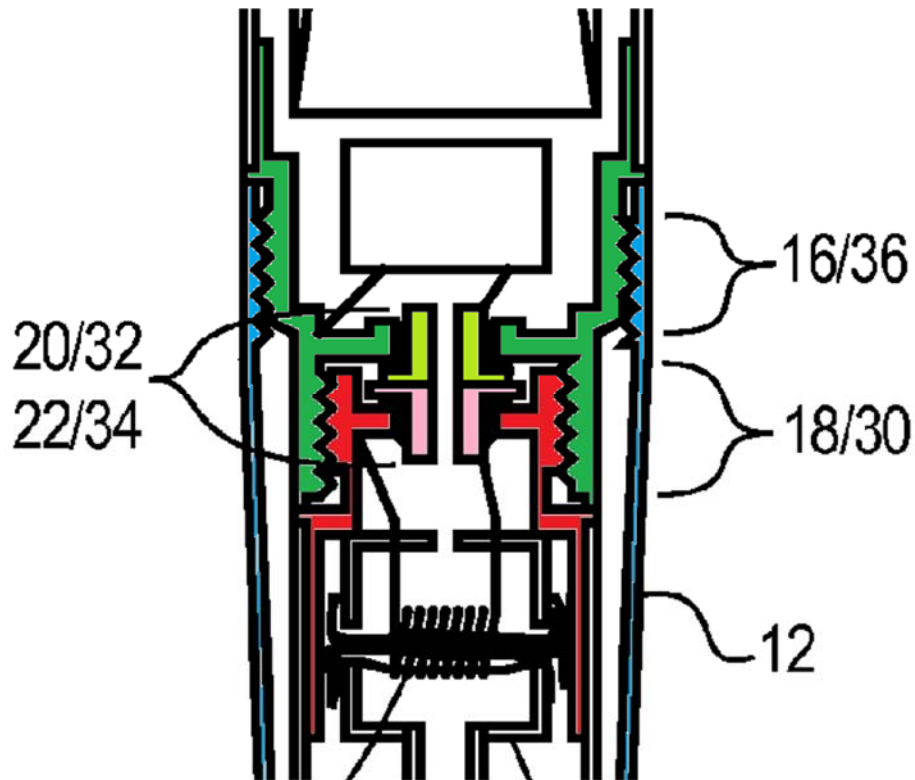
143. For clarity, this limitation is discussed in subparts [1k](i)-(ii) below.

- i. **“the first positive electrode and the second positive electrode abut against each other to be electrically connected,”**

144. As discussed above in connection with limitation [1f], **first positive electrode 20** and **second positive electrode 32** abut and are electrically connected, as further shown in FIG. 15.

Note that the second connector 18 of the larger battery assembly 6 and the small connector 30 of the small atomizer assembly 10 are engaged together 18/30. This connection facilitates the electrical connection of the two central contact terminals 20/32, respectively, and also facilitates the pneumatic port coupling 22/34.

(Ex.1005 ¶[0051], FIGS. 8 and 15.)



Portion of FIG. 15

145. Thus, Newton '141 discloses the elements of this limitation.

ii. **“the first connection seat and the second connection seat are electrically connected;”**

146. As discussed above, in connection with limitation [1h], Newton '141 discloses that first connection seat 16/18 is electrically connected to second connection seat 30:

Note that the second connector 18 of the larger battery assembly 6 and the small connector 30 of the small atomizer assembly 10 are engaged together 18/30. This connection facilitates the electrical connection of the two central contact terminals 20/32, respectively, and also facilitates the pneumatic port coupling 22/34. Also, note

that the first connector 16 of the large battery assembly 6 is connected to the shroud connector 36 of the connector shroud 12, labeled as 18/30.

(Ex.1005 ¶[0051], FIG. 15.)

The atomizer 72 is a coil of nickel-chromium wire that is electrically bonded to both the electrical contact terminal 32 and the small connector 30.

(Ex.1005 ¶[0049], FIG. 15.)

147. This explains the electrical connection between first connection seat 16/18 and second connection seat 30 and also between first electrode 20 and second electrode 32. In addition, as discussed above in connection with limitation **[1g]**, Newton '141's first connection seat 16/18 serves as an electrode electrically connected to an electrode of the battery 9. It therefore follows that Newton '141 discloses an electrical connection between first connection seat 16/18 and second connection seat 30 in order to supply power from the battery 9 to the heating coil 72.

148. Thus, Newton '141 discloses all elements of this limitation.

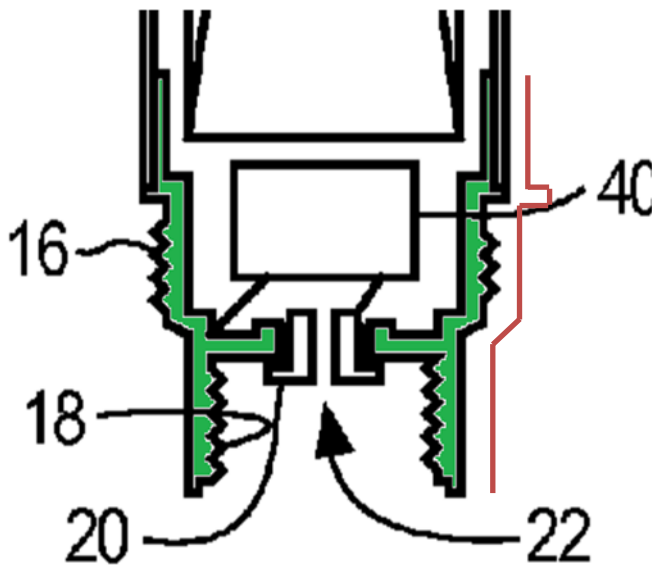
- l. [1l] the first connection seat has a step-like shape, a protruding step is formed at a middle portion of the first connection seat that has a maximum outer diameter;**

149. For clarity, this limitation is discussed in subparts **[1l](i)-(ii)** below.

- i. “the first connection seat has a step-like shape”**

150. Newton '141 discloses a first connection seat 16/18 with a step-like shape, as best understood. The '744 Patent states: “Referring to FIGS. 2 and 4, the

first connection seat 11 has a step-like shape . . . .” (Ex.1001 col.5 ll.27-28, FIGS. 2, 4.) Accordingly, an enlarged portion of FIG. 9A of Newton ’141 is shown below next to FIG. 4 of the ’744 Patent as having the same “step-like shape”:



Portion of FIG. 9A of Newton ’141

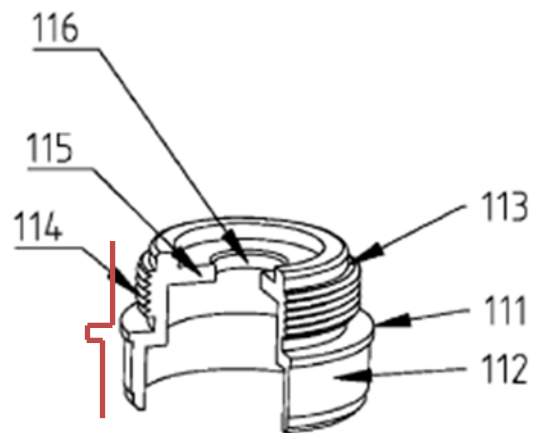


Figure 4

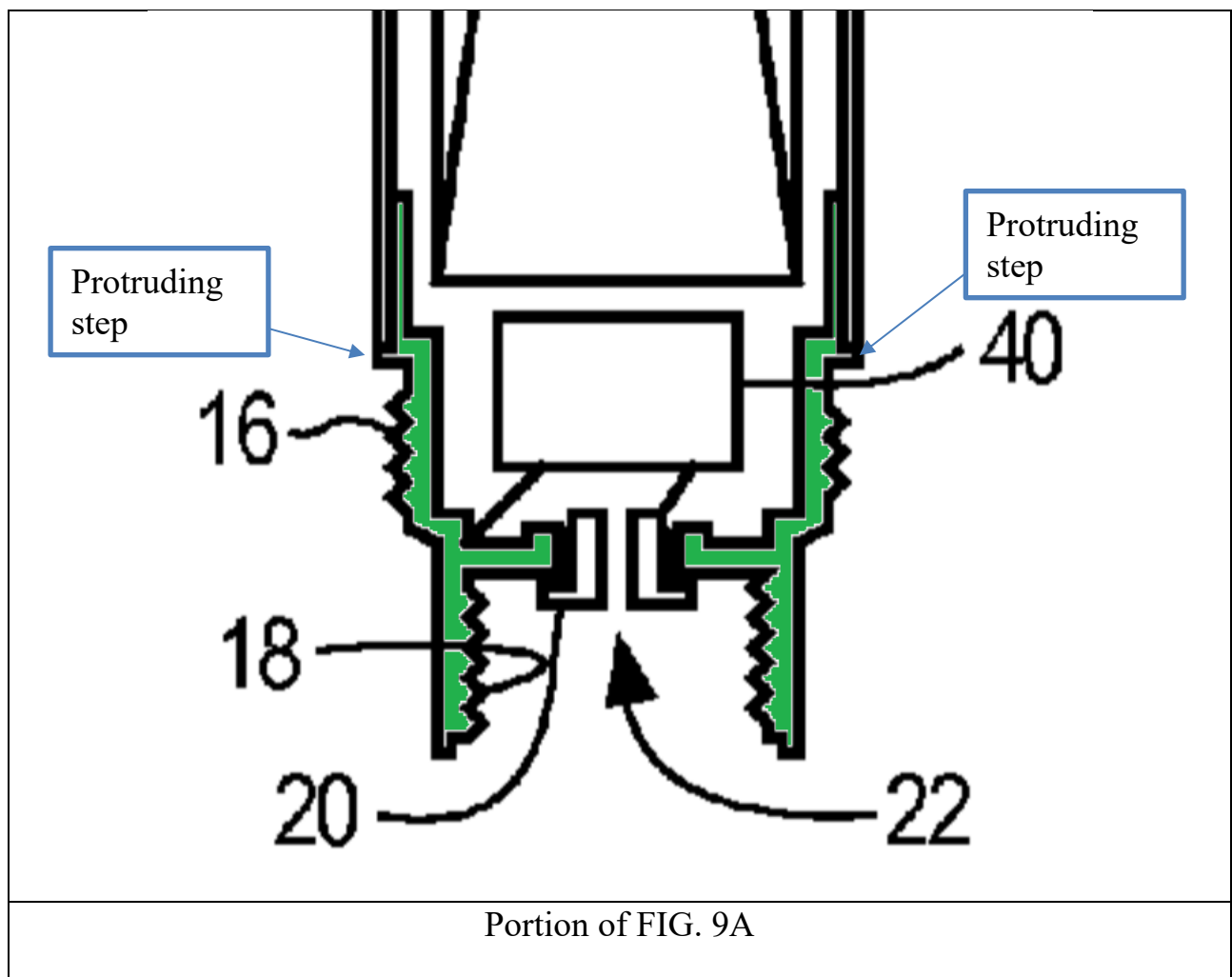
FIG. 4 of the ’744 Patent

151. Thus, Newton ’141 discloses the elements of this limitation.

- ii. **“a protruding step is formed at a middle portion of the first connection seat that has a maximum outer diameter;”**

152. Newton ’141 discloses a first connection seat 16/18 having a protruding step formed at a middle portion thereof, as shown in the portion of FIG. 9A annotated below. Since first connection seat 16/18 extends both above and below the annotated

protruding step, FIG. 9A shows that the protruding step is formed at a middle portion of first connection seat 16/18 at least because it is not at a terminal end thereof. All other portions of first connection seat 16/18, both above and below the annotated protruding step, have a smaller width, and FIG. 9A clearly discloses that the protruding step has a maximum outer diameter of first connection seat 16/18.



