
UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

GCE GAS CONTROL EQUIPMENT INC.,

Petitioner,

v.

VBOX, INC.,

Patent Owner.

Inter Partes Review No. IPR2023-00326

Patent No. 11,389,614

DECLARATION OF ORHAN TALU, Ph.D.

GCE Gas Control Equipment Inc. v. VBOX, Inc.
IPR2023-00326

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I, Orhan Talu, declare:

I. SUMMARY OF OPINIONS

1. Here is a summary of my opinions in this declaration which are supported by the rest of my declaration and the materials I have considered:
2. In the context of the '614 Patent, the correct interpretation of a “separation cartridge” is a cartridge configured to separate gas.
3. In the context of the '614 Patent, the correct interpretation of a “receptacle” is a space configured to receive and contain something.
4. In the context of the '614 Patent, the correct interpretation of “selectively removable” is can be chosen to be removed.
5. *Deane* (with or without *Dubois* and *Berntson*) does not support obviousness of claims 1-5 and 7-16
6. *Deane* (with or without *Dubois* and *Berntson*) and *Hill* does not support obviousness of claims 2, 3, and 15.
7. *Deane* (with or without *Dubois* and *Berntson*) and *Basset* does not support obviousness of claim 6.
8. Claims 1-11 are not obvious because the removal direction limitation is not disclosed or taught in *Deane*, and none of the other references relied on by Petitioner correct this deficiency of *Deane*.

9. None of the challenged claims are obvious because the non-contact limitations are not disclosed or taught in *Deane*, and none of the other references relied on by Petitioner correct this deficiency of *Deane*.

10. Claims 1-11 are not obvious because a receptacle is not disclosed or taught in *Deane*, and none of the other references relied on by Petitioner correct this deficiency of *Deane*.

11. Claims 2 and 15 are not obvious because one would not modify *Deane* to include the claimed spring (in view of *Hill* or otherwise).

II. QUALIFICATIONS

12. I am a Professor Emeritus of Chemical Engineering at Cleveland State University.

13. While I still hold the title of Professor Emeritus, I have effectively retired from my duties as a full time college professor as of May of 2021.

14. I have been either a Professor, Assistant Professor, or Associate Professor of Chemical Engineering at Cleveland State University since 1986, until June of 2021 when I became a Professor Emeritus.

15. An up to date version of my CV is attached as Ex. 2002.

16. I have studied, taught, and researched interfacial phenomena between solids and fluids, from fundamentals including molecular simulations to process developments with an emphasis on experiments.

17. I received a Ph.D. degree and Masters in Chemical Engineering from Arizona State University in 1984 and 1980, respectively. I received a Bachelors of Science degree in Chemical Engineering from Middle East Technical University (Ankara, Turkey) in 1978.

18. In my capacity as a Professor, I did research in the area of gas separation processes, adsorption, gas separation materials, etc. I also taught various courses related to the field of chemical engineering, some of which directly related to gas separation processes and adsorption. In my work, I have studied, reviewed, and designed oxygen concentrators, which employ a gas separation process and use adsorbent material to remove nitrogen from air.

19. I am an inventor or co-inventor on five patents, listed on pages 5 and 6 of my CV.

20. I have authored, alone or with my colleagues (including with my students), over 60 journal articles, many of which are related to gas separation, adsorption, etc.

21. I have contributed to the proceedings of 15 conferences.

22. I have presented at over 125 conferences, including presenting on the topics of gas separation and adsorption.

23. I have participated in 34 funded research projects, many of which related to gas separation and adsorption.

III. PRIOR TESTIMONY

24. In the past four years I have not testified in any other cases, either at trial or by deposition.

IV. ENGAGEMENT AND COMPENSATION

25. I am making this declaration at the request of Patent Owner.

26. I am being compensated at my usual consulting rate for my work on this matter.

27. I am being reimbursed at cost for my expenses.

28. My compensation is in no way dependent upon my opinions or testimony or the outcome of this proceeding.

V. MATERIALS CONSIDERED

29. In preparing this declaration, I have reviewed all filings and exhibits associated with IPR2023-00326. I have also reviewed some filings (including the Decision denying institution) and some exhibits associated with related IPR2023-00527.

VI. APPLICABLE LEGAL STANDARDS

30. I am not an attorney. I have been informed by my attorneys of the relevant legal principles and have applied them to arrive at the opinions set forth in this declaration.

A. Claim Construction

31. I have been advised that patent claim terms are to be given their plain and ordinary meaning, i.e., the meaning that the terms would have had to the skilled artisan at the time of the invention. I have been informed that the relevant time frame here is mid-to-late 2004 to February 9, 2005. I understand that this analysis focuses on intrinsic evidence, including how the claim term is used in the claims, specification, and prosecution history. I also understand that dictionaries or other extrinsic sources may assist in determining the plain and ordinary meaning but cannot override a meaning that is unambiguous from the intrinsic evidence.

32. I also understand that if a patent claim recites a term having a known meaning in the art, then that term should be construed according to its known, art-accepted meaning, unless the specification attempts to redefine the art-accepted meaning of the term.

33. I understand that a patent's claims are not typically limited to the embodiments disclosed in the specification of the patent, even if the specification only discloses one embodiment.

34. I understand it is typically improper to read words from the specification into the claims. Instead, the language of the claims should be interpreted for what it means to one skilled in the art.

35. I also understand that different claim terms within a patent should be construed such that those terms have different meanings.

36. I also understand that common claim terms in a patent should be construed consistently between all claims in the patent.

37. I also understand that when a dependent claim adds an additional feature that is not recited in a base claim, that the base claim should not be interpreted to include the feature of the dependent claim. Otherwise, the dependent claim would essentially be meaningless.

B. Obviousness

38. I have been advised that the burden is on Petitioner to demonstrate the unpatentability of the challenged claims based on a preponderance of the evidence.

39. I have been advised that a claimed invention is not patentable under 35 U.S.C. §103 if it is obvious.

40. I understand a patent claim is unpatentable if the claimed invention would have been obvious to a person of ordinary skill in the art at the time the claimed invention was made. I have been informed that the relevant time frame here is mid-to-late 2004 to February 9, 2005. Specifically, I have been informed that Patent Owner alleges that the claims of U.S. 11,389,614 (the '614 Patent) were conceived between July 23, 2004 to January 17, 2005 and were diligently reduced to practice as of the filing of the first patent application in the family of the '614 Patent, which is February 9, 2005. At a minimum the claims are entitled to a priority date of February 9, 2005. My opinions herein are unchanged regardless of whether the '614 Patent is entitled to a priority date of July 23, 2004, February 9, 2005, or some date in between.

41. I have further been advised that the ultimate conclusion of whether a claim is obvious should be based upon several factual determinations including (1) the level of ordinary skill in the field; (2) the scope and content of the prior art; (3) what differences, if any, existed between the claimed invention and the prior art; and (4) any objective indicia of non-obviousness (i.e., secondary considerations).

42. I have been advised that, in determining the level of ordinary skill in the field that someone would have had at the time the claimed invention was made, I should consider: (1) type of problems encountered in the art; (2) prior art solutions to those

problems; (3) rapidity with which innovations are made; (4) sophistication of the technology; and (5) educational level of active workers in the field.

43. I have been advised that a patent claim composed of several elements is not proved obvious merely by demonstrating that each of its elements was independently known in the prior art. In evaluating whether such a claim would have been obvious, I may consider whether there is a reason that would have prompted a person of ordinary skill to combine the elements or concepts from the prior art in the same way as in the claimed invention. I understand that for obviousness to be found, the proposed obviousness ground must be supported by an articulated reason with a rational underpinning, as opposed to a mere conclusory statement.

44. I understand that all words in a claim must be considered when judging the patentability of a claim against the prior art. I also understand that the each and every element of a claim must be addressed in order to render the claim obvious.

45. I understand if a claim element is alleged to be present in a certain prior art reference, then the claim element must be shown to be present, with certainty, in that prior art reference. If the claim element is not proven to be present in the prior art with certainty, I understand it is inappropriate to rely on common sense to fill in the missing structural element.

46. I have also been advised that I must be careful not to evaluate the question of obviousness using the benefit of hindsight. Rather, I should put myself in the position of a person of ordinary skill at the time the claimed invention was made and I should not consider what is known today or what is learned from the teachings of the patent.

47. I have been advised that secondary considerations can serve as evidence of non-obviousness. Such secondary considerations include licensing, commercial success, long felt but unsolved needs, failure of others, unexpected results, copying, and industry praise. The secondary considerations should have a nexus to the claimed invention. I understand secondary considerations help guard against slipping into use of hindsight when making a determination of obviousness.

48. I have been advised that any obviousness rationale for modifying or combining prior art must include a showing that a person of ordinary skill would have had a reasonable expectation of success.

VII. GENERAL OVERVIEW OF CASE

49. I understand that this case was brought by Petitioner in an effort by Petitioner to render the claims of the '614 Patent invalid.

50. Petitioner has raised various proposed grounds under which Petitioner argue that the claims would have been obvious.

51. I understand that Patent Owner submitted a preliminary response to the Petition.

52. I understand the Board granted institution of this case on all grounds.

VIII. TECHNOLOGY AT ISSUE

53. This case relates to oxygen concentrators, and specifically relates to a removable cartridge for an oxygen concentrator. *See* Ex. 1001.

54. An oxygen concentrator is a medical device that is used to provide a supply of oxygen to individuals who have low oxygen levels in their blood. It works by taking in room air, removing nitrogen from it, and delivering purified oxygen to the patient. Room air contains something on the order of 78% nitrogen, 21% oxygen, 1% argon, and trace amounts of carbon dioxide and other gases. The purified oxygen supplied to the patient by the oxygen concentrator includes on the order of 85-95% oxygen. Ex. 1001 at 20:66.

55. Oxygen concentrators are commonly used in various medical settings, as well as in home care, to treat conditions such as chronic obstructive pulmonary disease (COPD), emphysema, asthma, and other respiratory disorders. Ex. 1001 at 1:22-35. They are a more convenient alternative to traditional oxygen tanks, as they do not require refilling and can provide a continuous supply of oxygen. Ex. 1001 at 1:36-2:32.

56. A portable oxygen concentrator (POC) is a smaller, lightweight version of the traditional oxygen concentrator designed to provide mobility and convenience to individuals who require oxygen therapy. Ex. 1001 at 2:33-50. POCs are intended to be easily carried by the user, or worn by the user using a carrying device such as a belt, backpack, sling, etc., allowing them to move around and maintain an active lifestyle while still receiving the necessary oxygen therapy. Ex. 1001 at 1:17-21, 2:33-50.

57. Many POCs employ a technology known as pressure swing adsorption (PSA) using a molecular sieve to concentrate oxygen from the surrounding air. POCs contain sieve beds filled with a material called zeolite. Ex. 1001 at 18:30-47. Zeolite is a crystalline substance with a network of pores and channels that can selectively adsorb (i.e., trap) nitrogen molecules while allowing oxygen molecules to pass through. Adsorbent material typically resembles small beads comprised of bonded zeolite crystals. Ex. 1001 at 18:41-46. The beads are often packed together to form a bed of adsorbent material. The bed of adsorbent material can be referred to in different ways, such as a bed, sieve bed, an adsorbent bed, a column, or an adsorbent column.