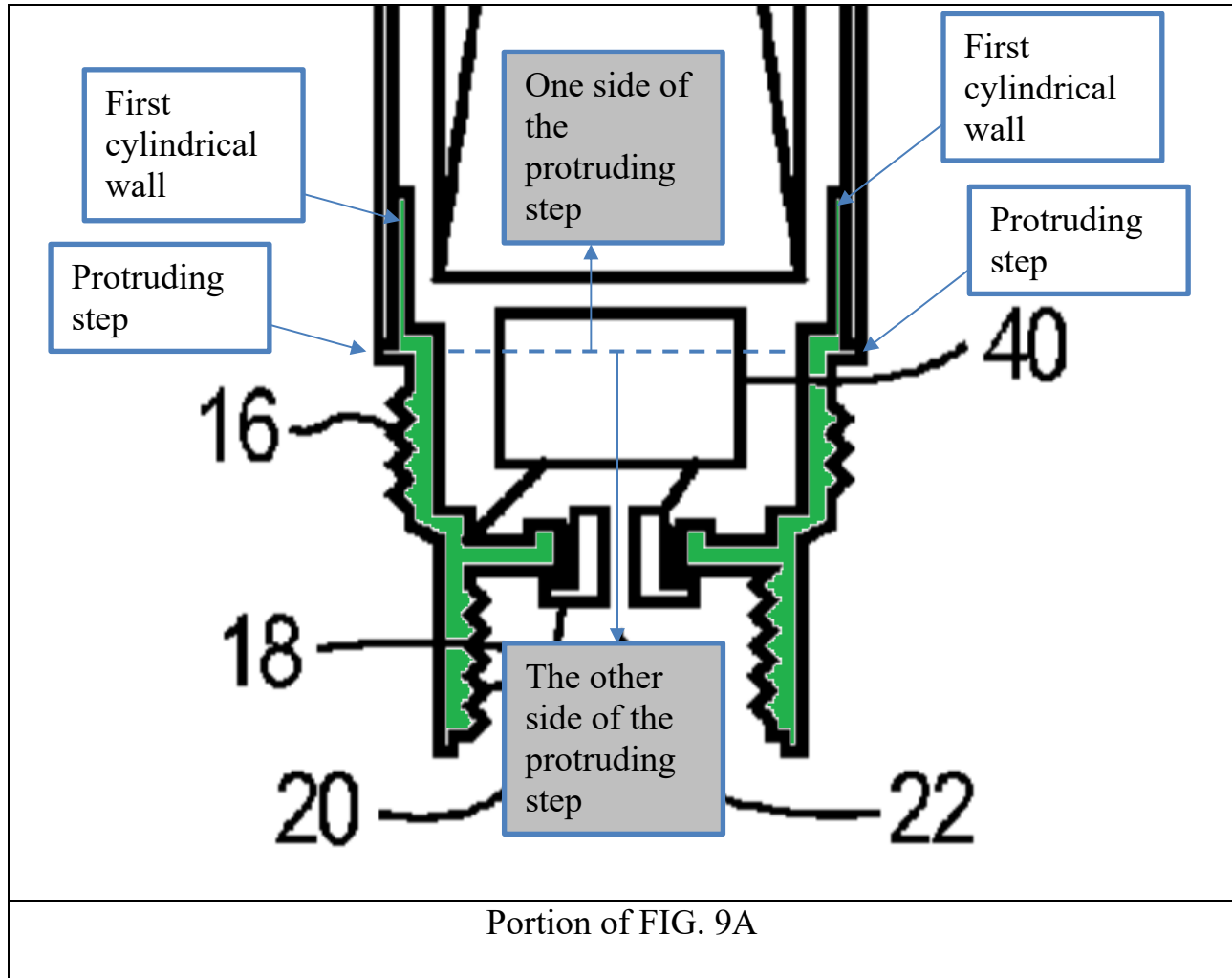
153. Thus, Newton '141 discloses all elements of this limitation.

- m. **[1m] one side of the protruding step is provided with a first cylindrical wall having an outer diameter smaller than that of the protruding step, the first cylindrical wall is sheathed with an inner wall of said end of the casing tube of the battery stick, the outer diameter of the protruding step equals an outer diameter of the casing tube of the battery stick;**

154. For clarity, this limitation is discussed in subparts **[1m](i)-(iii)** below.

- i. **“one side of the protruding step is provided with a first cylindrical wall having an outer diameter smaller than that of the protruding step”**

155. Newton '141 discloses that one side of the protruding step (an upper side as shown in FIG. 9A) is provided with a first cylindrical wall, as shown in the portion of FIG. 9A annotated below. The first cylindrical wall has a smaller outer diameter than the outer diameter of the protruding step as clearly shown in FIG. 9A.

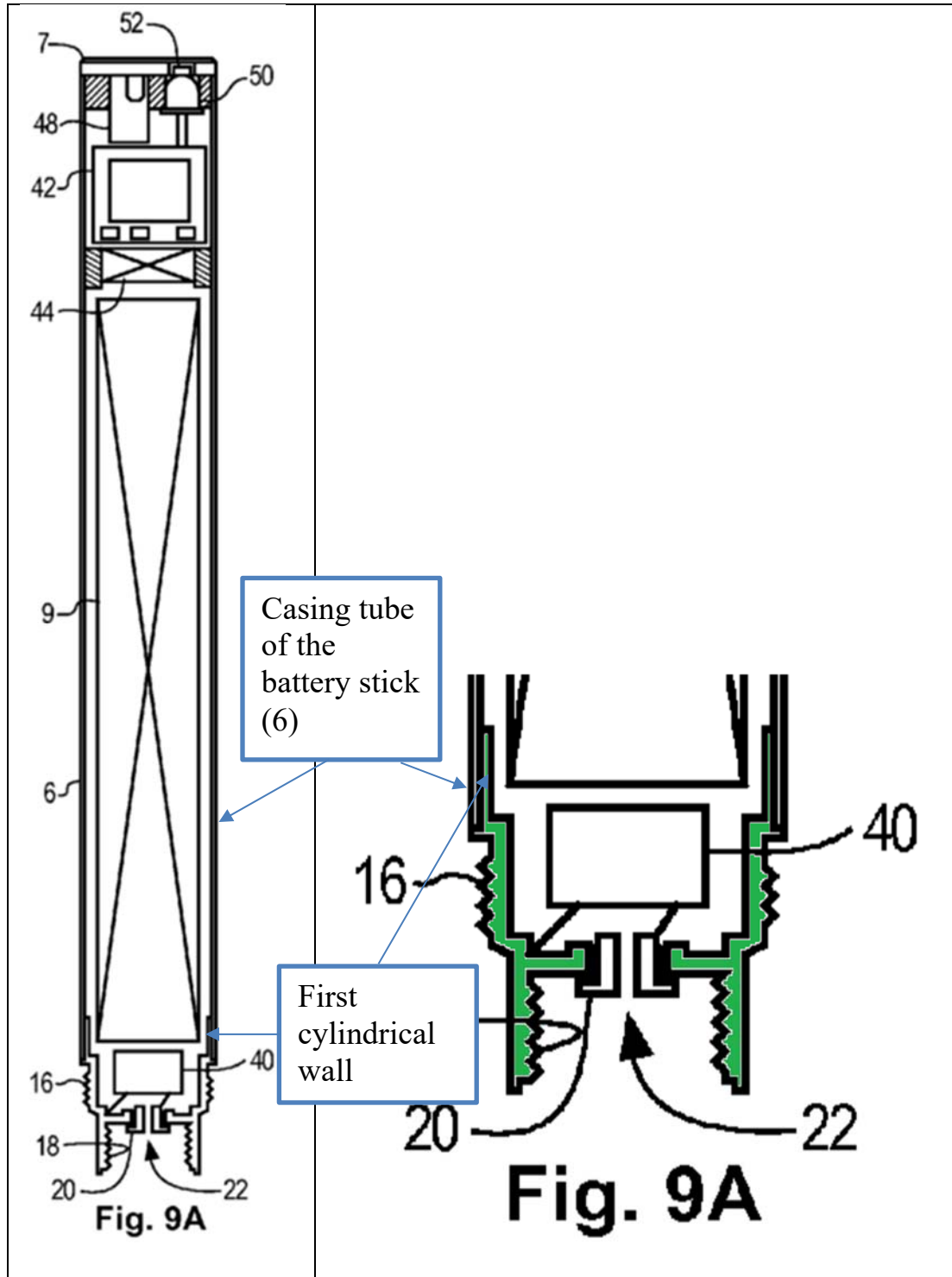


156. Thus, Newton '141 discloses all elements of this limitation.

- ii. **“the first cylindrical wall is sheathed with an inner wall of said end of the casing tube of the battery stick”**

157. Newton '141 discloses that the first cylindrical wall is sheathed with an inner wall of the end of the casing tube (referenced by numeral 6, as discussed in connection with Limitation [1b]) of the battery stick 6. This is shown in a full

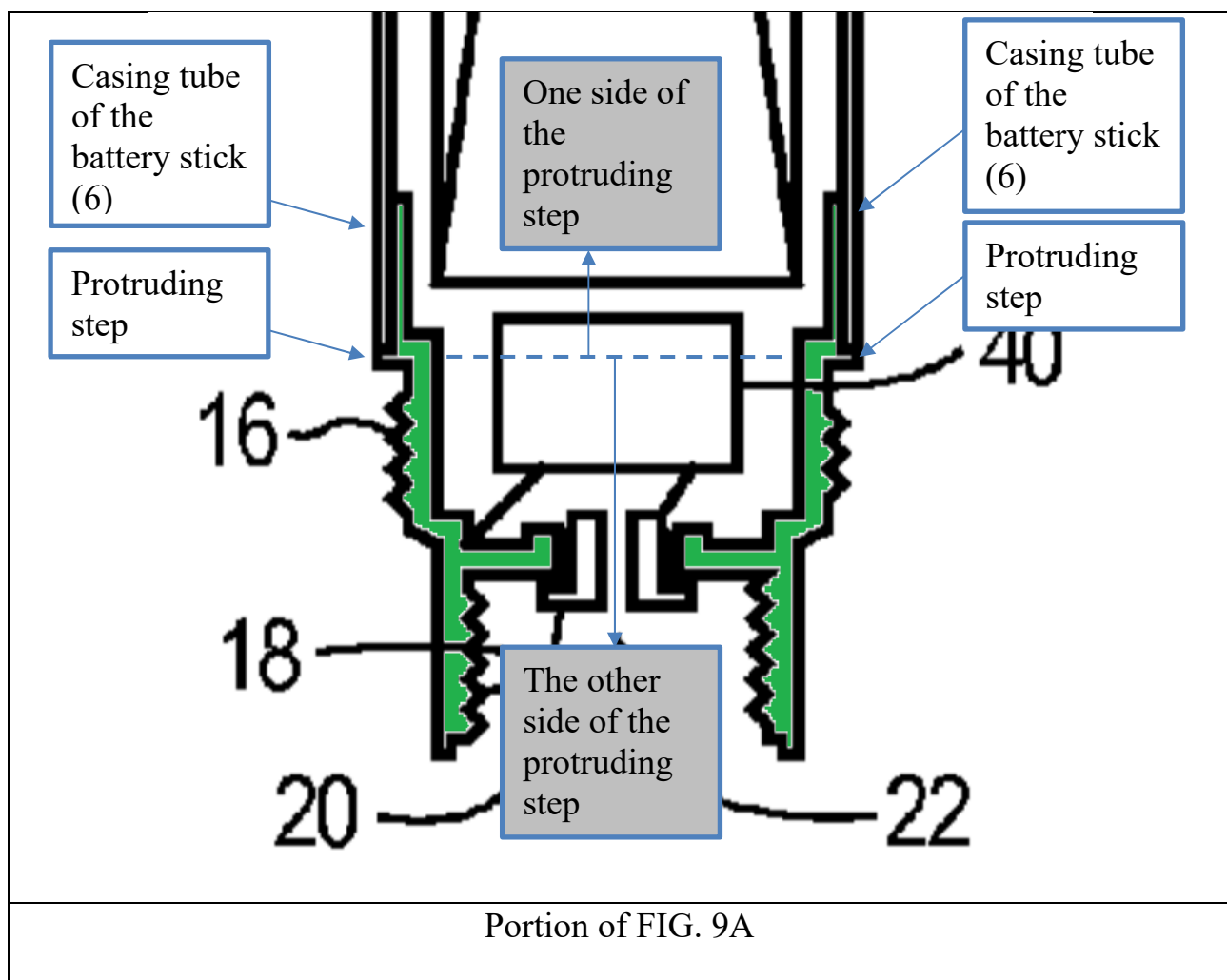
version of FIG. 9A next to an enlarged portion of FIG. 9A annotated below, showing that the first cylindrical wall of first connection seat 16/18 is disposed within an end of the casing tube of battery stick 6.



158. Thus, Newton '141 discloses all elements of this limitation.

iii. **“the outer diameter of the protruding step equals an outer diameter of the casing tube of the battery stick;”**

159. Newton '141 discloses that in the first connection seat 16/18, the outer diameter of the protruding step equals an outer diameter of the casing tube of the battery stick. This is clear from FIG. 9A annotated below, where the vertical lines representing the outermost portions of both the casing tube of battery stick 6 and the protruding step are colinear, indicating that the outer diameters are equal.



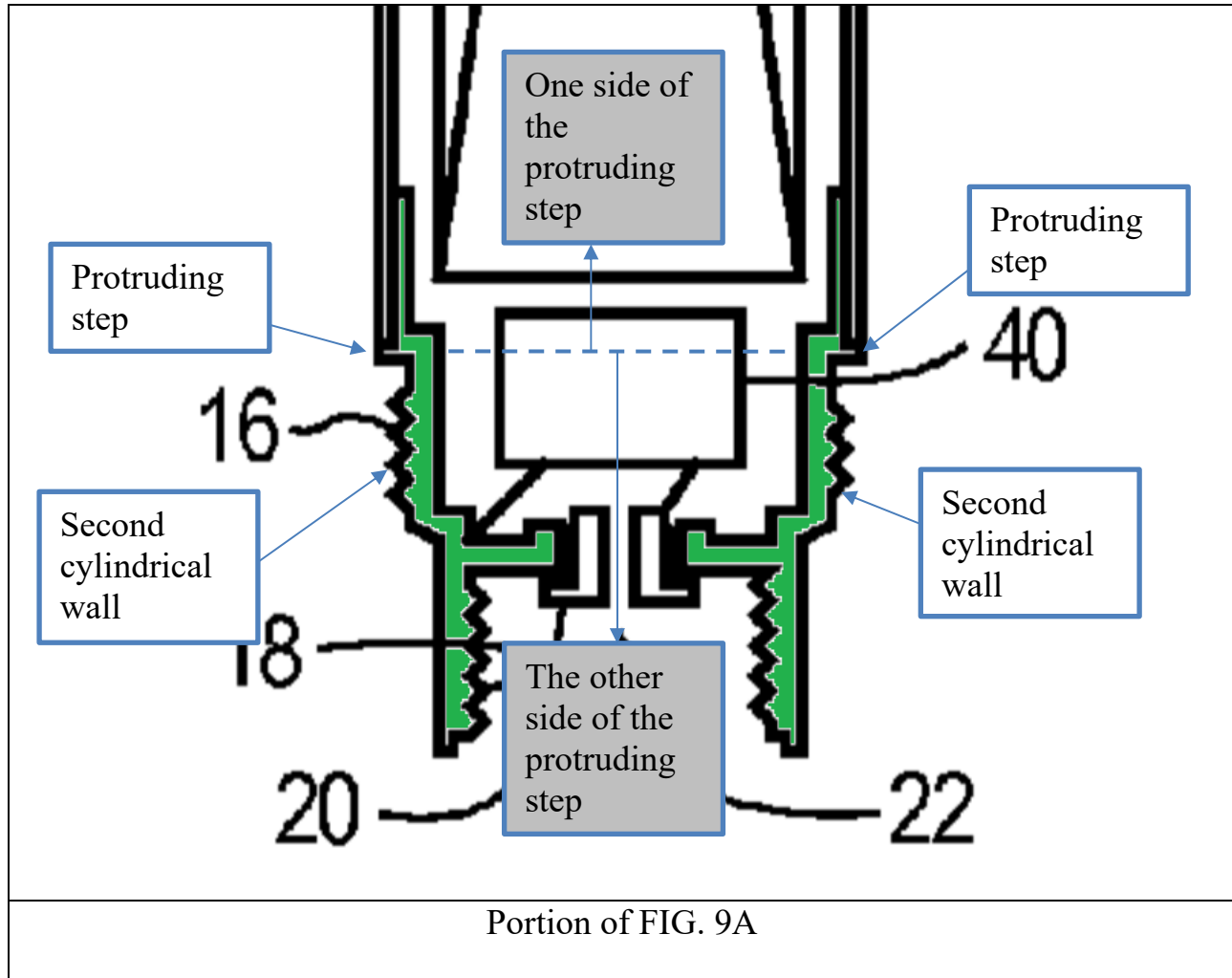
160. Thus, Newton '141 discloses all elements of this limitation.

- n. [1n] the other side of the protruding step is provided with a second cylindrical wall having an outer diameter smaller than that of the protruding step and having the outer thread, one end of the second cylindrical wall is provided with a base wall having a central through hole, the central through hole is configured for installing the first positive electrode and the first insulation sleeve.**

161. For clarity, this limitation is discussed below in subparts [1n](i)-(iii).

- i. “the other side of the protruding step is provided with a second cylindrical wall having an outer diameter smaller than that of the protruding step and having the outer thread”**

162. Newton '141 discloses that in the first connection seat 16/18, the other side of the protruding step is a lower side as shown in FIG. 9A, compared against the “one side of the protruding step” discussed in limitation [1m]. The “other side” of the protruding step is provided with a second cylindrical wall. FIG 9A clearly discloses that the second cylindrical wall has an outer diameter that is smaller than the outer diameter of the protruding step.

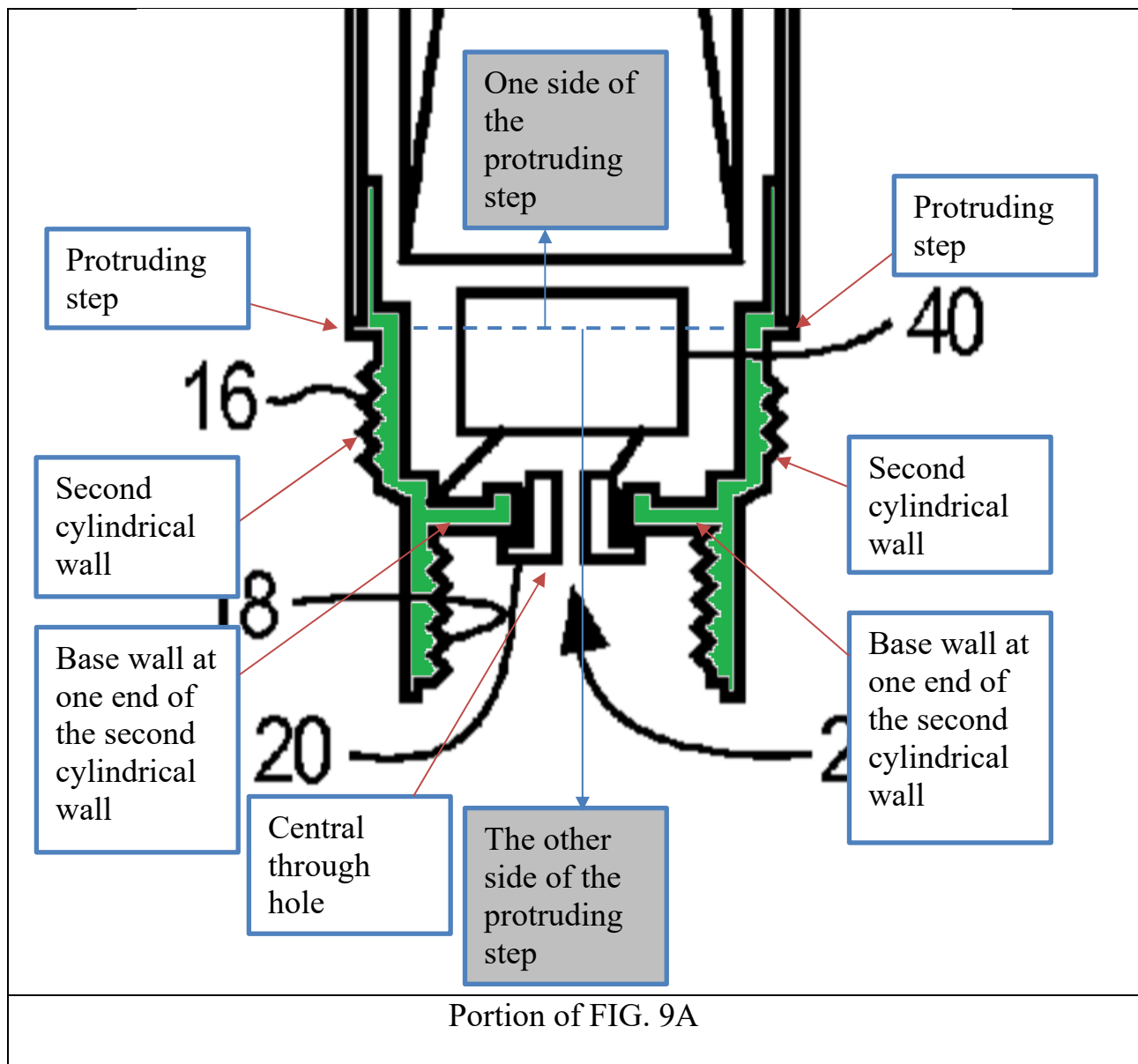


163. The “other side” of the protruding step includes first connector 16, and therefore has the outer thread: “The first connector 16 is an external machine tread [sic] at one end of the large battery assembly 6.” (Ex.1005 ¶[0046], FIG. 15.)

164. Thus, Newton ’141 discloses all limitations of this element.

- ii. **“one end of the second cylindrical wall is provided with a base wall having a central through hole”**

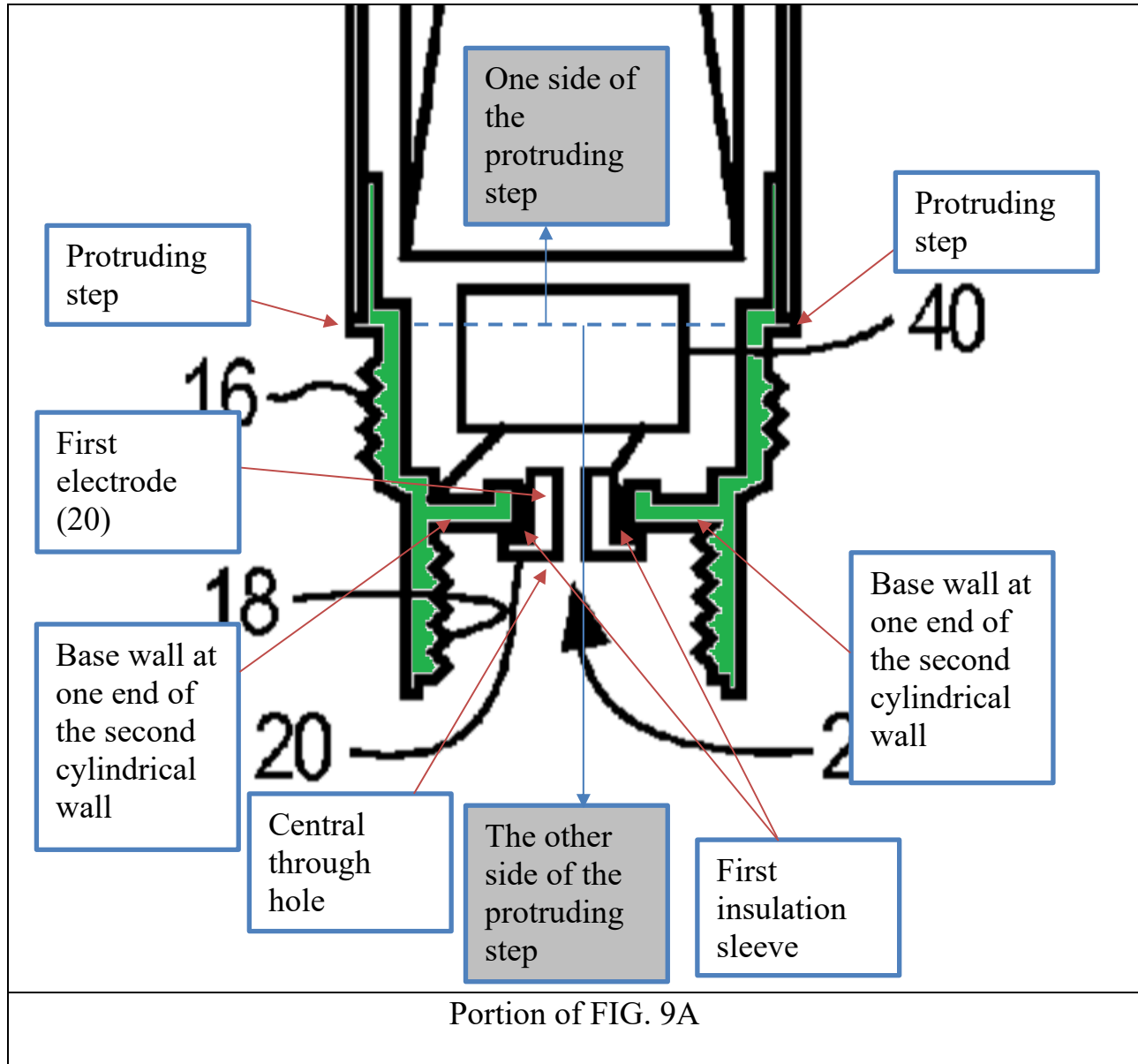
165. Newton '141 discloses that in the first connection seat 16/18, one end of the second cylindrical wall is provided with a base wall having a central through hole, as shown in the portion of FIG. 9A annotated below.



166. Thus, Newton '141 discloses all elements of this limitation.

**iii. “the central through hole is configured for installing the first positive electrode and the first insulation sleeve.”**

167. As indicated above in connection with limitation [1g], Newton '141 discloses a first connection portion comprising a first electrode 20 arranged at a center of the first connection seat 16/18, and Newton '141 either alone or in combination with Newton '191, as discussed above, discloses or renders obvious an insulation sleeve between the first positive electrode 20 and the first connection seat 16/18. As shown in the portion of FIG. 9A annotated below, both first electrode 20 and the insulation sleeve represented by the relatively thicker black lines are at the central through hole.



168. Thus, Newton '141 alone, or alternatively in combination with Newton '191, discloses or renders obvious this limitation.