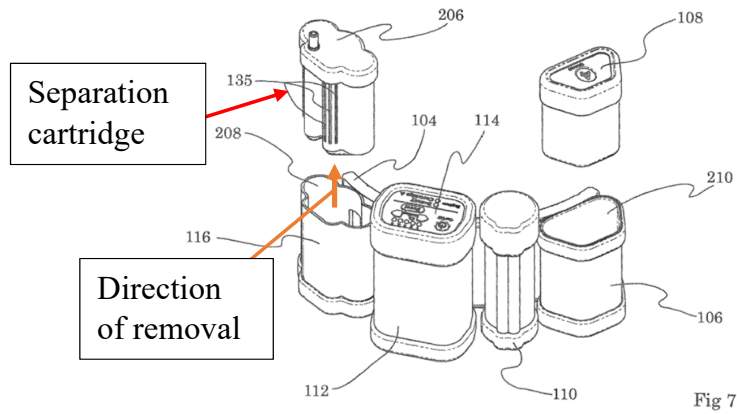
58. Over time, the trace gases and impurities degrade adsorbent material such that it loses its ability to adsorb nitrogen. Ex. 1001 at 12:1-15. When this happens, the

sieve bed or beds of the portable oxygen concentrator require replacement because the device cannot deliver oxygen at the specified purity level. Otherwise, a new POC is needed.

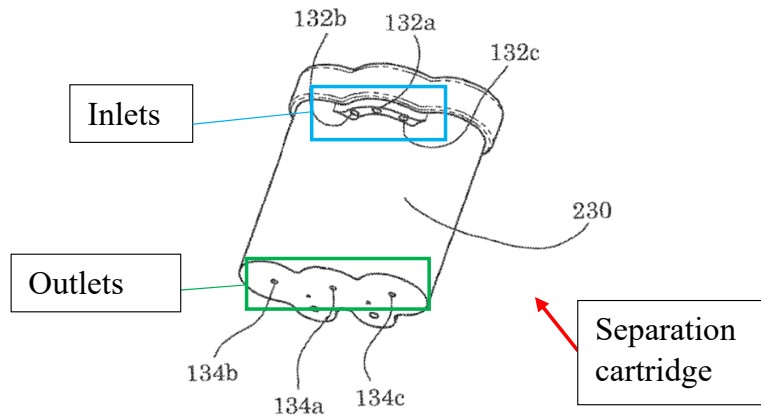
59. The claims of the '614 Patent are directed primarily to the configuration of these beds with respect to the remainder of the portable oxygen concentrator. The claimed arrangements enable ease of use and maintenance of the portable oxygen concentrator, including providing for ease of removability and replacement of the molecular sieve beds.

60. Increasing the ease with which sieve beds can be removed and replaced allows the user to remove and replace the beds without the assistance of the manufacturer. In this way, a user does not need send their entire oxygen concentrator away for service, or call for a specialized technician to perform an in-home service, every time sieve bed needs replacing. Rather, the patient or their caregiver can quickly replace the beds themselves.

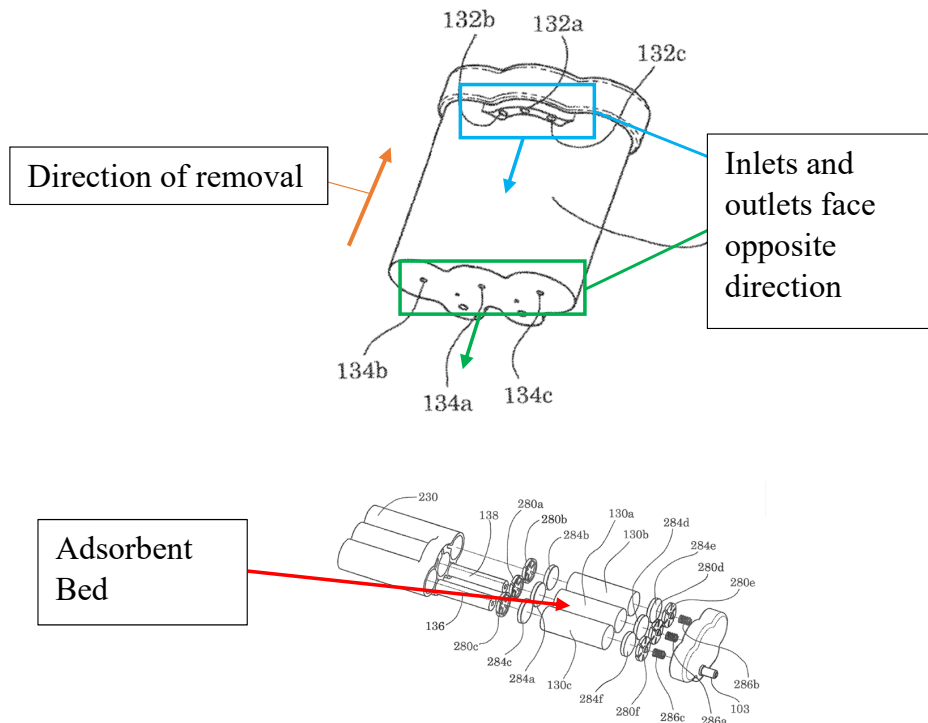
61. In one embodiment, the '614 Patent describes an oxygen concentrator 100 that can include, among other things, an adsorbent, or separation, cartridge 206, which is removable from a receptacle 208 of a cartridge module 116. *See, e.g.*, Ex. 1001 at 11:61-12:3. The separation cartridge 206 contains the adsorbent material. The separation cartridge is “easily removable to facilitate replacement.” [*Id.*].



62. The separation cartridge that can include inlet ports 132a-132c and outlet ports 134a-134c configured to direct fluid relative to adsorbent columns 130a-130c. Ex. 1001 at 4:60-66; Figures 15 and 16.



63. The inlet and outlet face toward the receptacle, which is a direction opposite the direction that the separation cartridge is removed.



64. During use, ambient air flows into one of the inlets 132a-132c and is directed internally to the corresponding adsorbent bed 130a-130c where the nitrogen in the ambient air is adsorbed as the air passes through the adsorbent bed 130a-130c. Ex. 1001 at 4:60-5:4; 18:30-56. Relatively pure oxygen is expelled through the outlet 134a-134c. *Id.*

IX. LEVEL OF ORDINARY SKILL

65. I understand that Petitioner's proposed definition of a person having ordinary skill in the art (POSA) is:

A POSITA of the '614 patent would have had at least a bachelor's degree, or the equivalent degree, in mechanical engineering, chemical engineering, or a related field, and 2-3 years of experience in the research, design, or development of portable oxygen concentrators and related hardware, software, and firmware, or equivalent experience. A person with less education but more relevant practical experience, or more education and less experience, may also meet this standard.

See Petition at page 21.

66. I have no opinion on Petitioner's definition. However, applying Petitioner's definition, at the time of the invention I was a POSA under this definition because I had at least a bachelor's degree in chemical engineering and at least 2-3 years of experience in the research, design, or development of portable oxygen concentrators and related hardware, software, and firmware, or equivalent experience. I continue to be a POSA under this definition.

X. CLAIM CONSTRUCTION

67. I understand Petitioner has proposed claim constructions for the terms "separation cartridge," "receptacle," and "selectively removable [from a receptacle]." I disagree with the Petitioner's proposals for the reasons outlined below.

A. Separation Cartridge

68. In the context of the '614 Patent, a "separation cartridge" is a cartridge configured to separate gas.

69. The term appears in claims 1-3, 8, 9, and 12 of the '614 Patent.

70. The above construction is consistent with the specification of the '614 Patent, which explains that “[t]he cartridge is removable from an oxygen concentrator which separates oxygen from ambient air.” Ex. 1001 at 2:52-58. The '614 Patent further refers to “oxygen rich gas separated by cartridge 206.” Ex. 1001 at 15:40-43. In both instances, the specification is clear that the separation cartridge is a cartridge configured to separate gas.

71. The above construction is consistent with the claims, which recite this term: “the separation cartridge comprising ... a bed of adsorbent material configured to preferentially adsorb nitrogen.” *Id.* at claim 1. Again, the language of the claim is consistent with the notion that the separation cartridge is a cartridge configured to separate gas.

72. Petitioner proposes construing this term as “a housing that holds multiple adsorbent columns for gas separation and provides separate inlet and outlet ports for each adsorbent column.” *See* Petition at page 23. This is incorrect.

73. Initially, Petitioner’s belief that a separation cartridge must have multiple adsorbent columns is inconsistent with the specification of the '614 Patent, which explains that an adsorption process can be “accomplished with a single column.” Ex. 1001 at 7:13-20. The specification also states that if multiple columns are used, then

a multiple of three should be used. But again, the specification is clear that only one column is required. Indeed, one skilled in the art would understand that an adsorption process can function with one or more columns. In other words, only one column is required.

74. Further, while the specification discloses an embodiment in which a separation cartridge 206 includes multiple “adsorbent columns 130a-130c,” “inlet ports 132a-132c,” and “outlet ports 134a-134c,” the claims are not limited to this embodiment. Multiple inlets/outlets are described in this embodiment because there are multiple adsorbent columns. While the separation cartridge 206 could have a plurality of columns, as in the embodiment with three columns 130a-130c, the specification is clear that the separation cartridge could include only one column of adsorbent material.

75. Further still, the rest of the language of the claim introduces additional structures of the separation cartridge. In other words, I can simply read the claim to determine which structures are part of the separation cartridge. For example, claim 1 recites “the separation cartridge comprising an inlet oriented in a second direction opposite the first direction, an outlet oriented in the second direction, and a bed of adsorbent material configured to preferentially adsorb nitrogen.” The plain text of claim 1 is clear that the separation cartridge has an inlet, an outlet, and a bed of

adsorbent material. The terms “an” as in “an inlet” and “an outlet” refer to a, singular, inlet and a, singular, outlet being recited. The claims are not reciting multiple inlets/outlets, which is consistent with the disclosed embodiment of a single bed being sufficient.

76. The summary of the invention in the '614 Patent echoes that only a single adsorbent column is required when it states that the cartridge includes “a housing having an inlet port, an outlet port, and a bed of adsorbent material.” Ex. 1001 at 2:52-56. This is again consistent with the understanding of a POSA, namely that an adsorption process can function with a single column.

77. More generally, it is unclear to me, and I believe it is improper, to define the term “separation cartridge” as containing various structures (namely “inlets,” “outlets,” and “beds”) when the claim already defines what structures the separation cartridge has. In other words, if one wanted to determine what structures were part of the separation cartridge, they could read the claims, which spell out that it has an inlet, an outlet, and a bed of adsorbent material. It does not require all of the additional elements Petitioner proposes.