**3. Dependent Claim 2**

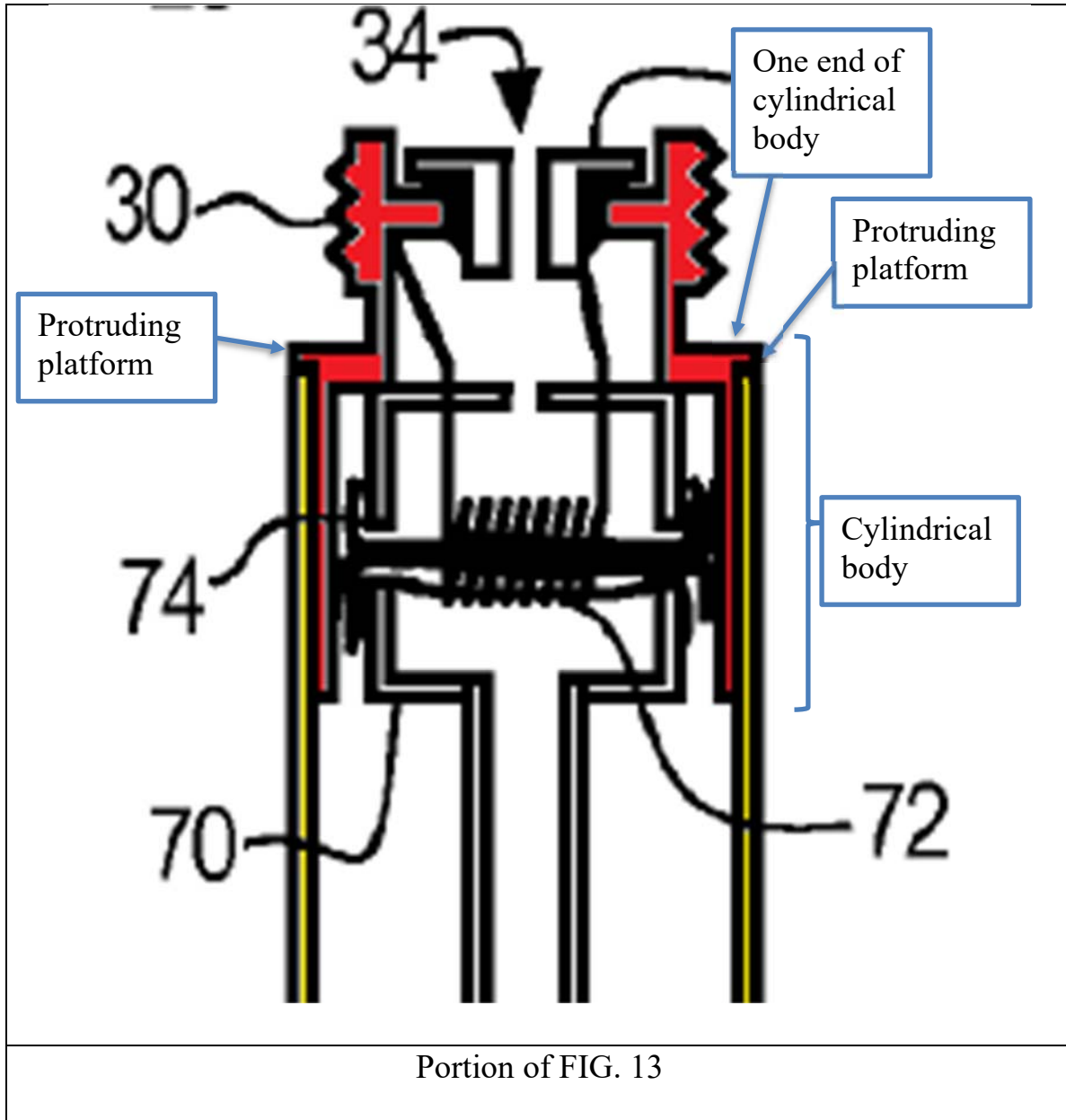
169. Dependent claim 2 is obvious in view of Newton '141 combined with Newton '191.

**a. [2pre] 2. The electronic cigarette according to claim 1, characterized in that**

170. Newton '141 discloses an electronic cigarette 4 as recited in the preamble of claim 2 for the same reasons explained above in connection with limitation [1a].

**b. [2a] the second connection seat is a cylindrical body having a protruding platform at one end thereof;**

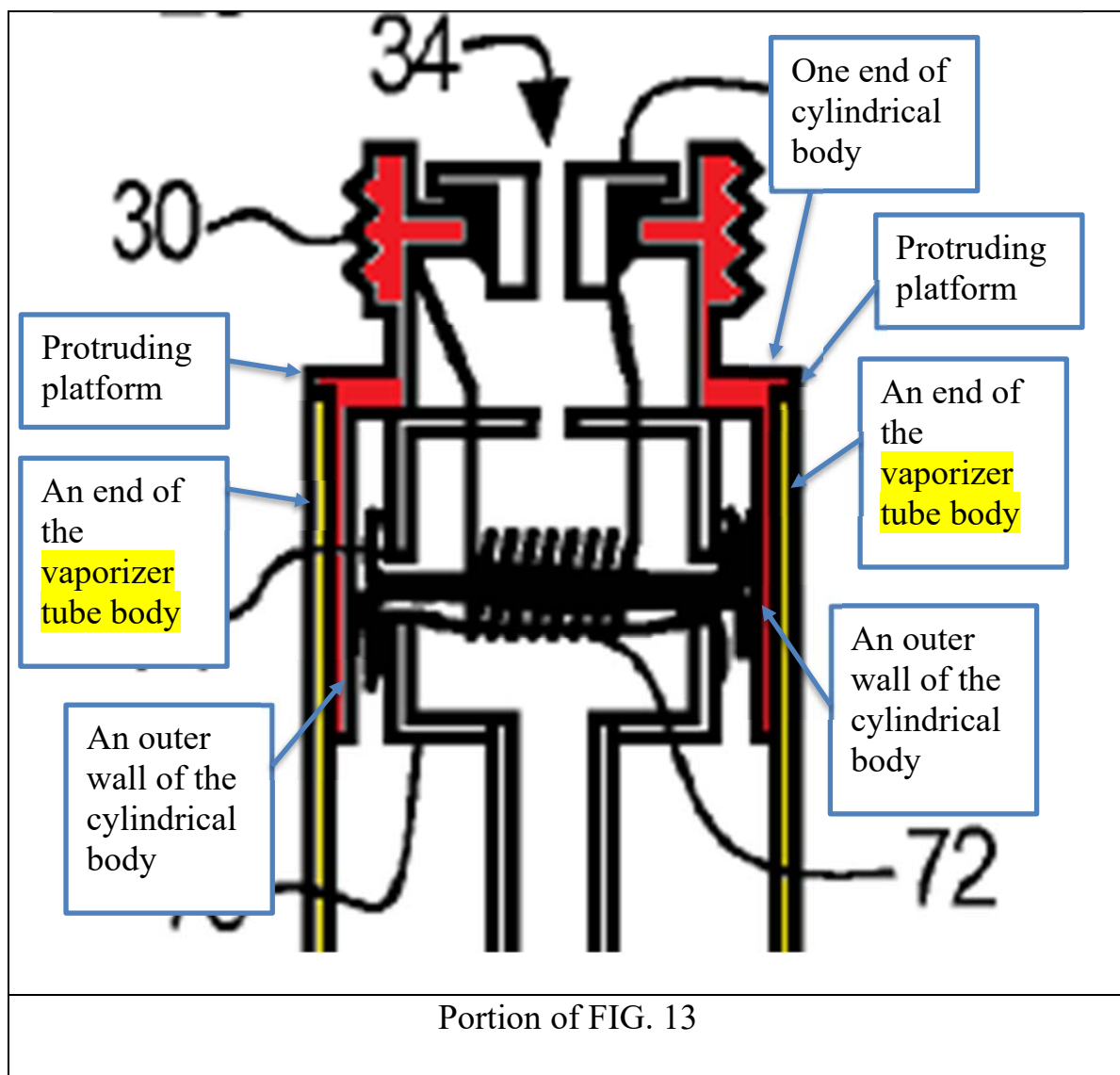
171. As discussed above in connection with limitation [1h], Newton '141 discloses a second connection portion comprising a second connection seat 30. As shown in the portion of FIG. 13 annotated below, second connection seat 30 is a cylindrical body having a protruding platform at one end thereof.



172. Thus, Newton '141 discloses the elements of this limitation.

- c. [2b] an outer wall of the cylindrical body is sheathed with an inner wall of said end of the vaporizer tube body;

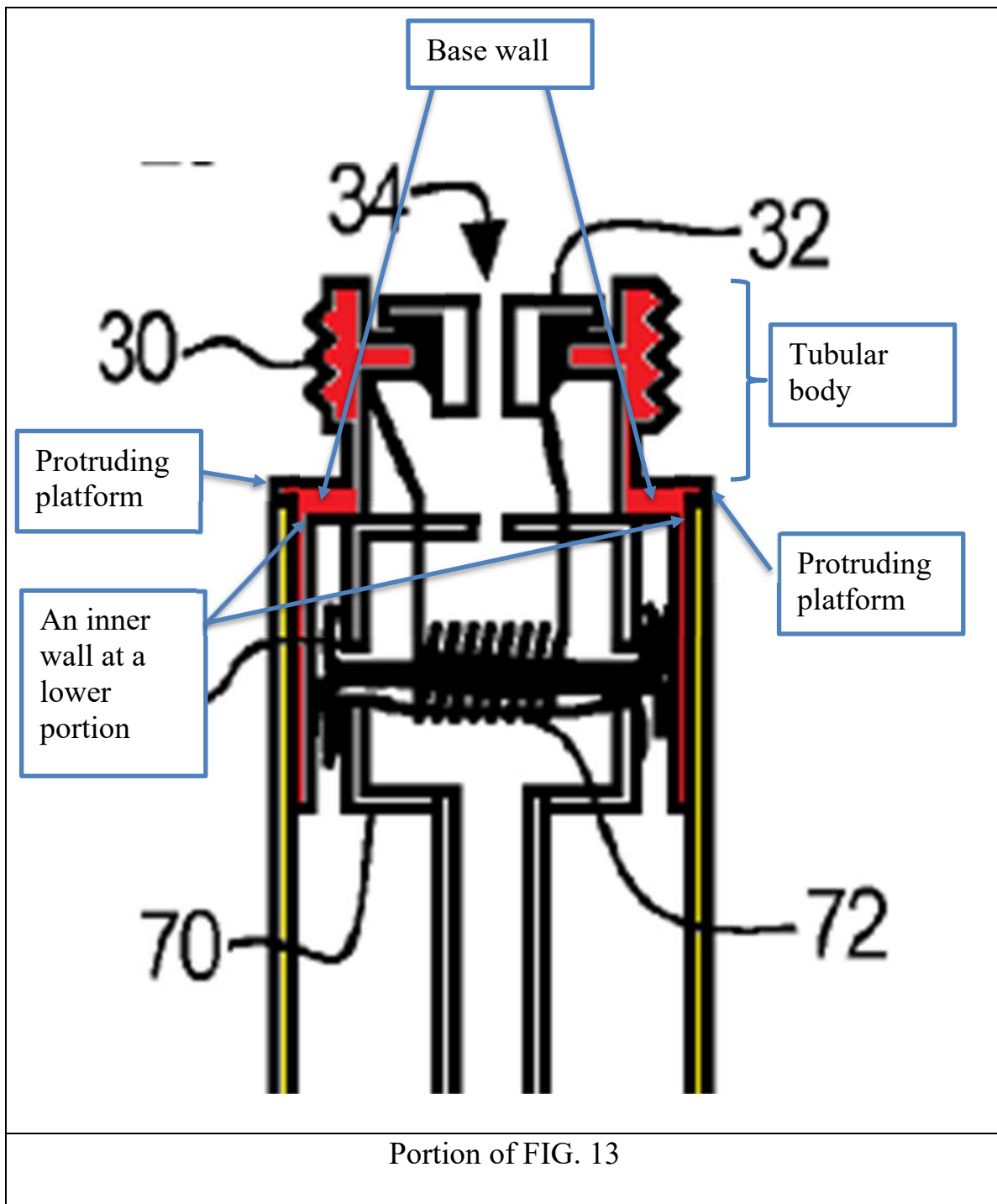
173. As discussed above in connection with limitation [1d], Newton '141 discloses a vaporizer tube body 10 as shown in FIG. 13. An outer wall of the cylindrical body of the second connection seat 30 (in red) is disposed within an end of the vaporizer tube body as shown below:



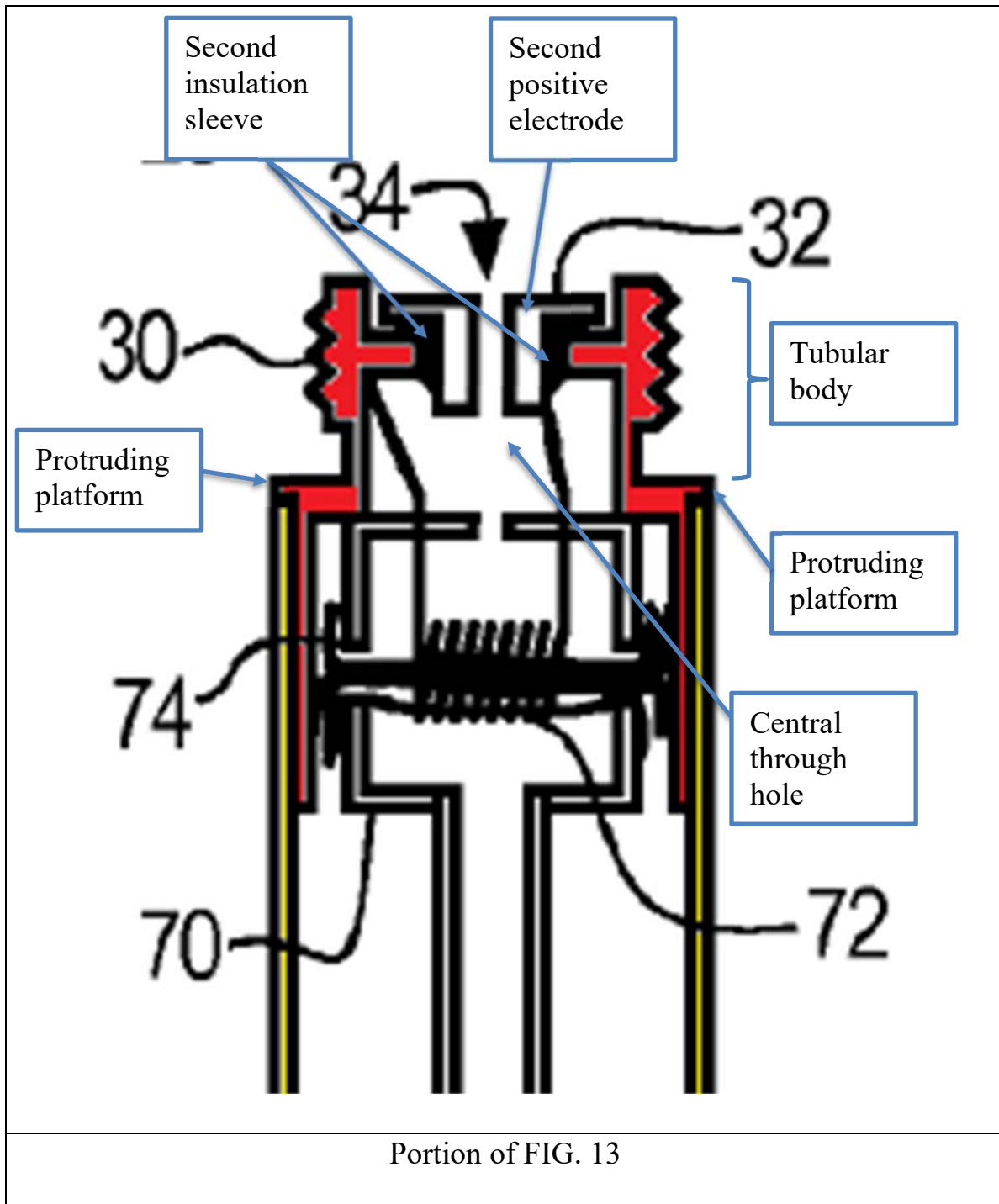
174. Thus, Newton '141 discloses the elements of this limitation.

- d. [2c] an inner wall at a lower portion of the second connection seat is provided with a base wall, a tubular body is protruded from a center of the base wall, the tubular body is provided with a central through hole for installing the second insulation sleeve and the second positive electrode.**

175. Newton '141 discloses at least in annotated FIG. 13 that a base wall is provided at an inner wall at a lower portion of second connection seat 30, as shown in the portion of FIG. 13 annotated below. A tubular body is shown protruded from a center of the base wall.



176. As indicated above in connection with limitation **[1h]**, Newton '141 discloses a second connection portion comprising a second positive electrode 32 arranged at a center of the second connection seat 30, and Newton '141 either alone or in combination with Newton '191 disclose a second insulation sleeve placed between the second positive electrode 32 and the second connection seat 30. As shown in the portion of FIG. 13 annotated below, both second positive electrode 32 and the insulation sleeve represented by the relatively thicker black lines are at the central through hole of the tubular body.



177. Thus, Newton '141 alone or in combination with Newton '191 discloses all elements of this limitation.

**B. Ground 2: Claim 5 Is Obvious In View Of Newton '141, Newton '191, And Thompson**

**1. The Combination Of Newton '141, Newton '191, And Thompson**

178. It would have been obvious to modify Newton '141 with the teaching of Newton '191 as discussed above, and further with the teaching of Thompson of using a cylindrical groove in the outer wall of the cylindrical body of limitation [5] as explained below. Newton '141 and Thompson are analogous art, from the same field of endeavor (electronic cigarettes) as the '744 Patent, and are both pertinent to multi-component e-cigarette assemblies that hold liquid for vaporization and have simplified connection structures among the components, including a battery stick, vaporizer, and casing tube of the vaporizer.

**2. Dependent Claim 5**

179. Claim 5 is obvious in view of Newton '141 combined with Newton '191 and Thompson.

**a. [5] 5. The electronic cigarette according to claim 2, characterized in that the outer wall of the cylindrical body is**

**provided with a circular groove configured for mounting a sealing ring.**

180. As explained in limitation [1d], Newton '141 discloses small atomizer assembly 10 having **small connector 30** and **vaporizer tube body 10**. (Ex.1005 ¶¶[0042], [0045], FIGS. 3 and 13.) Newton '141 also discloses that small atomizer assembly 10 includes “a bundle of absorbent fibers 74 enables atomizing liquid (not shown) to flow by capillary action from a liquid storage chamber 68 to the atomizer 72.” (Ex.1005 ¶[0049], FIG. 13.) Thus, as shown in FIG. 13, liquid storage chamber 68 is provided within **vaporizer tube body 10**, which has **small connector 30** at one end. As discussed in limitations [2pre]-[2c], connection seat 30 also meets the language of claim 2.

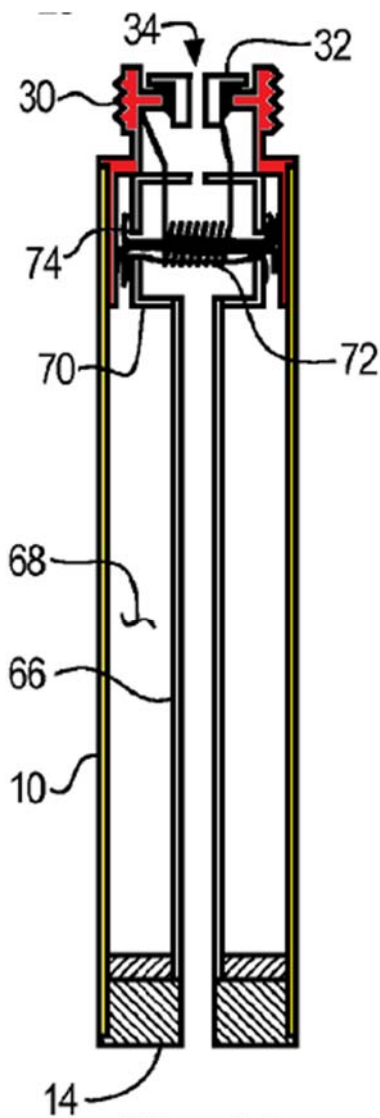
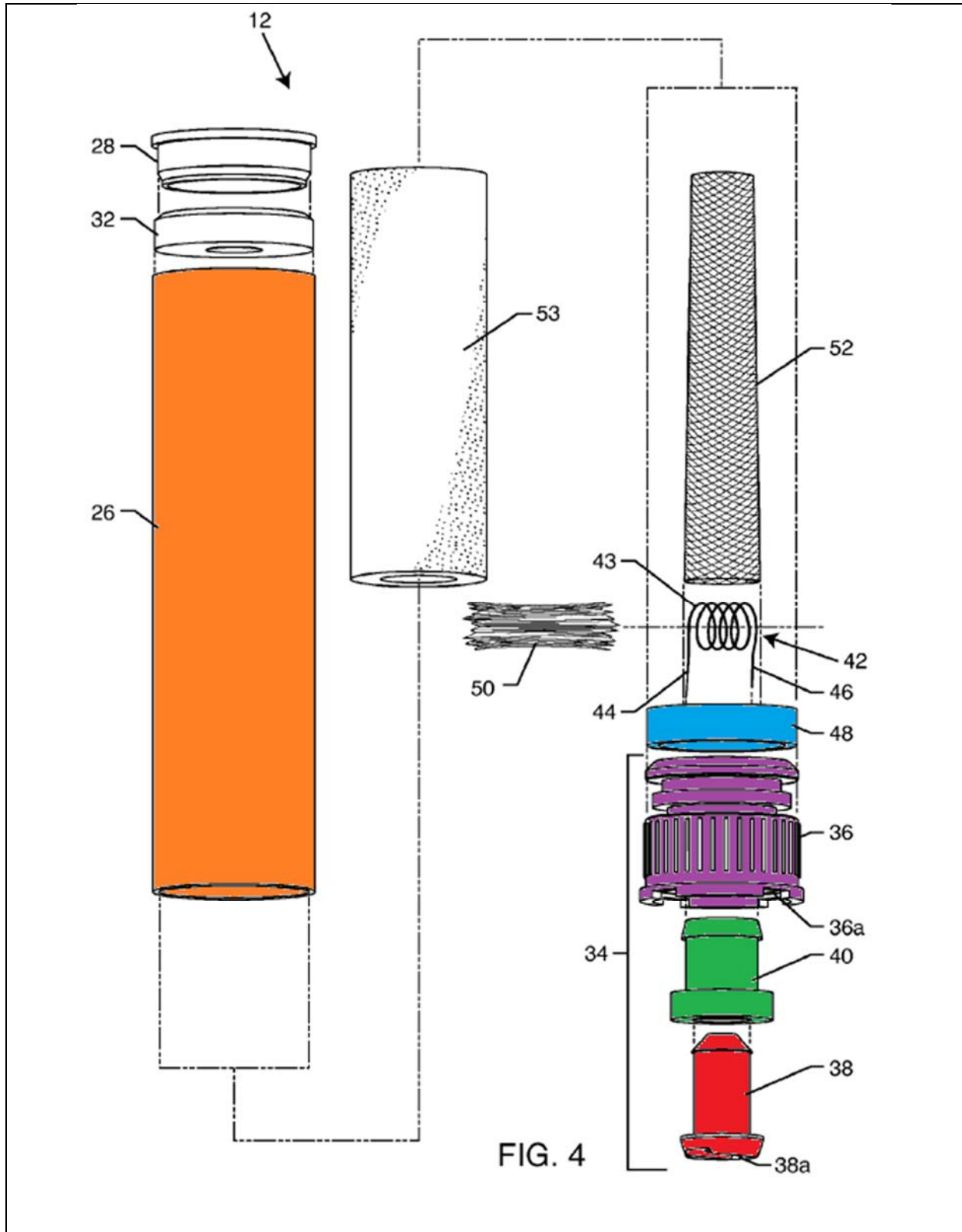


**Fig. 13**

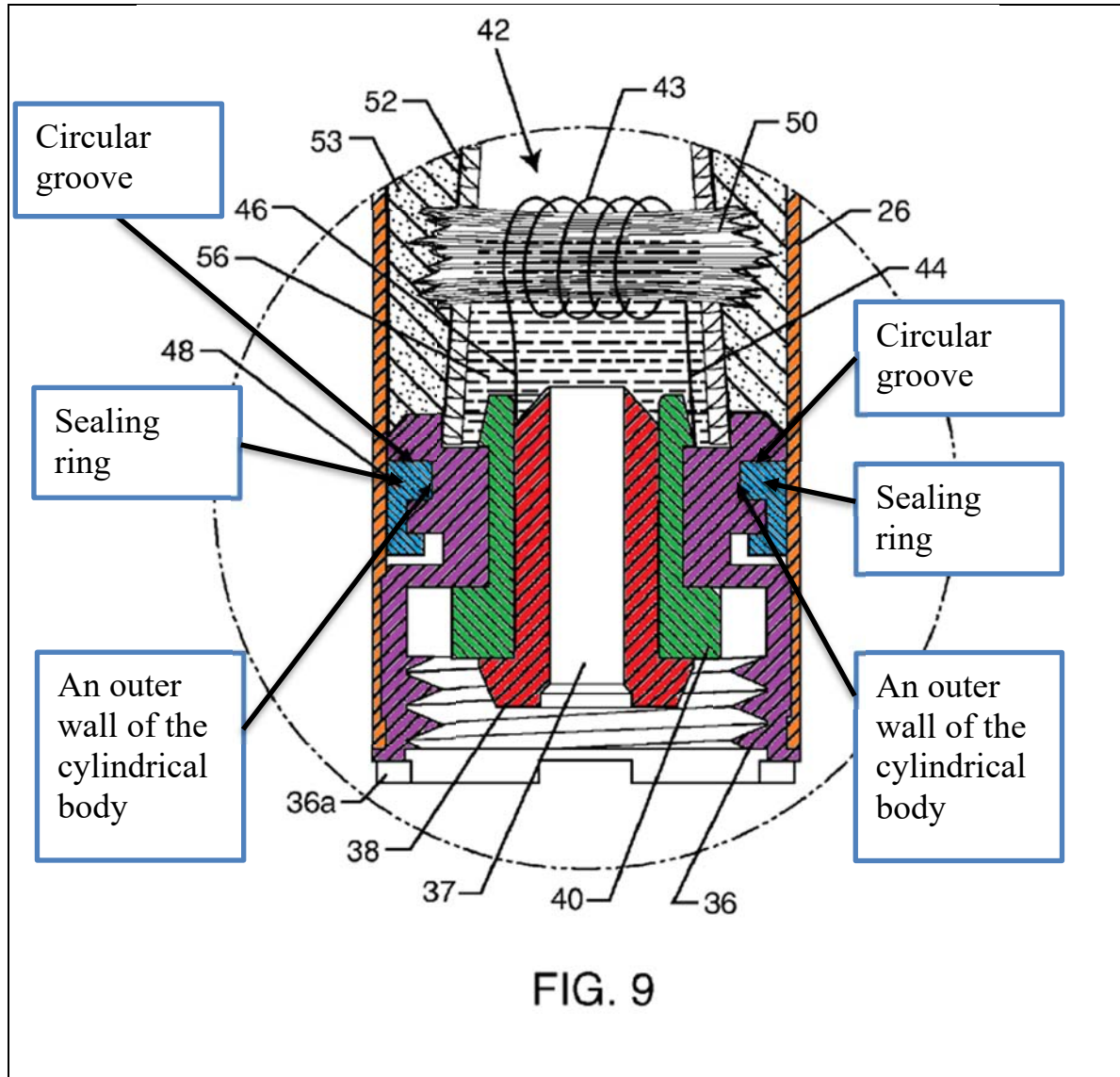
Portion of FIG. 13

181. Thompson discloses a similar liquid housing as a cartomizer 12 including an atomizing coil 42 electrically connected via positive and negative terminal leads 44, 46 to an outer terminal 36 and an inner terminal 38, with a silicone

rubber gasket 40 concentrically disposed therebetween. (Ex.1007 ¶¶[0025]-[0027],  
FIGS. 4 and 9.)