78. Also, there are other claims in the '614 Patent and the related U.S. Patent No. 10,357,628 (the '628 Patent; Ex. 1054) that recite multiple beds of adsorbent, such as claim 21 of the '628 Patent and claim 16 of the '614 Patent. For example, claim

16 of the '614 Patent recites “wherein the first and second beds are contained within a common separation cartridge.” So, the Patent Owner was deliberate with specifying when multiple beds are required. When the Patent Owner does not expressly specify in the claims that multiple beds are required, it does not make sense to assume the Patent Owner meant to recite multiple beds, because the Patent Owner clearly knew how to recite multiple beds if it wanted to do so. Moreover, if Petitioner’s construction were adopted, it would eliminate the meaning from these other claims that recite multiple beds of adsorbent within a separation cartridge.

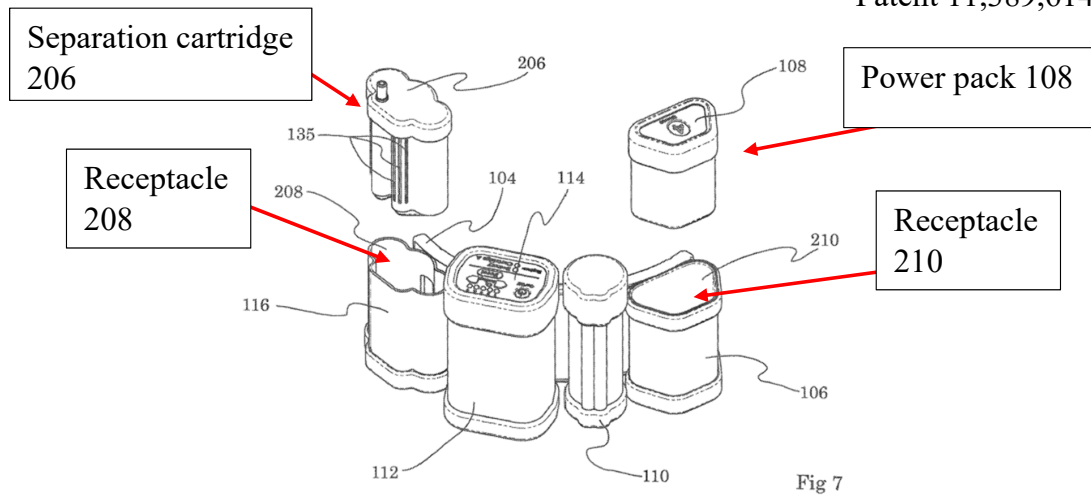
79. A POSA such as myself would understand the term “separation cartridge” and not limit the term “separation cartridge” in the manner Petitioner proposes.

B. Receptacle

80. In the context of the '614 Patent, a receptacle is a space configured to receive and contain something.

81. The term appears in claim 1 of the '614 Patent.

82. Figure 7 of the '614 (copied and annotated below) Patent illustrates a power pack and an adsorbent cartridge removed from their respective receptacles 208 and 210.



83. The specification of the '614 Patent explains that the adsorbent cartridge and power pack are removable from their respective receptacles to facilitate replacement. Ex. 1001 at 11:66-12:3. The receptacles are spaces that receive and contain the cartridge or power pack. The receptacles are defined by housings in the above embodiment.

84. Moreover, by way of example, claim 1 recites “a separation cartridge selectively removable from a receptacle by movement relative to the receptacle in a first direction.” It is clear from at least the above excerpts of the specification and claim 1 that a receptacle is a space that receives and contains something. In the asserted claims, it is the separation cartridge that is received and contained in the receptacle.

85. While the claims relate to a receptacle for the separation cartridge, the specification also identifies another receptacle for receiving and containing the power module. The construction of “receptacle” should also take into account the specification’s consistent use of the term receptacle in both instances.

86. Petitioner construes this term as “a structure that releasably interfaces with the inlet(s) and outlet(s) of the separation cartridge and at least partially contains the separation cartridge.” *See* Petition at page 24.

87. First, I do not believe it is proper to interject the terms “inlet,” “outlet,” and “separation cartridge” into the definition of “receptacle.” These terms are recited elsewhere in the claims and do not need to be interjected into the definition of another term.

88. I also do not believe anything about the term receptacle means “releasably interfaces.” This appears to be an effort by Petitioner to limit the claims to the disclosed embodiment of quick-connect attachments from the specification. Ex. 1001 at 12:4-14. A separation cartridge could be placed in a receptacle and a connection could be formed between the separation cartridge and the remainder of the oxygen concentrator using connections other than quick-connects. Regardless, it is improper to limit the claims to quick-connects because that is just an embodiment from the specification. The language of the claim already specifies the role of the

“receptacle.” It is a space that receives and contains something, namely the separation cartridge.

89. A POSA such as myself would understand the term “receptacle” and not limit the term “receptacle” in the manner Petitioner proposes.

C. Selectively Removable [From A Receptacle]

90. In the context of the '614 Patent, “selectively removable” means can be chosen to be removed.

91. The term appears in claim 1 of the '614 Patent.

92. To be “selectively removable,” something must be able to be chosen to be removed. This is consistent with the specification, which shows components such as a separation cartridge or a power pack which can be chosen to be removed (from a receptacle, for example). Ex. 1001 at 11:65-12:3.

93. Petitioner construes this term as “withdrawable or separable as a whole from a receptacle.” *See* Petition at page 26.

94. Petitioner’s proposal does not account for the term “selectively.” In other words, it completely reads out the “selectively” language, which is language that emphasizes choice. Selectively means able to be chosen, or can be chosen.

95. Further, it is unclear to me why Petitioner believes selectively removable must require the language “as a whole.” To me, this language is not required by “selectively removable.”

96. As a POSA, I understand this term and would not construe it in the manner proposed by Petitioner.

XI. PRIOR ART REFERENCES RELIED ON IN GROUNDS 1-6

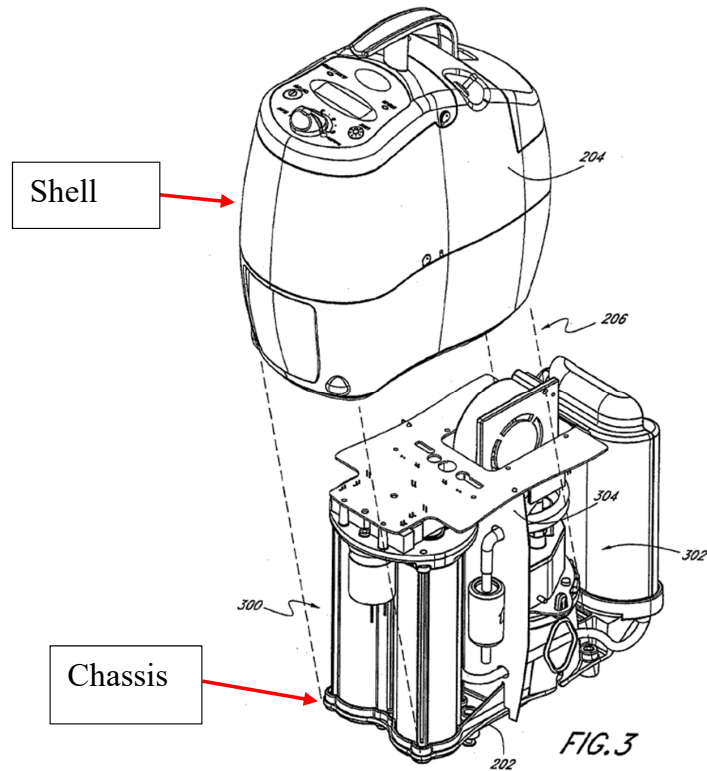
97. In Grounds 1-6, Petitioners rely on prior art references to Deane (Ex. 1004), Dubois (Ex. 1005), and Berntson (Ex. 1006). I have reviewed these references. I summarize them below.

A. Deane

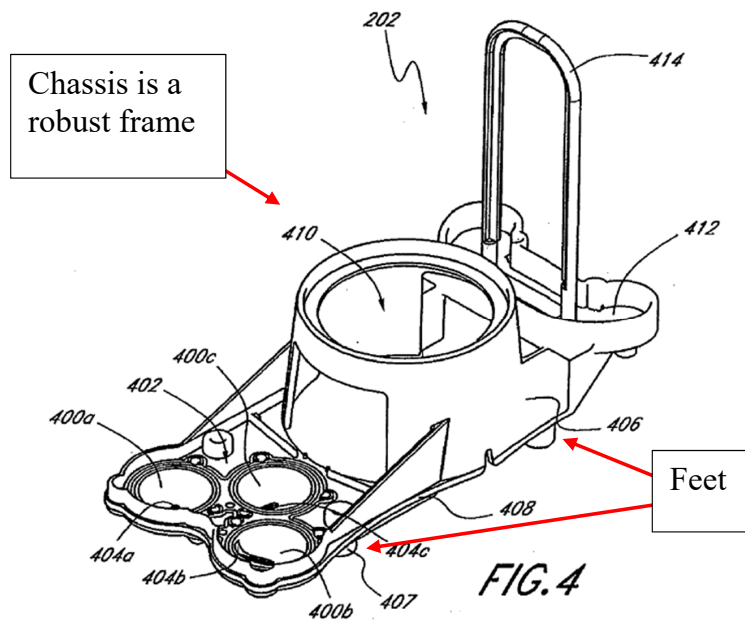
98. *Deane* discloses a portable gas fractionalization apparatus 200. Ex. 1004 at ¶ [0057].

99. While referred to as portable, the *Deane* apparatus 200 is bulky, and is configured to be carried by a handle or rolled on a wheeled cart 1800 (Ex. 1004 at ¶ [0099]; Figures 18A and 18B).

100. *Deane*’s apparatus 200 includes a chassis 202 and a shell 204, which together form a housing 206. *Id.* at ¶ [0057]; Figure 3 (below).



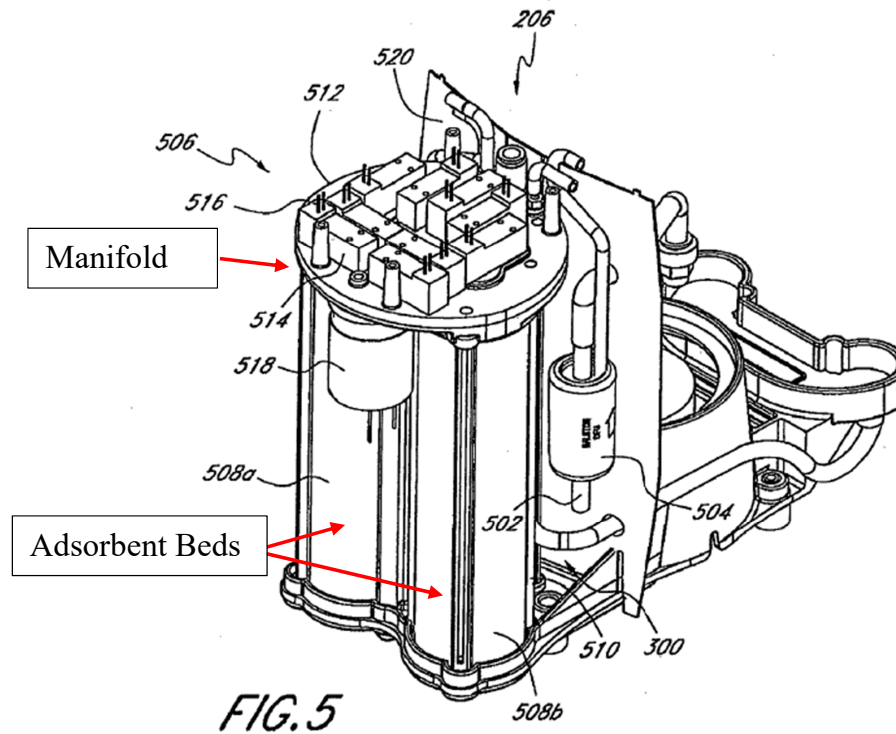
101. The chassis 202 is a frame with isolation feet 407 configured such that the apparatus 200 can rest on a flat surface, such as a floor or table, while supporting the various internal components of the *Deane* device. *See Id.* at ¶ [0060].



102. *Deane's* apparatus is not designed to be used in any configuration other than its vertically-upright configuration. On this point, *Deane's* shell 204 exhibits curved, non-planar walls to discourage users from resting the apparatus 200 on its side. See *Id.* at ¶ [0057].

103. Inside *Deane's* housing 206, the apparatus 200 includes a first compartment 300 which contains the components that adsorb nitrogen from ambient air, and a second compartment 302 which contains heat generating components. *Id.* at ¶ [0058]. Specifically, the first compartment 300 includes adsorbent bed columns

508a, 508b. *Id.* at ¶ [0061]; Fig. 5. Fluid is directed relative to the adsorbent bed columns 508a, 508b via a manifold 512, which includes two plates. *Id.* at ¶ [0063, 0071]; Fig. 8.

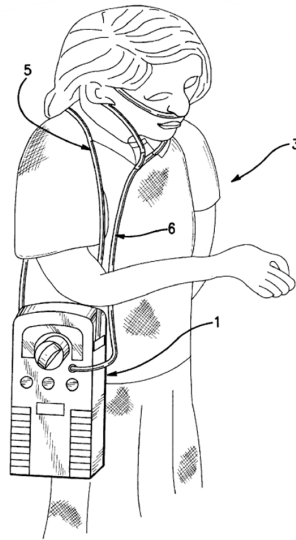


104. There are a number of differences between *Deane* and the claims. One difference is that the adsorbent bed columns 508a, 508b are not removable in the claimed manner.

105. In reality, removing the adsorbent bed columns of *Deane* is a complicated process that requires a coordinated effort and specialized tools. A specialized technician would have to replace the adsorbent beds since it is sandwiched in between two plates and includes numerous parts such as gaskets to be oriented exactly while tensioning springs inside the columns. In practice, in order to assemble the configuration of *Deane*, a specialized jig, which is not disclosed, may have been used to mount the columns on the base 408 and simultaneously mounting the manifold 512 and while tensioning the springs and keeping gaskets, filters, etc., aligned properly.

B. Dubois

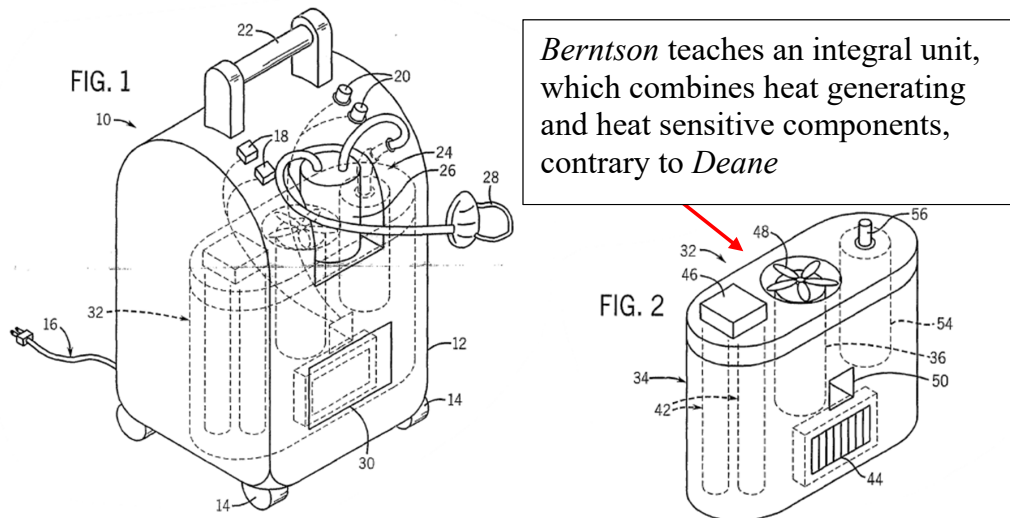
106. *Dubois* (Ex. 1005) teaches a portable oxygen concentrator, which appears to be more portable than that of *Deane*, namely because it is smaller and can be worn by a user, as shown in Figure 5, copied in part below.



C. Berntson

107. *Berntson* (Ex. 1006) generally teaches an oxygen concentrator with a consolidated oxygen-rich air generator (ORAG) unit including a pump 36, adsorbent containers 42, a valve system 46, a cooling fan 48, an air tank 54, and an air outlet 56 all consolidated in one removable unit. Ex. 1006 at ¶ [0012, 0014].

108. *Berntson* teaches integrating its heat generating and heat sensitive components. Ex. 1006 at ¶ [0018] (“It may also be desirable to integrate components formerly considered separate. For example, ...the sieve beds may be incorporated into the pump housing...”).



109. In this regard, *Berntson* is in conflict with *Deane* because *Deane* desires separation of its heat generating and heat sensitive components, while *Berntson* teaches combining them into a single unit.

110. I will discuss these and more differences between the prior art and the claims below.

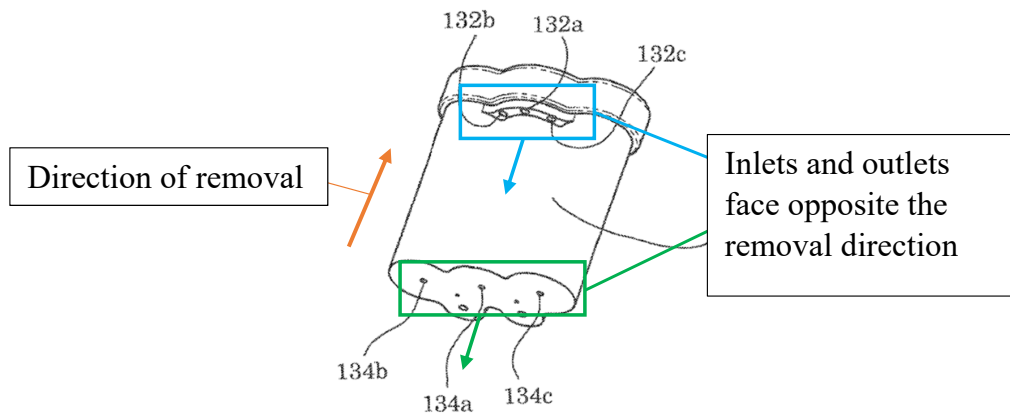
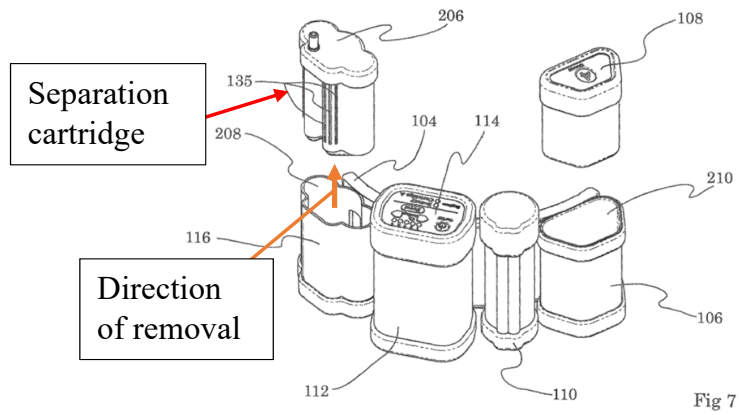
XII. THE CHALLENGED CLAIMS ARE NOT OBVIOUS

A. Ground 1 – Deane, Dubois, and Berntson do not support obviousness of claims 1-5 and 7-16

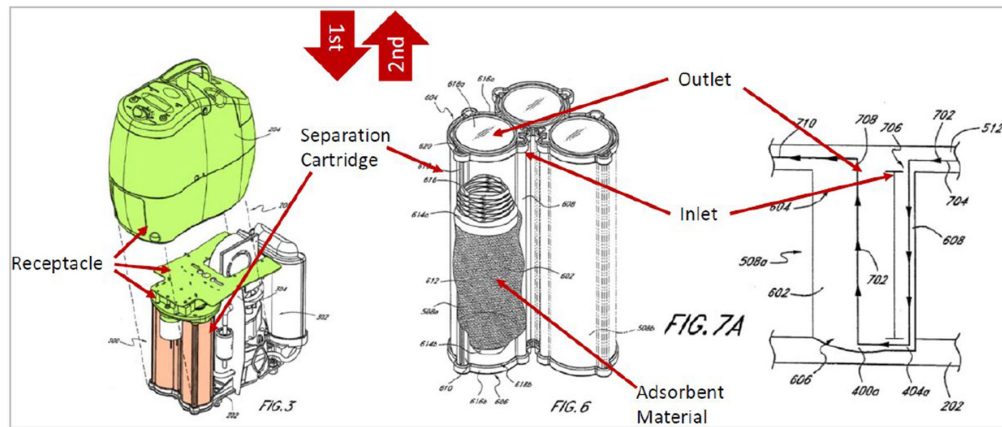
1. Independent claim 1 - Removal direction limitations

111. Claim 1 recites “a separation cartridge selectively removable from a receptacle by movement relative to the receptacle in a first direction.” Claim 1 further recites that the inlet and outlet are both oriented in a “second direction” which

is “opposite the first direction.” The below annotated figures from the ’614 Patent summarizes the removal direction limitations.



112. According to Petitioner, the removal direction limitations read on *Deane*. See Petition at pages 41-45. Petitioner provides the below annotated drawings of *Deane*. See Petition at page 45.