182. As shown in FIG. 9, **outer terminal 36** is cylindrical with a protruding platform at the bottom end, and is sheathed with an inner wall of an end of **a body 26** holding a vaporizable liquid 56. (Ex.1007 ¶¶[0029]-[0030], FIGS. 4 and 9.) “A volatile liquid 56 is contained within the **body 26** between the silicone rubber liquid barrier 32 and the **silicone rubber ring 48**.” (Ex.1007 ¶[0029], FIGS. 4 and 9.) FIG. 9 further shows that rubber **ring 48** is disposed in a recessed groove around the cylindrical **outer terminal 36**:



183. It would have been obvious to a POSITA to provide the outer wall of the cylindrical body of **second connection seat 30** of Newton '141 with a circular groove configured for mounting a sealing ring, as disclosed by the recessed groove around the cylindrical **outer terminal 36** of Thompson. Both Newton '141 and Thompson are in the same field of e-cigarettes and connect an atomizer to a battery

to vaporize a liquid. Both include tubular housings with seats at the end and in which a liquid is disposed. Both maintain the vaporizable liquid within the designated chambers without leaking so that it is available to be heated and vaporized. Further, Thompson expressly teaches use of a circular groove mounting a [silicone rubber ring 48](#) at a location within the seat ([outer terminal 36](#)) at the end of [body 26](#). Thus, it would have been obvious to modify the outer wall of [small connector 30](#) of Newton '141 to include a circular groove mounting a [silicone rubber ring 48](#) as disclosed by Thompson since it would involve combining well known prior art elements (seats at the end of tubular bodies holding liquids) according to known methods to yield the predictable result of ensuring that no liquid leaks from the associated chamber.

184. It also would have been obvious to a POSITA to modify the outer wall of [small connector 30](#) of Newton '141 to include a circular groove since doing so would use a known technique of a [silicone rubber ring 48](#) to improve a similar connection between a seat and a casing tube in the same way of providing an additional barrier to prevent leakage of the vaporizable liquid. The arrangement of the casing tube and seat of cartomizer 12 of Thompson is an obvious modification of the comparable casing tube and seat of atomizer assembly 10 of Newton '141 since it adds a circular groove for a sealing ring to enhance the ability of the device to maintain the liquid without leaking. Adding the circular groove disclosed by

Thompson to the outer wall of **small connector 30** of Newton '141 matches the structure of claim 5 of the '744 Patent, and achieves the same purpose of preventing leakage from a reservoir.

185. In addition to being disclosed in Thompson, other state of the art electronic cigarette references Pan (Ex. 1010) and Liu '919 (Ex. 1011) disclose the well-known feature of a circular groove configured for mounting a sealing ring of limitation [5]. (See seal washer 251 in leak-proof-piece 23 in Pan, Ex. 1010 ¶[0029], FIG. 3; see sealing ring 82 in groove 814 of sleeve seat 81 in Liu '919, Ex. 1011 ¶[0041], FIGS. 6, 7.)

186. Thus, the disclosure of Newton '141 combined with Newton '191, as discussed above in connection with claims 1 and 2, and further modified by the disclosure of Thompson discloses Limitation [5].

**C. Ground 3: Claims 1, 2, And 5 Are Obvious In View Of Newton '141 And Thompson**

**1. The Combination Of Newton '141 And Thompson**

187. It would have been obvious to modify Newton '141 with the teaching of Thompson as explained below. Newton '141 and Thompson are analogous art, from the same field of endeavor (e-cigarettes) as the '744 Patent, and are both pertinent to multi-component e-cigarette assemblies with simplified connection

structures among the components, including a battery stick, vaporizer, and casing tube of the vaporizer.

## **2. Independent Claim 1**

188. Claim 1 is obvious in view of Newton '141 and Thompson.

- a. [1a] 1. An electronic cigarette comprising a battery stick, a vaporizer assembly and a mouth piece that are connected together, characterized in that**

189. Newton '141 discloses this limitation. See paragraphs 84-85.

- b. [1b] the battery stick comprises a battery, a casing tube of the battery stick for sheathing the battery, and a first connection portion arranged at an end of the casing tube of the battery stick adjacent to the vaporizer assembly;**

190. Newton '141 discloses this limitation. See paragraphs 86-88.

- c. [1c] the vaporizer assembly comprises a vaporizer, and a casing tube of the vaporizer for sheathing the vaporizer in an inner cavity of the casing tube;**

191. Newton '141 discloses this limitation. See paragraphs 89-92.

- d. [1d] the vaporizer comprises a vaporizer tube body, and a second connection portion arranged at an end of the vaporizer tube body adjacent to the battery stick;**

192. Newton '141 discloses this limitation. See paragraphs 93-95.

- e. [1e] a third connection portion is arranged at an end of the casing tube of the vaporizer adjacent to the battery stick;**

193. Newton '141 discloses this limitation. See paragraph 96.

- f. [1f] the second connection portion and the first connection portion abut against each other to be connected, the third**

**connection portion is detachably connected to the first connection portion by means of a screw thread;**

194. Newton '141 discloses this limitation. See paragraphs 97-99.

**g. [1g] the first connection portion comprises a first connection seat having an outer thread and serving as a negative electrode electrically connected to a negative electrode of the battery, a first positive electrode arranged at a center of the first connection seat and electrically connected to a positive electrode of the battery, and a first insulation sleeve placed between the first positive electrode and the first connection seat;**

**i. “the first connection portion comprises a first connection seat having an outer thread”**

195. Newton '141 discloses this limitation. See paragraphs 100-101.

**ii. “the first connection portion comprises . . . a first . . . electrode arranged at a center of the first connection seat”**

196. Newton '141 discloses this limitation. See paragraph 102.

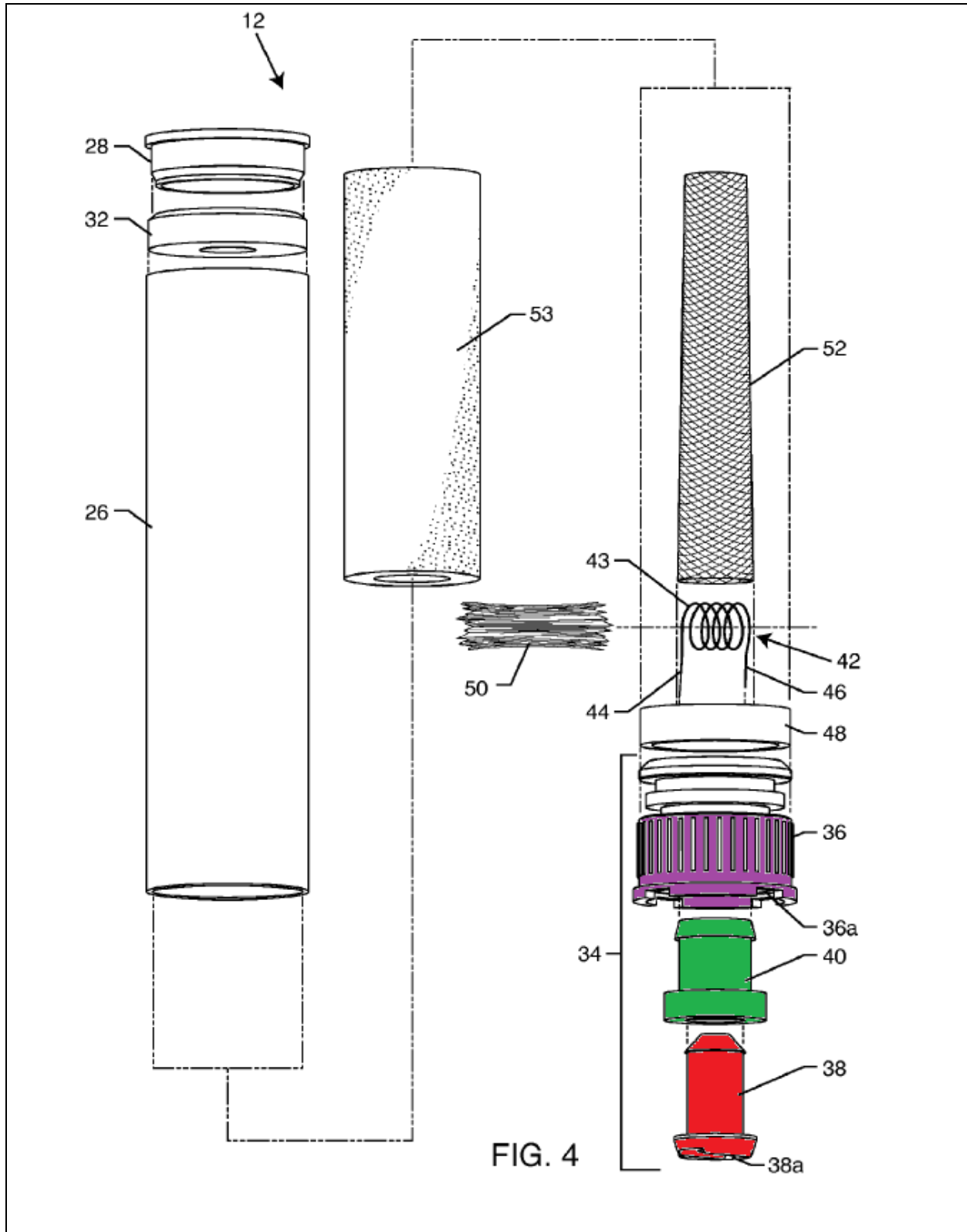
**iii. “first connection seat . . . serving as a negative electrode electrically connected to a negative electrode of the battery” / “a first positive electrode . . . electrically connected to a positive electrode of the battery”**

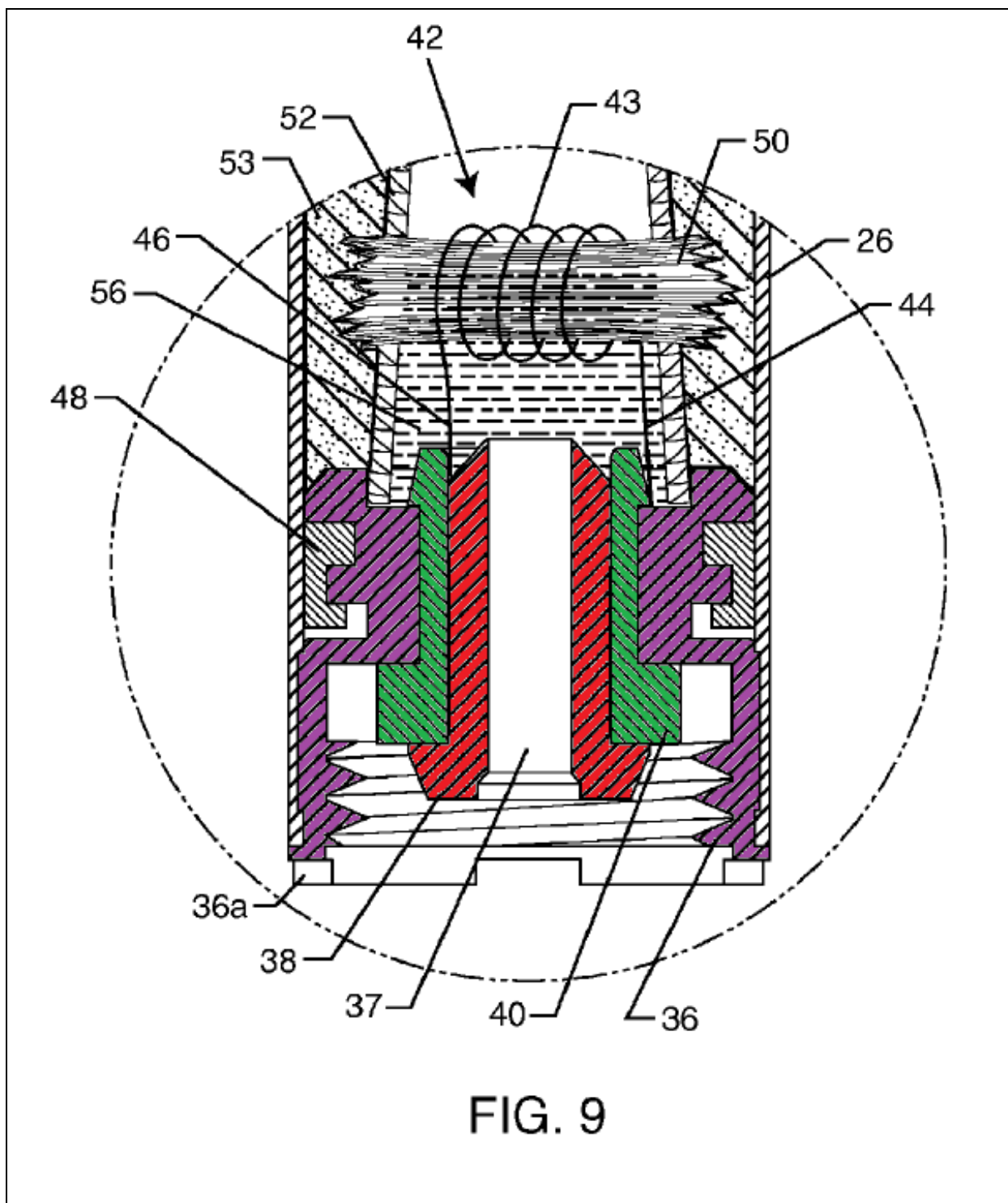
197. Newton '141 renders obvious this limitation. See paragraphs 103-105.

**iv. “the first connection portion comprises . . . a first insulation sleeve placed between the first positive electrode and the first connection seat;”**

198. Newton '141 discloses, inherently discloses, or renders obvious a first insulation sleeve between first positive electrode 20 and first connection seat 16/18, as explained above, as discussed above in paragraphs 106-107.