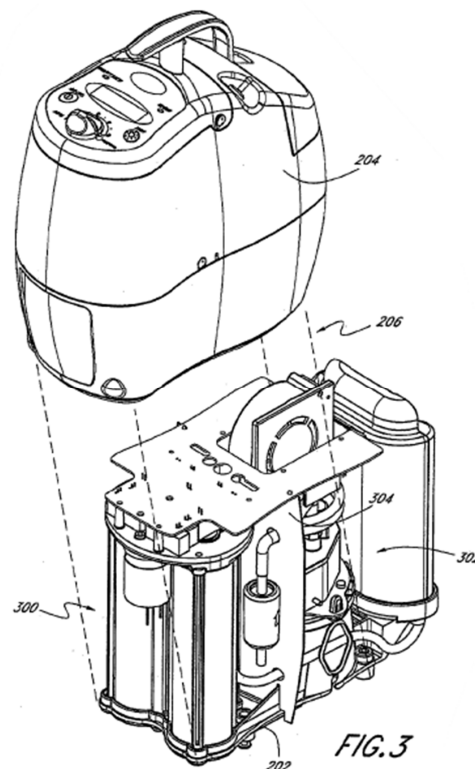


113. However, there is no evidence the orange component which the Petition calls out as *Deane's* separation cartridge (allegedly the housing 602 and adsorbent columns 508a, 508b) moves in the first direction at all, let alone relative to a receptacle, which is allegedly either the green manifold 512 or the combination of the manifold 512 and shell 204. See Petition at page 42-46. For purposes of this argument I will assume that these are proper receptacles, however they are not, as noted below.

114. There is no evidence that *Deane* teaches movement of the housing 602 and adsorbent columns 508a, 508b in the vertically-downward direction (labeled as the

“1st” direction with a red arrow by Petitioners above) relative to either the manifold 512 or the combination of the manifold 512 and the shell 204.

115. Petitioner seems to equate vertically upward movement of *Deane*’s manifold 512/shell 204 with downward movement of the separation cartridge. *See below*, for example:



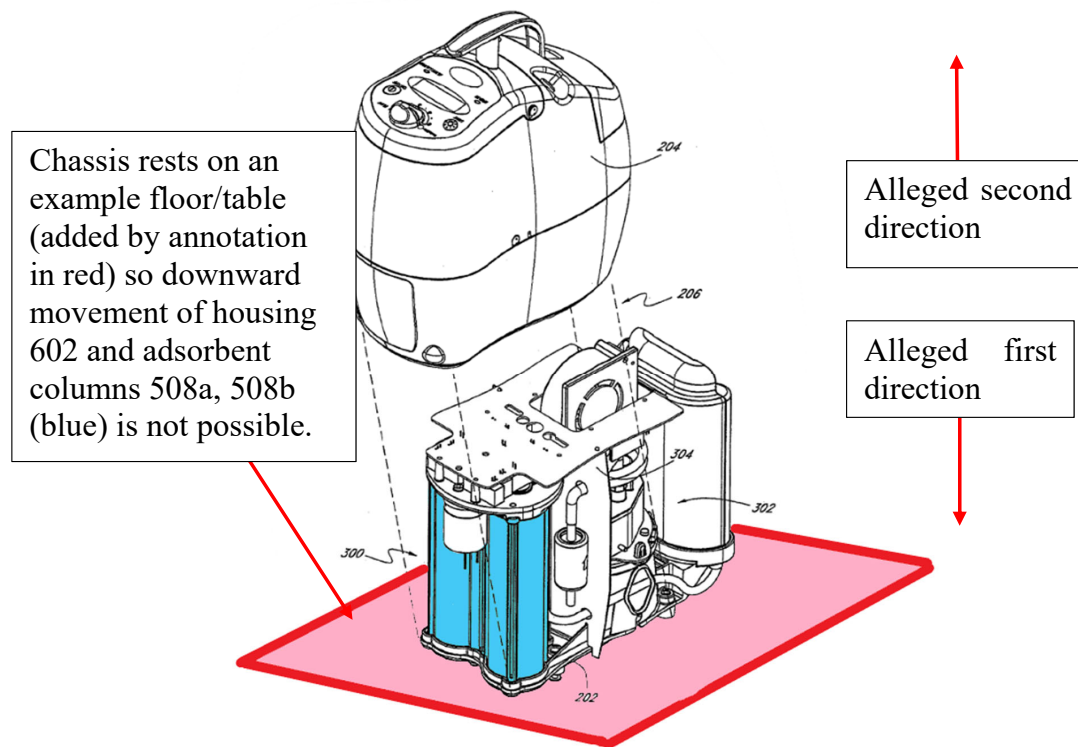
116. While the shell 204 is shown in an exploded view relative to the rest of the concentrator in Figure 3, and while Figure 3 appears to show the shell 204 above the

alleged separation cartridge, there is no evidence that *Deane* teaches moving the alleged separation cartridge downward, relative to either the manifold 512 or the shell 204, which would be required to meet the claims, because the claims require the separation cartridge to be physically movable in the first direction, relative to the receptacle, for removal.

117. *Deane* does not teach that the alleged separation cartridge is moveable in the alleged first direction for removal at all, let alone movable in the first direction relative to either of the alleged receptacles.

118. *Deane*'s housing 602 and adsorbent columns 508a, 508b cannot be moved downward in the alleged first direction for removal because the bottom of the alleged separation cartridge directly abuts and is supported by the chassis 202. *See* Ex. 1004 at ¶ [0058] and Figs. 4, 5. The chassis 202 includes vibration isolation feet 407, which are designed to sit on a floor or table surface such that *Deane*'s apparatus 200 is held in the vertical upright position. *Id.* at ¶ [0060]; Fig. 3 (annotated by Patent Owner below). *Deane*'s shell 204 is designed to discourage resting the unit on anything other than the feet of the chassis 202. *See Id.* at ¶ [0057], [0093] (non-planar walls “serve to discourage users from setting the housing on its side or placing it in any orientation other than the upright” orientation). And in general, a POSA would understand *Deane* is designed to rest on the bottom feet during use. It is not

intended to be inverted or placed on its side as doing so would impede access to the cannula port and controls, cause one or more of the internal components to function poorly or fail completely (e.g., compressor could dislodge from its mount 1202), and/or block the air intake or exhaust.



119. *Deane* does not teach movement of the separation cartridge in the alleged first direction for removal, and, in fact, such movement is not even possible in *Deane*. Claim 1 is not obvious for at least this reason.

120. While the invention of the '614 Patent permits a user to readily remove and replace a separation cartridge, *Deane* does not. *Deane* requires a series of steps to even access, let alone remove its columns. Given the complexity of the device of *Deane* and the disclosed arrangement of components, the housing 602 and adsorbent columns 508a, 508b are not something that I would consider to be removable.

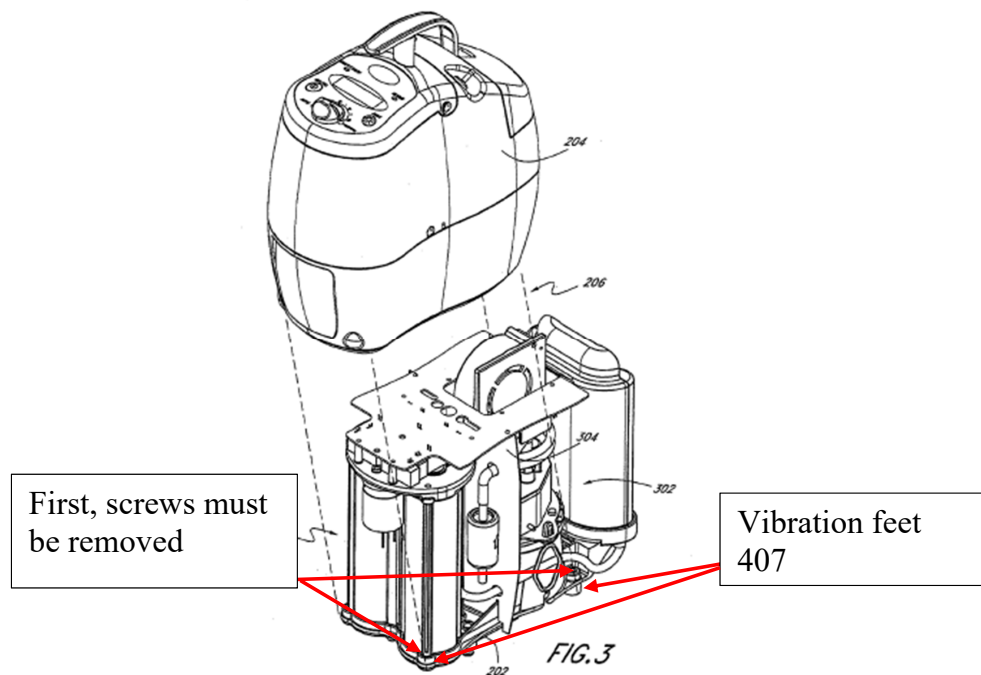
121. The alleged receptacles of *Deane* must be completely removed before the alleged separation cartridge can be accessed at all. Therefore, it is not possible for the housing 602 or adsorbent columns 508a, 508b to be removable from the alleged receptacles by moving “relative to the receptacle in a first direction” as required by the independent claims. Claim 1 is not obvious for this additional reason.

122. While *Deane*'s disclosure does not describe a particular removal process, the teachings of *Deane* suggest that the adsorbent columns 508a, 508b could only be accessed after one performed a near full tear down of *Deane*'s gas fractionalization apparatus 200.

123. First, to gain any access to the inner workings of *Deane*'s fractionalization device 200, including the adsorbent bed columns 508a, 508b, one must remove the outer shell 204. *See* Ex. 1004 at Figure 3 and ¶ [0058].

124. *Deane* explains that its chassis has bottom mounts or vibration isolation feet 407, and that those mounts/feet engage with shell 204. Ex. 1004 at ¶ [0060]. *Deane*

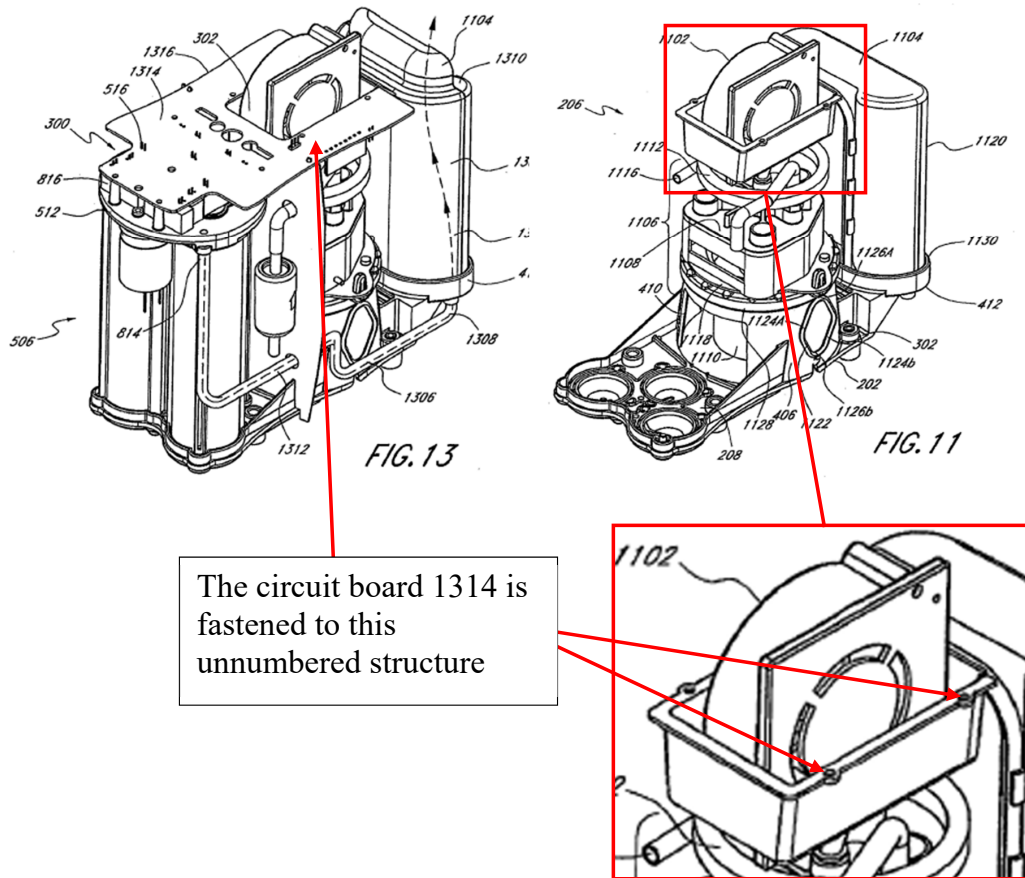
then states that there are preferably screws inserted through the bottom of the shell 204 and into the bottom of vibration isolation feet 407. *Id.* at ¶ [0060]. So, to remove the shell 204, one must first unscrew the screws extending through bottom of the shell 204 into the vibration feet 407 of the chassis 202.



125. With the shell 204 removed, a circuit board 1314 covers the alleged separation cartridge. *See, e.g.,* Ex. 1004 at Fig. 3. The circuit board 1314 is “mounted directly on top of manifold 512.” *Id.* at ¶¶ [0063], [0087].

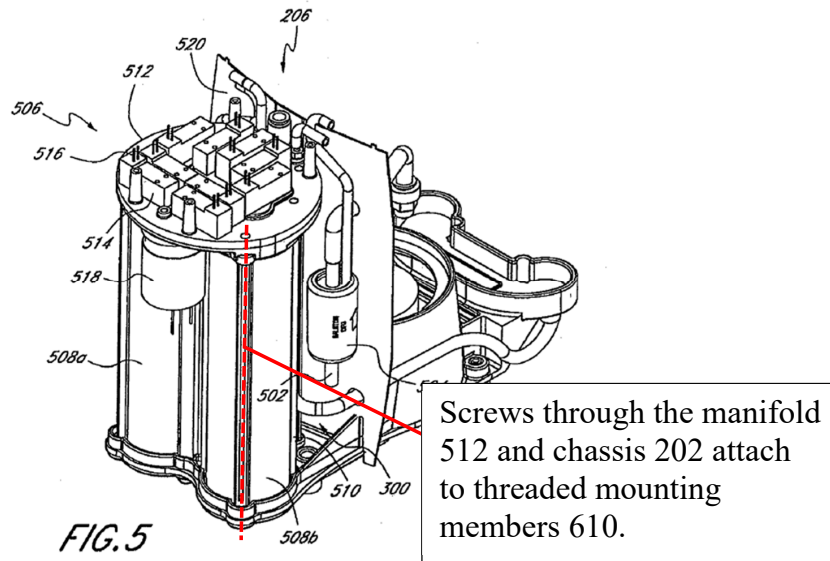
126. *Deane’s* figures indicate that the circuit board 1314 is fastened to the structure surrounding the fan 1102 in the second compartment 302. *See Id.* at Fig. 11, 13. So,

a technician would next remove the circuit board 1314 by detaching it from at least the manifold 512 and the structure surrounding fan 1102.



127. With the circuit board 1314 removed, the adsorbent column 508a, 508b component remains fastened to the manifold 512 and chassis 202. *Deane* discloses that the adsorbent bed column 508a includes a plurality of threaded mounting members 610 that are co-extruded with the housing 602 and attach the columns to

the chassis and manifold. Ex. 1004 at ¶ [0067]. Therefore, these screws would need to be removed. Only then could the manifold 512 be removed from the housing 602 or the adsorbent columns 508a, 508b.



128. There is at least one more main complication with removing the manifold 512.

129. The springs in the columns 508a, 508b are normally under compression to retain the adsorbent particles 612. As the fasteners are removed, these springs will pop-up the manifold 512, gaskets 616a,b and filter 618a,b which may result in adsorbent particles spilling. As the manifold 512 pops up, it may even split into two plates 802, 804. When popped up, the manifold 512 would be separated from the housing 602 and columns 508a, 508b. At a minimum, a technician would

immediately seek to remove the popped-up manifold 512 from the housing 602 and columns 508a, 508b. Therefore, after removing the fasteners holding the manifold 512 to the housing 602, the housing 602 and columns 508a, 508b are still sitting atop the chassis 202, but the alleged “receptacles” have been removed. Therefore, it is not possible to move the alleged separation cartridge relative to the alleged receptacles, as claimed.

130. Finally, one would then access and remove the housing 602 and adsorbent columns 508a, 508b by lifting them. This is tantamount to movement in the second direction—not the first direction. And again, it is not movement “relative to” any receptacle, which has been removed, nor is it movement in the first direction, as required.

131. Further, if one lifted the housing 602 and adsorbent columns 508a, 508b relative to the chassis 202, the adsorbent material may drop out of the bottom of the columns 508a, 508b because there would be no bottom supporting structure.

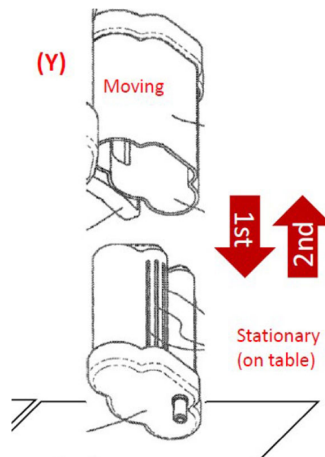
132. In view of all the steps required to remove the housing 602 and adsorbent columns 508a, 508b, I would not consider the housing 602 and columns 508a, 508b to be “removable” at all.

133. *Berntson* does not teach movement of its ORAG unit 32 in a particular direction relative to a receptacle, let alone anything that could be considered the

claimed “first direction.” Therefore, Berntson would not teach one to modify Deane to meet the claims.

134. Even if *Berntson* did have relevant teachings, one would not have found it obvious to incorporate such a teaching into *Deane* for at least two reasons. First, if one were to form an ORAG unit similar to *Berntson*’s with the same internal components of *Deane*, that unit could not be moved downward through *Deane*’s chassis 202, which is designed to rest on a table/floor. *See*, e.g., Ex. 1004 at Fig. 3. Second, *Deane* teaches thermal separation of its motor, blower, etc., and the adsorbent columns 508a, 508b (Ex. 1004 at ¶ [0058]), and therefore one would not be motivated to modify *Deane* in view of the ORAG unit of *Berntson* where heat-generating components are combined into a common unit with heat-sensitive adsorbent components. Ex. 1006 at ¶ [0018].

135. I understand in a related IPR, Petitioner envisioned an unclaimed and undisclosed use of ’614 Patent in which one would hold the separation cartridge inverted, and stationary, during removal. Reply in IPR2023-00527 (Paper 7) at page 2 (Petitioner’s Example Y). Petitioner’s Example Y does not come within the scope of the claims because the separation cartridge is not the moveable component.



136. The above embodiment does not show “a separation cartridge selectively removable from a receptacle by movement relative to the receptacle in a first direction” as claimed. Specifically, in the above embodiment, the separation cartridge is stationary and not removable by movement relative to the receptacle in the first direction, as claimed. Claim 1 and its dependent claims do not read on situations where the receptacle moves and the separation cartridge does not.

137. In the related IPR, Petitioner alleged that the adsorbent columns 508a, 508b (alleged separation cartridge) and manifold 512 (an alleged receptacle) of *Deane* could first be removed together from the chassis 202 prior to disconnecting these components. Reply in IPR2023-00527 (Paper 7) at page 3. This would cause the columns to get disassembled completely since there would be nothing left to support the bottom of columns 508a, 508b with the bottom plate 408 removed. Regardless,

at a minimum, this allegation is not supported by the disclosure of *Deane*. Even if one could remove the manifold 512 and columns 508a, 508b of *Deane* as a unit (which is not taught by *Deane* and is pure conjecture, and I understand it was submitted by Petitioner's attorneys), the manner by which this sub-unit would then be disassembled is also not taught by *Deane*. As noted above, when the screws connecting its manifold 512 to its adsorbent columns 508a, 508b are removed, the manifold 512 separates by the release of compression of the springs 616, and may even separate into two plates 802, 804. Ex. 1004 at ¶ [0071] and Figure 3. So, when detaching *Deane*'s manifold from the columns, there may be two unsecured plates sitting atop the columns with filters popped-up by the springs, and one would desire to immediately remove those popped-up plates from the columns, as opposed to moving the columns relative to those plates. Therefore, there would still be no movement of the alleged separation cartridge relative to the alleged receptacle.

138. Further, *Deane* requires the chassis 202 to enclose the bottom of its adsorbent columns 508a, 508b. If one attempted to move the columns 508a, 508b, together with the manifold 512, upward from the chassis, the adsorbent material (which again are small beds of material) would fall out of the bottom of the columns 508a, 508b, creating an enormous mess. One would simply not do this, nor does *Deane* teach this.

2. Independent claims 1, 12, and 13—Non-Contact Limitations

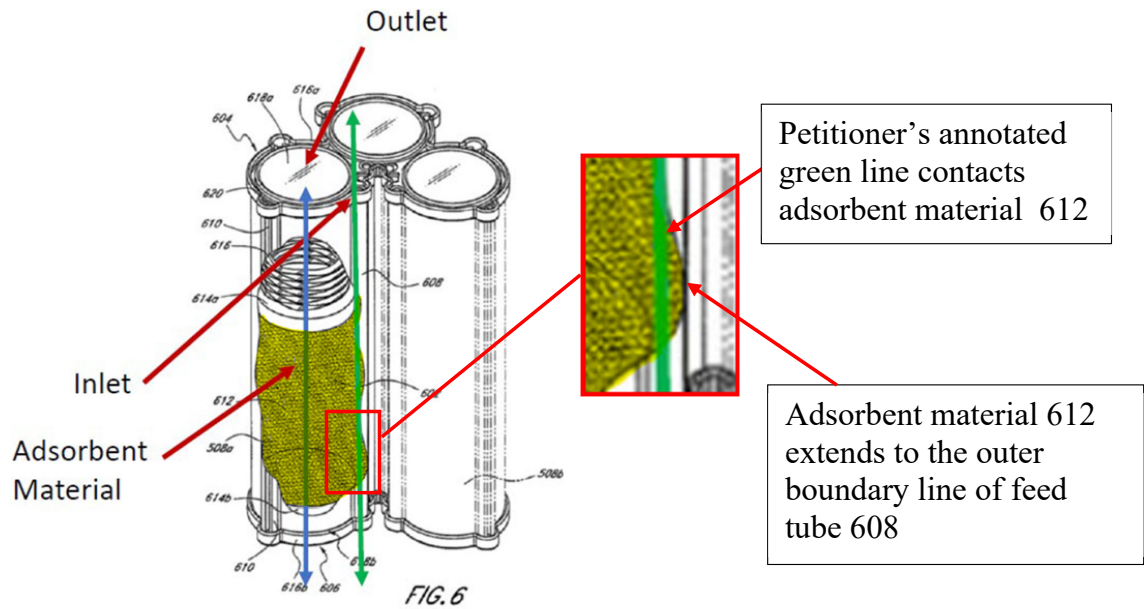
139. Claims 1, 12, and 13 are non-obvious because Petitioner has not properly addressed the non-contact limitations.