199. Alternatively, the use of an insulation sleeve between the first positive electrode and the first connection seat is also rendered obvious by Newton '141 in view of Thompson. As shown in FIGS. 4 and 9 of Thompson, the cartomizer 12 includes an atomizing coil 42 electrically connected via positive and negative terminal leads 44, 46 to an outer terminal 36 and an inner terminal 38, with a silicone rubber gasket 40 concentrically disposed therebetween:





In a preferred embodiment, the battery coupling 34 comprises an outer terminal 36 and an inner terminal 38. The outer terminal 36 and the inner terminal 38 are concentrically disposed in the second end of the body 26 and have central passageways 37. . . . A silicone rubber gasket 40 is disposed between the outer terminal 36 and the inner terminal 38 so as to prevent leakage and electrically insulate one terminal from the other, thus preventing a short circuit or other electrical failure. The silicone rubber gasket 40 is configured such that the concentric nesting of the outer terminal 36, the silicone rubber gasket 40 and the inner terminal 38 results in a friction or press fit that maintains a tight connection.

(Ex.1007 ¶[0025], FIGS. 4 and 9.)

As illustrated most clearly in FIGS. 8 and 9, an atomizing coil 42 is disposed in the body 26 adjacent to the battery coupling 34. The atomizing coil 42 has a body composed of loops of conductive wire 43 ending in positive and negative terminal leads 44, 46. . . .

(Ex.1007 ¶[0026], FIGS. 4 and 9.)

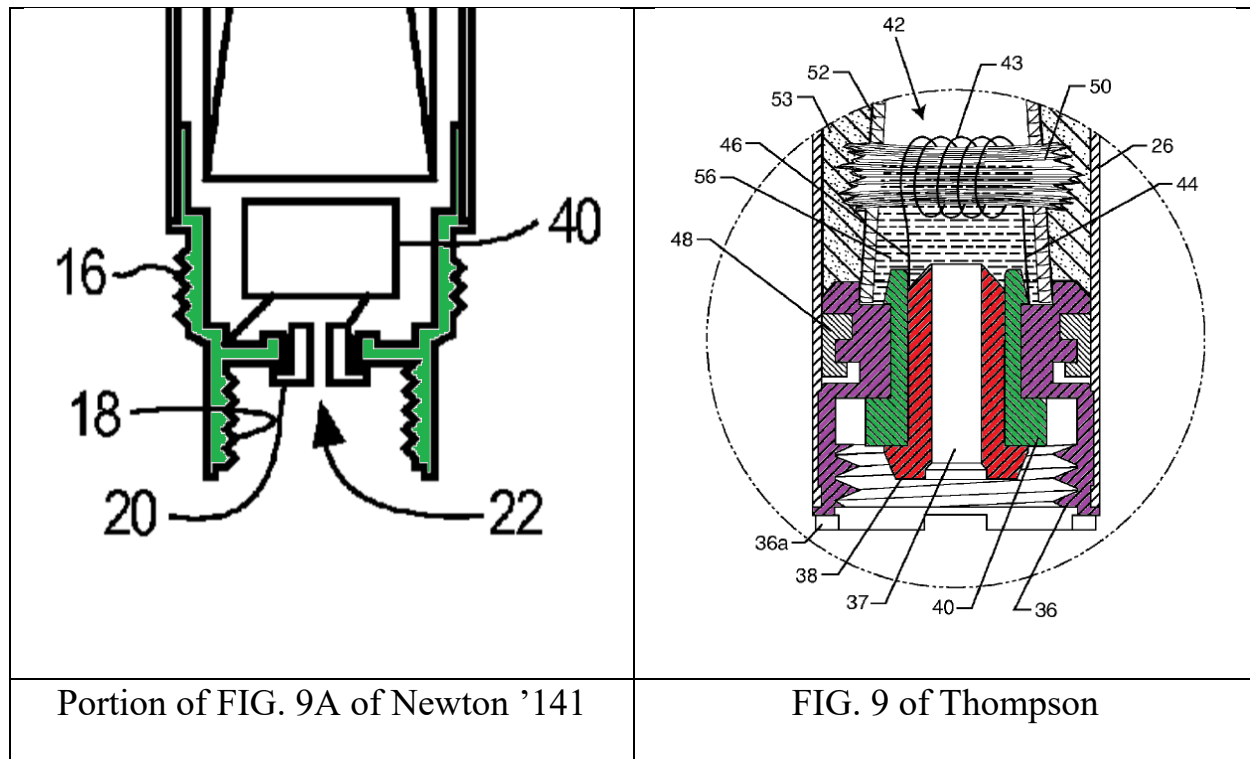
In this configuration, a partial circuit is created from the outer terminal 36 through the positive terminal lead 44, the atomizing coil 42, the negative terminal lead 46, and to the inner terminal 38.

(Ex.1007 ¶[0027], FIGS. 4 and 9.)

200. It would have been obvious to a POSITA to use an insulation sleeve as disclosed in Thompson between the first positive electrode and first connection seat in Newton '141 for multiple reasons. Namely, both Newton '141 and Thompson are disclosures in the same field of electronic cigarettes dealing with the same purpose

of connecting an atomizer to a battery. Both require insulation of positive/negative electrodes from one another to prevent short circuiting during operation of the circuit, as specifically discussed by Thompson. Further, Thompson expressly teaches use of a silicone rubber gasket sleeve concentrically nested between outer terminal 36 and inner terminal 38 to electrically insulate the terminals. Thus, it would have been obvious to use a gasket sleeve between the first positive electrode and first connection seat in Newton '141 since it would involve combining well-known prior art elements (insulators) according to known methods to yield predictable results and needed insulation. While Thompson's disclosure relates to the atomizer of its electronic cigarette, and the first positive electrode and first connection seat in Newton '141 are on the battery stick 6 of its electronic cigarette, a POSITA would be motivated to employ an insulator since the electrical operation of the seats, electrodes, and insulators with respect to one another are the same irrespective of whether the arrangement is on an atomizer or a battery stick. Based on the described electrical operation of Newton '141, including the operation of its electrical contact terminal 20 and threaded element 16/18, and the relatively thicker black lines illustrated in FIG. 9A, a POSITA would have been motivated to provide an insulation sleeve (like gasket 40 of Thompson) at the locale of the thick black lines to engage/support electrical contact terminal 20 and insulate it from electrical

contact with threaded element 16/18 to prevent a short circuit and enable operation of the circuit.



201. Thus, Newton '141 itself discloses, inherently discloses, or renders obvious, or renders obvious in combination with Thompson, all elements of limitation [1g](i-iv).

- h. [1h] the second connection portion comprises a second connection seat serving as a negative electrode electrically connected to a heating coil of the vaporizer, a second positive electrode arranged at a center of the second connection seat and electrically connected to the heating coil of the vaporizer,**

**and a second insulation sleeve placed between the second positive electrode and the second connection seat;**

**i. “the second connection portion comprises a second connection seat”**

202. Newton ’141 discloses this limitation. See paragraphs 111-113.

**ii. “the second connection portion comprises . . . a second . . . electrode arranged at a center of the second connection seat”**

203. Newton ’141 discloses this limitation. See paragraphs 114-115.

**iii. “second connection seat serving as a negative electrode electrically connected to a heating coil of the vaporizer,” / “a second positive electrode . . . electrically connected to the heating coil of the vaporizer,”**

204. Newton ’141 renders obvious this limitation. See paragraphs 116-120.

**iv. “the second connection portion comprises . . . a second insulation sleeve placed between the second positive electrode and the second connection seat;”**

205. Newton ’141 discloses, or inherently discloses, or renders obvious all elements of this limitation, including, a second insulation sleeve between second positive electrode 32 and second connection seat 30, as discussed above in paragraphs 121-122.

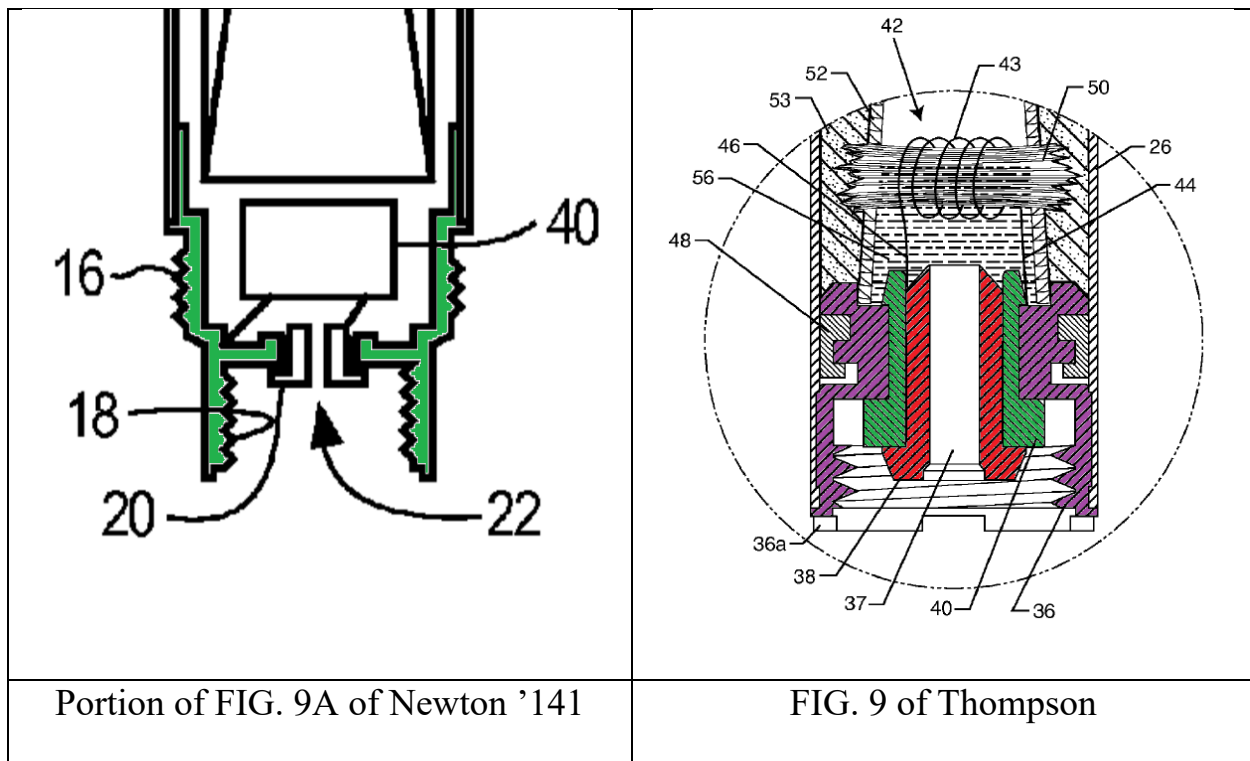
206. In addition, use of an insulation sleeve between the second positive electrode and the second connection seat is also rendered obvious by Newton ’141 in view of Thompson. As indicated above, Thompson teaches such a silicone rubber

gasket 40 between metal atomizer assembly 28 and electrical coupler 22 outer terminal 36 and inner terminal 38.

207. For the same reasons set forth above, it would have been obvious to a POSITA to use an insulation sleeve between the second positive electrode and second connection seat in Newton '141. Namely, both Newton '141 and Thompson are disclosures in the same field of electronic cigarettes dealing with the same purpose of connecting an atomizer to a battery. Both require insulation of positive/negative electrodes from one another to prevent short circuiting during operation of the circuit. Further, Thompson expressly teaches use of a silicone rubber gasket sleeve concentrically nested between outer terminal 36 and inner terminal 38 to electrically insulate the terminals. Thus, giving this express teaching of using a gasket sleeve 40 in Thompson for providing insulation between the terminals, it would have been obvious to use a gasket sleeve between the first positive electrode and first connection seat in Newton '141 since it would involve combining well-known prior art elements (insulators) according to known methods to avoid a short circuit and yield predictable results.

208. Further, based on the described electrical operation of Newton '141, including the operation of its electrical contact terminal 32 and small connector 30, and the relatively thicker black lines illustrated in FIG. 13 of Newton '141, a

POSITA would have been motivated to provide an insulation sleeve (like gasket 40 of Thompson) at the locale of the thicker black lines to engage/support electrical contact terminal 32 and insulate it from electrical contact with small connector 30 to prevent a short circuit and enable operation of the circuit.



209. The above is reinforced by the disclosure of Thompson, which explicitly discloses a gasket 40 concentrically arranged between the same elements.

210. Thus, Newton '141 discloses or renders obvious, either alone or in combination with Thompson, all elements of limitation [1h](i)-(iv).

- i. [1i] the second positive electrode has a central through hole along an axial direction of the second positive electrode for

**intercommunicating with a vaporizing cavity of the vaporizer, an end surface of the second positive electrode has a transversal groove along a radial direction of the end surface for intercommunicating with the central through hole;**

211. All elements of this limitation are disclosed in Newton '141 except for a transversal groove in the second positive electrode. However, as demonstrated below, an electrode with a traversal groove was a common feature in the art (e.g., see Newton '191, Thompson, Liu '556, and Liu '527) such that this limitation would have been obvious based on the combination of Newton '141 with either Newton '191 or Thomson, or in view of the well-known state of the art. For clarity, limitation [1i] is discussed in subparts [1i](i)-(ii) below.