140. Independent claim 1 of the '614 Patent recites “a second line spaced-apart from the first line and extending parallel to the first line passes through the inlet” and “wherein the separation cartridge is configured such that, when fluid flows through the separation cartridge, ... fluid flowing along the second line does not contact the adsorbent material of the bed.” *See* Ex. 1001 at claim 1. Independent claim 12 includes identical non-contact limitations. *Id.* at claim 12. Independent claim 13 recites similar non-contact limitations. *Id.* at claim 13 (“fluid flowing along the second line does not contact the adsorbent material of the first bed... fluid flowing along the fourth line does not contact the adsorbent material of the second bed”). This argument applies to each independent claim of the '614 Patent, and each dependent claims because of their dependency from one of the independent claims.

141. The Petition has not established that *Deane* teaches the non-contact limitations because the only evidence that the Petition cites in support runs contrary to the limitations, or, at the absolute best, is unsupported based on the disclosure of *Deane*.

142. The Petition primarily relies on the adsorbent bed columns 508a, 508b of *Deane* as depicted in Figures 6 and 7A as allegedly reading on the claimed separation cartridge. *See* Petition at page 32, *et seq.* Both Figures 6 and 7A have some questionable features, seemingly as artist's renditions, which render them ambiguous. When addressing each of the independent claims, the Petition points to the top of feed tube 608 as the alleged inlet, and annotates a green line extending through the feed tube 608 as allegedly reading on the claimed second line. *Id.* at pages 49, 59, and 62. Without additional discussion, the Petition summarily states "fluid flowing along the green line in the figures below flows through feed tube 608 that does not contain adsorbent material 612." *See Id.* at page 49.

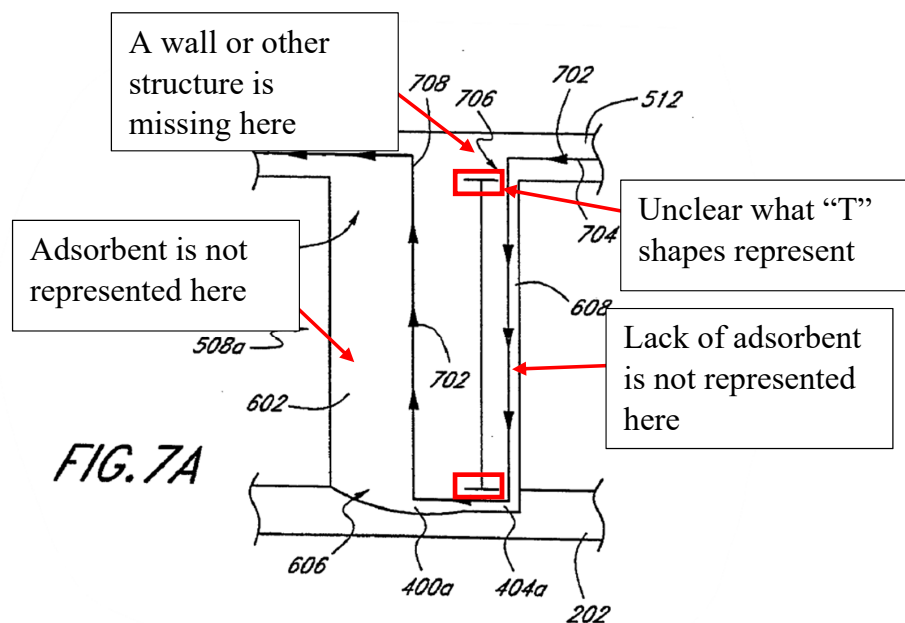
143. The adsorbent material 612 in Figure 6 is illustrated as extending into the feed tube 608, and Petitioner's annotated green line quite clearly does contact the adsorbent material 612 (highlighted in yellow below) of adsorbent column 508a. *See* Petition at page 49 (yellow coloring of adsorbent added by Patent Owner). Petitioner makes no attempt to address this deficiency.



144. Stated plainly, Figure 6 illustrates that fluid flowing along the green line is contacting the adsorbent, which is contrary to the claim language. Indeed, the adsorbent material 612 extends to the outer boundary line of the feed tube 608, which shows the adsorbent is in the feed tube 608. *See* Ex. 1004 at Fig. 6.

145. Further, the highly schematic drawing in *Deane's* Figure 7A does not help Petitioner. Adsorbent is not even shown in Figure 7A, and, as such, it does not establish that feed tube 608 lacks adsorbent. In fact, the only Figure in *Deane* that discloses the location of adsorbent in *Deane* is Figure 6. I have reviewed Dr. Knaebel's deposition transcript, and Dr. Knaebel appears to agree that Figure 6 is the only location in *Deane* that expressly discloses where the adsorbent is located.

146. Figure 7A is a schematic and cannot demonstrate the lack of adsorbent in the feed tube 608 since it does not show any adsorbent at all. Figure 7A does not include an accurate depiction of the structures that guide movement of fluid relative to the feed tube 608. For instance, there is quite clearly a missing wall or other structure that would direct the fluid from the inlet 702 downwards into the feed tube 608. I am also unsure why there are “T” shapes at the ends of the feed tube 608. Regardless, I do not deem Figure 7A to be a credible drawing, at least for what it teaches relative to where adsorbent is located, where guiding structures such as walls are located, or how those guiding structures are configured. Figure 7A certainly does not establish the lack of adsorbent in a certain location, let alone the feed tube.



147. Nothing in *Deane*'s written description proves that the feed tube 608 lacks adsorbent. *See, e.g.*, Ex. 1004.

148. While *Deane*'s feed tube 608 is shown as being narrow, *Deane* states that it could be 0.125 inches in diameter "[i]n one embodiment." *See* Ex. 1004 at ¶ [0067]. So, *Deane*'s feed tube 608 does not limit the feed tube 608 to a specific size of 0.125 inches.

149. I understand Petitioner argues that *Deane* refers to its fluid as "feed gas" after it passes through the feed tube, which, according to Petitioner, means that the gas has yet to pass through any adsorbent. Reply at page 2. This is not correct. Feed gas could have passed through adsorbent. For example, in two bed systems, "feed gas" refers to gas that is fed to both beds. *See* Ex. 1068 at page 127-129 ("feed air" flows relative to pre-bed and main bed in Figures 6.10(b)(1), (5); describing "feed air" as being "[a]ir at near-ambient pressure [that] is passed through the prebed and main bed...").

150. Further, Petitioner argued on Reply that *Deane* lacks retaining disks in its feed tube, which proves that there cannot be adsorbent material in the feed tube. *See* Reply at page 2. However, *Deane* suggests that its feed tube could have a greater diameter than what is shown. And, the absence of a retaining disk does not mean

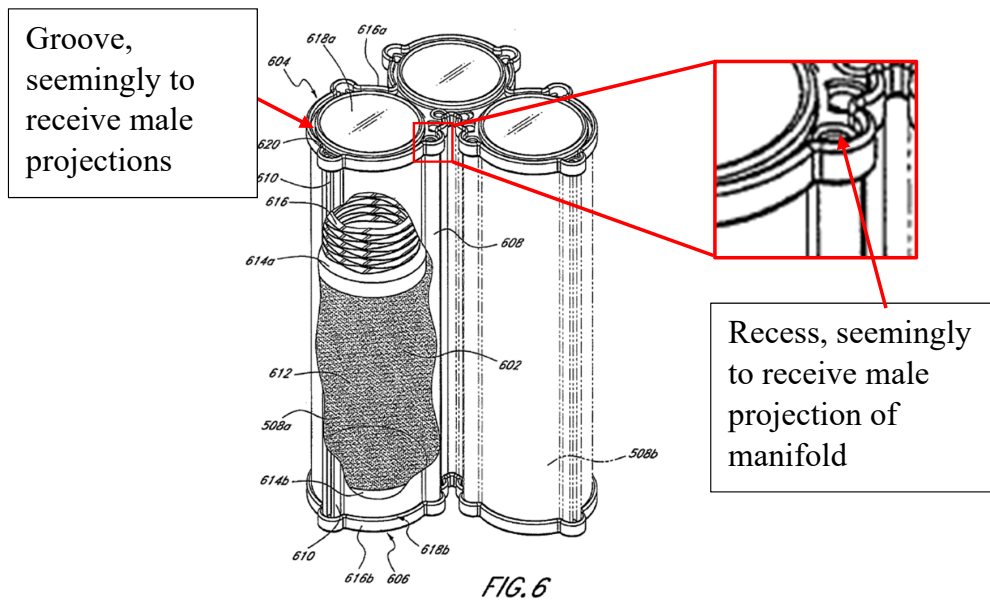
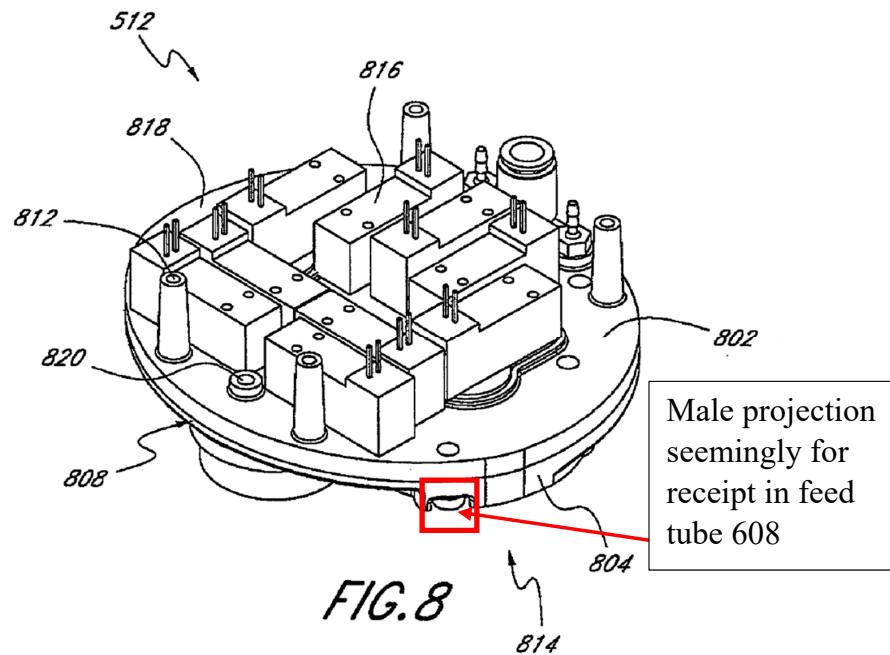
absence of adsorbent material. Adsorbent beds can be made of monolithic adsorbents, which do not need retaining disks to hold them in place.