- i. **“the second positive electrode has a central through hole along an axial direction of the second positive electrode for intercommunicating with a vaporizing cavity of the vaporizer,”**

212. Newton '141 discloses this limitation. See paragraphs 129-131.

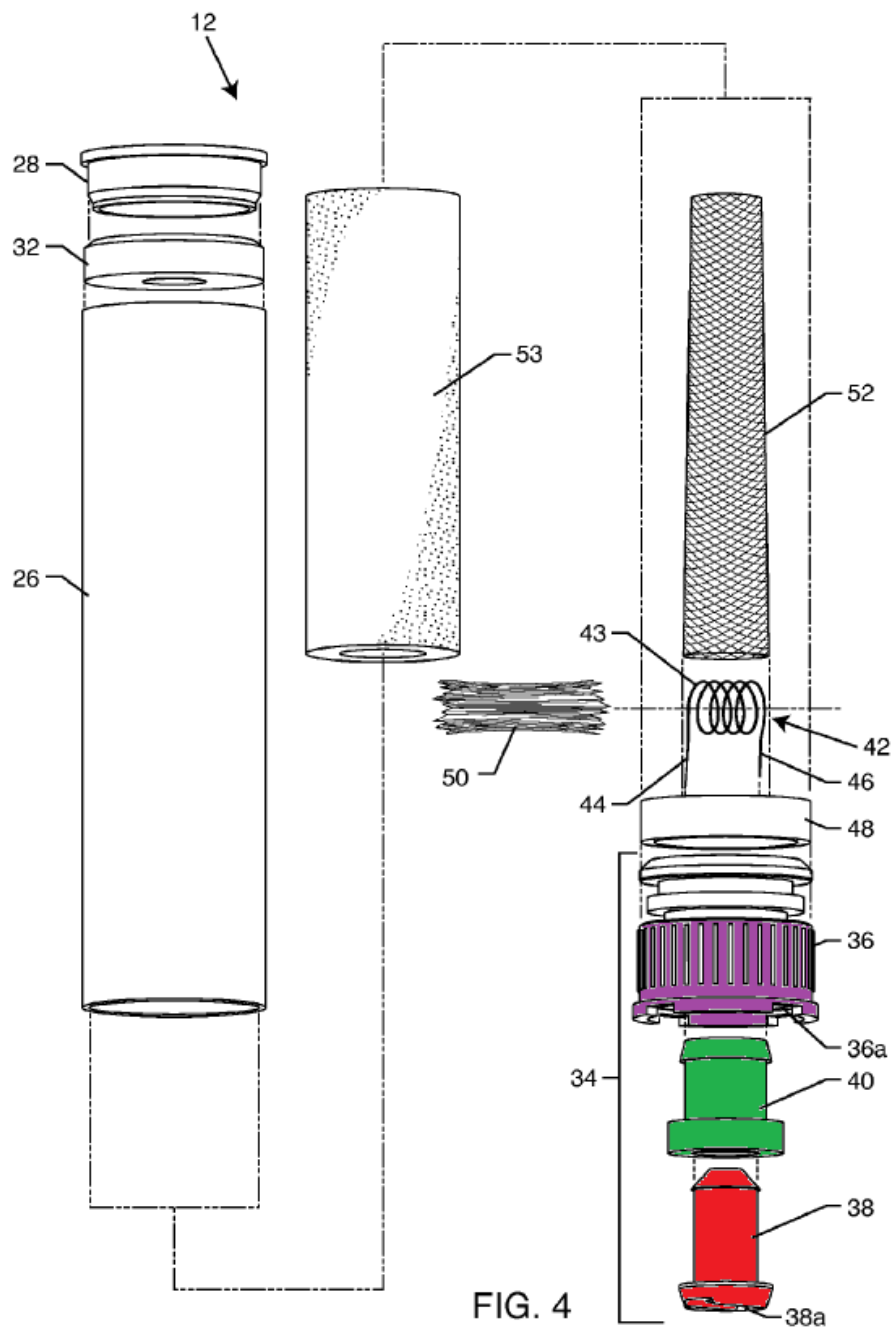
- ii. **“an end surface of the second positive electrode has a transversal groove along a radial direction of the end surface for intercommunicating with the central through hole;”**

213. It would have been obvious to a POSITA to modify Newton '141 to use the inner terminal 38 with a transversal groove (air vents 38a) disclosed in Thompson in place of electrical contact terminal 20 of Newton '141.

214. Such a modification would have been obvious to a POSITA for the following reasons: (1) it was a well-known design choice and a simple substitution to use such an electrode design, (2) the use of such electrodes and air flow techniques yield predictable results, (3) Newton '141 and Thompson are in the same field of e-cigarettes, (4) there is express teaching, suggestion, and motivation to combine Newton '141 with Thompson to use an electrode with a transversal groove, and (5) Patent Owner already conceded during prosecution that a second positive electrode with a transversal groove is a known feature in the art and is thus unpatentable. The explanation below relies on the same structural analysis of Newton '141 and modification of its disclosure with the same structural feature (though found in Thompson instead of Newton '191), all of which is set forth above in paragraphs 132-140.

215. As discussed above, Newton '141 discloses electrical contact terminal 32 in small atomizer assembly 10 having a pneumatic port 34 formed there through to allow air to enter atomizing chamber 70. (Ex.1005 ¶[0049], FIGS. 13, 15.) “The pneumatic port 34 serves as the entry point for air to enter the atomizing chamber 70, for flow out through the chimney 66 and mouthpiece 14.” (Ex.1005 ¶[0049], FIG. 15.)

216. Thompson discloses the well-known state of the art design choice of using an electrode having an end surface with a transversal groove. Thompson discloses an electrode (inner terminal 38) having an end surface with a transversal groove (air vents 38a) along a radial direction of the end surface for intercommunicating with a central passageway, as shown in the annotated FIG. 4:



The outer terminal 36 includes air intake vents 36a around its perimeter to allow air into the central passageway (described below) during inhalation. The inner terminal 38 also includes air vents 38a to connect the air intake vents 36a to the central passageway.

(Ex.1008 ¶[0025], FIG. 4b.)

217. Using such a design of Thompson in place of electrical contact terminal 32 of Newton '141 would be a matter of obvious design choice and a simple substitution of one part for another. It was known in the art to use an electrode with a transversal groove in its end surface to accommodate the entry of external airflow, as explained in Thompson. Designs such as that of Thompson were also used in other prior art electronic cigarette designs as discussed in paragraphs 76-80.

218. To a POSITA, in Newton '141, it is clear that airflow is required for the operation of electronic cigarette 4. The positions for the air inlet openings in an electronic cigarette amount to only a finite number of solutions, *i.e.*, locations along the electronic cigarette, for air to be allowed into the electronic cigarette. Thompson discloses the design choice that air is inlet to the electronic cigarette at air intake vents 36a located at the outer terminal 36 and flows via a transversal groove 38a in the electrode 38. (Ex.1008, FIGS. 3-9.) Thompson requires air flow through the central passageways 37 in inner terminal 38 in the same manner that Newton '141 does. (Ex.1005 ¶[0049], FIG. 15; Ex.1008, FIG. 3-9.)

219. Using inner terminal 38 of Thompson in the electronic cigarette of Newton '141 would also provide predictable results of permitting electrical connection from the battery to the atomizer while also providing an entrance for

airflow into the internal port of the electrode. The interchangeability of these features in these electronic cigarette disclosures was readily known in the art.

220. Since Thompson discloses inner terminal 38 having a transversal groove (air vents 38a) for permitting access by air to its central through hole, a POSITA would be motivated to use inner terminal 38 so that air can be accommodated into the electronic cigarette of Newton '141 to facilitate its use in the same way. A POSITA would have understood the similarities between the disclosures of Newton '141 and Thompson, which include the same field of electronic cigarettes dealing with the same purpose of connecting an atomizer to a battery, and therefore found it obvious to utilize inner terminal 38 of Thompson in place of electrical contact terminal 20 of Newton '141.

221. In addition to being disclosed in Thompson, this claimed transversal groove of limitation [1i] was rejected in view of Thompson or Liu '556 during prosecution (Ex.1004, 86-90), both of which disclose use of this groove. (See groove (air vents 38a) in Thompson, Ex.1008 ¶[0025], FIG. 4b; see groove in first electrode 57 in Liu '556, Ex.1009 ¶[0035], FIG. 2.) Liu '556 further evidences the state of the art for electrodes used in electronic cigarettes. Patent Owner did not offer any response to those rejections, but rather pursued other language deemed allowable by the examiner and did not mention the claimed transversal groove of limitation [1i]

in its arguments for patentability. (Ex.1004, 78-79.) Thus, Patent Owner conceded that the claimed transversal groove was a known design choice and was disclosed by the prior art.

222. Thus, in view of the foregoing, Newton '141 in view of Thompson renders obvious an end surface of a second positive electrode having a transversal groove 38a along a radial direction of the end surface for intercommunicating with the central through hole 26.

- j. [1j] the third connection portion has an inner thread engaging with the outer thread of the first connection seat;**

223. Newton '141 discloses this limitation. See paragraphs 141-142.

- k. [1k] the first positive electrode and the second positive electrode abut against each other to be electrically connected, the first connection seat and the second connection seat are electrically connected;**

224. Newton '141 discloses this limitation. See paragraphs 143-148.

- l. [1l] the first connection seat has a step-like shape, a protruding step is formed at a middle portion of the first connection seat that has a maximum outer diameter;**

225. Newton '141 discloses this limitation. See paragraphs 149-153.

- m. [1m] one side of the protruding step is provided with a first cylindrical wall having an outer diameter smaller than that of the protruding step, the first cylindrical wall is sheathed with an inner wall of said end of the casing tube of the battery stick, the outer diameter of the protruding step**

**equals an outer diameter of the casing tube of the battery stick;**

226. Newton '141 discloses this limitation. See paragraphs 154-160.

- n. [1n] the other side of the protruding step is provided with a second cylindrical wall having an outer diameter smaller than that of the protruding step and having the outer thread, one end of the second cylindrical wall is provided with a base wall having a central through hole, the central through hole is configured for installing the first positive electrode and the first insulation sleeve.**

227. For clarity, this limitation is discussed below in subparts [1n](i)-(iii).

- i. “the other side of the protruding step is provided with a second cylindrical wall having an outer diameter smaller than that of the protruding step and having the outer thread”**

228. Newton '141 discloses this limitation. See paragraphs 161-164.

- ii. “one end of the second cylindrical wall is provided with a base wall having a central through hole”**

229. Newton '141 discloses this limitation. See paragraphs 165-166.

- iii. “the central through hole is configured for installing the first positive electrode and the first insulation sleeve.”**

230. Newton '141 alone or in combination with Thompson discloses this limitation, noting that Newton '141 either alone or in combination with Thompson, as discussed above, discloses or renders obvious an insulation sleeve between the

first positive electrode 20 and the first connection seat 16/18. See paragraphs 167-168.

### **3. Dependent Claim 2**

231. Dependent claim 2 is obvious in view of Newton '141 combined with Thompson as to claim 1.

**a. [2pre] 2. The electronic cigarette according to claim 1, characterized in that**

232. Newton '141 discloses this limitation. See paragraph 170.

**b. [2a] the second connection seat is a cylindrical body having a protruding platform at one end thereof;**

233. Newton '141 discloses this limitation. See paragraphs 171-172.

**c. [2b] an outer wall of the cylindrical body is sheathed with an inner wall of said end of the vaporizer tube body;**

234. Newton '141 discloses this limitation. See paragraphs 173-174.

**d. [2c] an inner wall at a lower portion of the second connection seat is provided with a base wall, a tubular body is protruded from a center of the base wall, the tubular body is provided with a central through hole for installing the second insulation sleeve and the second positive electrode.**

235. Newton '141 alone or in combination with Thompson discloses this limitation, noting that Newton '141 either alone or in combination with Thompson discloses a second insulation sleeve placed between the second positive electrode 32 and the second connection seat 30. See paragraphs 175-177.

**4. Dependent Claim 5**

236. Claim 5 is obvious in view of Newton '141 combined with Thompson.

- a. **[5] 5. The electronic cigarette according to claim 2, characterized in that the outer wall of the cylindrical body is provided with a circular groove configured for mounting a sealing ring.**

237. Thompson discloses this limitation. See paragraphs 178-186.

Moreover, the analysis in that section explains why it would have been obvious to a POSITA to modify Newton '141 based on the disclosure of Thompson to arrive at limitation [5]. Also, that analysis did not rely upon the disclosure of Newton '191 to invalidate limitation [5].

**XI. SECONDARY CONSIDERATIONS OF NONOBVIOUSNESS**

238. I have seen no evidence of, nor am I aware of any, secondary considerations that would tend to show non-obviousness of the '744 Patent, including commercial success, long-felt need, failure of others, skepticism, praise, teaching away, recognition of a problem or copying by competitors. However, should Patent Owner assert any secondary considerations of non-obviousness, I reserve the right to respond.

**XII. CONCLUSION**

239. For the reasons set forth above, it is my opinion that the Challenged Claims of the '744 Patent are invalid.

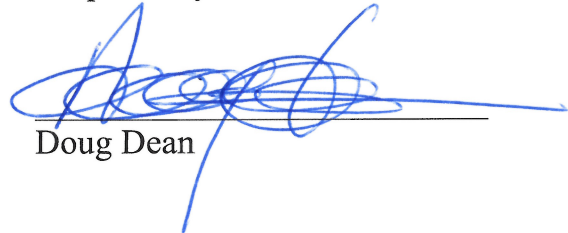
\* \* \*

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code.

IPR – Patent No. 9,924,744  
Declaration of Doug Dean

Date: October 19, 2023

Respectfully submitted,



Doug Dean