3. Independent claim 1 - Receptacle

151. Independent claim 1 is non-obvious for the additional reason that Petitioner has not demonstrated that *Deane* discloses a receptacle under either Petitioner's construction or Patent Owner's construction.

152. Again, Petitioner believes the claimed "receptacle" is either *Deane*'s manifold 512 or the combination of the manifold and shell 204. *See* Petition at page 32.

153. First, the manifold 512 alone cannot be considered a receptacle. As noted above, in the context of the '614 Patent, a POSA would understand a "receptacle" as a space configured to receive and contain something. Manifold 512 only engages with the top of the of the adsorbent column 508a/508b component. There is no evidence that manifold 512 receives the top of the adsorbent columns 508a, 508b.



154. In Figure 8 above, it appears that the manifold 512 includes male components, or projections, that project into the feed tube 608. In that case, the feed tube 608 and housing 602 receive the manifold 512, not the other way around.

155. Further, as shown in Figure 6, above, the top of the end 604 of the adsorbent columns 508, 508b, appears to include grooves and recesses configured to receive male components of the manifold. Again, in that case, alleged separation cartridge is receiving the manifold, not the other way around. Therefore, the manifold is not a recess.

156. Even if there is a slight overhang of the manifold 512, it cannot be said to both receive and “contain” the separation cartridge.

157. The shell 204 and the manifold 512 together cannot read on the claimed receptacle because they are distinct structures, serve different purposes, and, when disassembling the concentrator of *Deane*, they are moved relative to the alleged separation cartridge at different times. The shell 204 serves the purpose of enclosing the interior components, including the manifold 512, and protecting them from the outside environment. The manifold does not perform this function. The manifold is configured to direct fluid relative to the adsorbent columns 508a, 508b, whereas the shell 204 does not perform this function. The distinct nature of the two structures is such that a POSA would never consider them to separately provide a receptacle.

Further, during disassembly, first the shell 204 is removed, then the circuit board 1314, then the manifold 512 is removed from the adsorbent columns 508a/508b. Thus, there is never a point where the alleged separation cartridge is moved relative to the combination of both the manifold 512 and shell 204.

158. The Petition states that “[m]aking individual components separate or integral is simply a matter of preference since no functionality is gained or lost via that choice and is therefore obvious.” *See* Petition at page 40. However, this reasoning is incorrect because functionality would be lost, because making the shell 204 and manifold 512 an integral component would make *Deane* impossible to disassemble and make it impossible to remove the adsorbent column component 508a/508b in any direction. As discussed above, to remove the manifold 512 one would first need to first remove the shell 204. If these components were somehow combined into a one-piece construction the shell 204 would be held in place by the connection of the manifold 512 to the adsorbent column 508a/508b component and chassis 202, and it is unclear how one could then access the manifold 512 disengage this connection. At a minimum, it would be impossible to remove the shell 204 because the circuit board would be holding the manifold 512 in place, preventing movement of the combined shell 204/manifold 512. For these and other reasons, I do not find it

reasonable to read the claimed receptacle on the combination of the shell 204 and manifold 512 of Deane.

159. I also understand Petitioner alleges *Deane's* circuit board 1314 could be part of a receptacle. I disagree. The circuit board is a separate, independent structure from the manifold 512. Further, the circuit board does not at least partially contain the alleged separation cartridge. Rather, it merely sits atop the manifold 512.

4. Dependent claims 2 and 15 - Spring

160. Claim 2 recites “the outlet is arranged adjacent a first end of the bed, and adjacent a second end of the bed opposite the first end, the separation cartridge includes a spring configured to hold the bed in place.” Claim 15 recites a similar combination.

161. The Petitioner acknowledges that *Deane* does not teach a spring adjacent the bottom of its bed, which would be required to meet the claims.

162. Petitioner makes two arguments when alleging that it would have been obvious to provide a spring adjacent the bottom of *Deane's* bed. Essentially, Petitioner argues that one would either (1) move *Deane's* top spring to the bottom, or (2) keep *Deane's* top spring in place and add a spring to the bottom. Petition at pages 51-53.

163. Petitioner's first argument does not make sense because *Deane's* housing 602 is loaded with adsorbent material from the top. In *Deane*, when the columns 508a, 508b are nearly full, a retaining disk and a spring are placed atop the adsorbent material. The gasket and manifold are then secured over the top of the spring, compressing the spring down on the bed of adsorbent material. If this top spring were moved to the bottom or a second spring were added to the bottom, it would be difficult, if not impossible to load the columns 508a, 508b with beads of material such that those beads would be held under uniform compression by the spring after packing. One would either have to underfill the column in order to avoid spilling adsorbent beads, in which case the column would not be held under compression, or one would have to overfill the column, and spill beads, and even in that case there is no guarantee that the beads would be held under compression. Specifically, there would be no means to ensure that the bottom spring is compressed so as to keep the particles in place.

164. In practice, one always desires a spring to be present adjacent the same end where the adsorbent material is added or packed into the column. The spring is compressed and held in place by the cap of the adsorbent column. Placing the spring near the same end as the cap ensures that the entire bed of adsorbent material is uniformly packed from the bottom up, and compressed/held in place from the top to

bottom. When enough material has been packed into the column, the filter disk and spring are then added and the cap is closed, thereby compressing the spring. When the spring is located at the bottom, there may be uneven packing or voids in the upper portion of the column. Uniform packing is important for consistent and reproducible separation and adsorption processes. Further, adjusting the compression or packing density of the adsorbent bed is often easier when the compression mechanism is located at the top of the column.

165. In response to Petitioner's second argument, where one would allegedly keep Deane's top spring in place and add another spring near the bottom. In general, using one spring at the top end of the adsorbent column works perfectly fine. There is no reason to add a second spring at the bottom of the bed. Further, using two springs can make setup more complex and may require additional hardware and adjustments. Managing the compression of the adsorbent bed at both ends may require more careful calibration and control. Further, achieving uniform compression throughout the entire column can be challenging when using springs at both ends. There is a risk of uneven compression and the creation of localized areas with different packing densities, which can severely impact the separation or adsorption process. Further, using two springs adds to the cost of equipment and may require more maintenance and calibration compared to a simpler compression setup.

B. Grounds 2-6 Generally

166. Ground 2 relates to dependent claims 2, 3, and 15. Petitioner applies *Deane*, *Dubois*, *Berntson*, and *Hill* (Ex. 1008) to the claims in Ground 2.

167. Ground 3 relates to dependent claims 6. Petitioner applies *Deane*, *Dubois*, *Berntson*, and *Basset* (Ex. 1007) in Ground 3. Petitioner does not rely on *Hill* or *Basset* in an attempt to cure any of the above-noted deficiencies relating to the removal direction limitations, the non-contact limitations, or the receptacle limitation in the proposed grounds of rejection of the independent claims. Therefore, the Petition fails on Grounds 2 and 3 for the same reasons as Ground 1, above. Grounds 4-6 repeat the allegations of Grounds 1-3, but eliminate the teachings of *Dubois* and *Berntson*. Grounds 4-6 fail for the same reasons as Grounds 1-3.

168. While Petitioners attempt to rely on *Hill* to teach the claimed spring, I disagree that one would have modified *Deane* in view of *Hill* (or otherwise) to include the claimed spring for the reasons I set forth below.

C. Grounds 2 and 5 – Deane (with or without Dubois and Berntson) and Hill do not support obviousness of dependent claims 2, 3, and 15

169. In Grounds 2 and 5, Petitioner argues as an alternative that it would have been obvious to modify *Deane* in view of *Hill* to provide *Deane* with the spring of claims 2, 3, and 15. However, *Hill* teaches an adsorbent bed 24 with a single spring 36. The spring 36 is adjacent a cap 35. The spring 36, therefore, is located adjacent the end

of the bed 24 and is configured to hold the bed 24 in place. For the same reasons articulated above, the bed 24 of *Hill* is in all likelihood packed from the bottom, essentially from the location of header 34, and closed with cap 35. One would not pack *Deane's* columns 508a, 508b from the bottom, because the bottom is blocked by the chassis 202. Rather, *Hill* is consistent with my opinion that one would apply a spring at the same end that the adsorbent material is loaded or packed into the column. Again, doing so helps uniformly pack the column. *Hill* would teach one to use a single spring at the end where adsorbent is packed, which happens to be the bottom in *Hill* and the top in *Deane*. So, when applied to *Deane*, one would keep *Deane's* spring in the same location that *Deane*—adjacent the top of the column. Thus, *Hill* would not lead one to modify *Deane* at all, let alone in the manner Petitioner suggests, to either use a spring (only) at the bottom of *Deane's* column, or to use two springs—one on top, and one on the bottom—of *Deane's* columns. Grounds 2 and 5 do not render the claims obvious for at least these reasons.

XIII. SECONDARY CONSIDERATIONS

170. I understand that so-called “secondary considerations” are relevant to an obviousness inquiry. I understand that secondary considerations are also referred to as objective evidence of non-obviousness. Such secondary considerations include copying, licensing, commercial success, and praise in the industry, among others. I

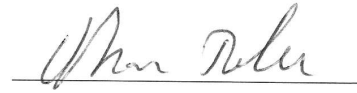
also understand that secondary considerations must be tied to the novel aspects of the claimed invention. In other words, there must be a nexus between the secondary consideration and the claims.

171. Inogen has taken a license from 3B (exclusive licensee of Patent Owner) for Inogen's POC products regarding patent families including U.S. Patent Nos. 10,357,628 and 7,604,005 (which includes the '614 Patent). I am aware of Inogen and their good reputation as a leading company in this industry. To me, the fact that Inogen has taken a license to patent families including the '614 Patent speaks to the inventiveness of the '614 Patent.

XIV. CONCLUSION

172. I understand and have been warned that willful false statements and the like are punishable by fine or imprisonment, or both (18 U.S.C. § 1001). I 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 § 1001 of title 18 of the United States Code.

173. I declare under penalty of perjury that the foregoing is true and correct.

A handwritten signature in cursive script, appearing to read "Orhan Talu", is written over a horizontal line.

By: Orhan Talu, Ph.D.

Dated: 9/19/2023