

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

DYSON TECHNOLOGY LIMITED AND DYSON, INC.,
Petitioners,

v.

OMACHRON INTELLECTUAL PROPERTY INC.,
Patent Owner.

Case No. IPR2024-01351
U.S. Patent No. 7,776,120

**DECLARATION OF DR. GLENN VALLEE IN SUPPORT OF
PATENT OWNER'S PRELIMINARY RESPONSE**

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I. INTRODUCTION

1. In connection with the above-captioned Investigation, Omachron Intellectual Property Inc. (“Omachron” or “Patent Owner”) has asked me to respond to the invalidity assertions of U.S. Patent No. 7,776,120 (Ex. 1001) made by Petitioner Dyson Inc. and Dyson Technology Limited (collectively, “Petitioners” or “Dyson”) in their Petition for *Inter Partes* Review (Ex. 1001) and through their expert Dr. Robert Giachetti in his declaration (Ex. 1002).

II. SUMMARY OF OPINIONS

2. For the reasons discussed in detail in this rebuttal expert report, it is my opinion that the claims of the 120 Patent (“Challenged Claims of the 120 Patent”) are not invalid.

III. QUALIFICATIONS AND MATERIALS RELIED UPON

3. I am an Associate Professor and Chair of Mechanical Engineering at Western New England University in Springfield, Massachusetts. I have been at the University as an Assistant Professor, then Associate Professor since August 2002; I was appointed as the Department Chair in July 2022.

4. My expertise is in the areas of mechanical engineering, design, product development, and quality assurance. I received a Ph.D. (1995) and an M.S. (1990) in Mechanical Engineering and Applied Mechanics from the University of Rhode Island, where I earlier received a B.S. (1995) in Mechanical Engineering. I am a

member of the American Society of Mechanical Engineers (ASME member no. 1259837) and I am a licensed Professional Engineer (RI Lic. No. 6765).

5. At Western New England University, I teach courses in various subjects including Mechanical Design, Kinematics, Vibrations, Mechanics of Materials, and Materials Science. I also teach a Product Development and Innovation (PDI) course, where students design consumer products having commercial potential. Two of these products involved the use of vacuum technology, the first of which involved the development of a vacuum designed for automotive detailers, and the second which involved the development of a vacuum used to dry pets after bathing. Six utility patents have been filed for student inventions developed in the course. I also teach undergraduate engineers how to design products involving air flow. Finally, I teach laboratory courses where students utilize a variety of electrical transducers and data acquisition systems.

6. Prior to my current academic positions, I was an Adjunct Assistant Professor at the University of Rhode Island in Kingston, Rhode Island from September 1990 to January 1998. I have also taught courses at the Community College of Rhode Island and New England Institute of Technology on subjects including machine design.

7. As set forth in more detail in my curriculum vitae (attached hereto as Exhibit A), I have substantial expertise in the areas of mechanical engineering,

consumer product design and development, quality assurance, mechanical testing, and the design of a wide variety of mechanical and electromechanical products involving air flow. Prior to joining Western New England University, I served as the Director of Engineering and Quality Assurance, Worldwide for the Remington Products Company, L.L.C., in Bridgeport, CT, from 1997 to 2002. Remington Products Company is a major manufacturer of consumer products, including electric shavers, beard trimmers, and hair dryers. My responsibilities there included directing the activities of Design and Product Engineering, Quality Assurance, and Manufacturing departments in the U.S., U.K., and Asia. I was responsible for the design and development of international consumer products, and for focusing new product engineering toward continuously improving customer satisfaction through improved product design, performance, and quality.

8. Before Remington Products, I served as the Manager of the Engineering Laboratories at the Stanley Bostitch Company, now a division of Stanley Black & Decker. Stanley Bostitch is a leading manufacturer of pneumatic nailers and staplers, a variety of hand tools such as hammer tackers and staplers, and various other office products. My positions there from 1985 to 1997 included, in order, Technician, Test Engineer, Product Design/Development Engineer, and eventually Manager of the Engineering Laboratories. While at Stanley Bostitch, I acquired extensive experience in the design and testing of a variety of mechanical, pneumatic and

electromechanical products, including pneumatic fastening tools, electric trackers and staplers, and electric pencil sharpeners. As Technician and Test Engineer, I developed extensive insights into conducting and developing test methodologies for all products. On the other hand, as Product Design/Development Engineer I gained experience in designing and developing products from conception through manufacture and quality control. Finally, as Manager of the Engineering Laboratories, I managed the largest of the Engineering Laboratories in Stanley and supervised 18 employees. This position required that I coordinate testing and allocate resources to meet stringent scheduling requirements of the Product Development, Manufacturing, and Marketing departments.

9. I have given deposition testimony as a technical expert in patent-related matters and testified before the International Trade Commission. I have also given deposition testimony in cases involving a Petition for *Inter Partes* Review (“IPR”) for patents related to hole saws, hoverboards, and accessories for mobile phones, and in cases involving the issue of infringement related to patents on gas spring-powered nailers, beveling miter saws, and consumer products including spring-loaded desktop staplers, air mattresses with embedded air pumps, hand held razors, recreational coolers, hoverboards, toy car and track systems, and e-cigarettes. I have also given deposition and courtroom testimony as a technical expert in product liability matters.

10. In addition to the above, I have served as a consultant in the areas of mechanical engineering design, product development, numerical stress analysis, and mechanical testing. For example, in 2016 and 2017, I served as a consultant for Shark Ninja, in the role of a supervisor to Finite Element Analysis (FEA) analysts based in China related to Shark's vacuum cleaners.

11. I am listed as an inventor on nine patents, some of which involve fluid flow, such as pneumatic nailers and a water purification device. Other patented devices are related to hand tools and surgical devices. I have reviewed patents and PTO submissions in the patent application process, in collaboration with patent attorneys.

12. Exhibit A is a copy of my curriculum vitae, which further sets out my qualifications and expertise as well as a list of my publications and prior testimony.

13. In reaching the conclusions and opinions stated in this declaration, I have relied upon my education, experience, and training, as summarized herein and in my *curriculum vitae* (Ex. 2002). I have also considered the Petition and all exhibits cited therein, including the Declaration of Dr. Robert Giachetti (Ex. 1002).

14. I am being compensated for my time at my standard rate of \$400 per hour, plus reimbursement of expenses. I do not have a financial interest in this action or its outcome, and my compensation in this matter is not based in any way on the substance of the opinions rendered here or the outcome of this case.

IV. LEGAL PRINCIPLES AND POSA

A. Presumption of Validity

15. I am a technical expert and do not offer any legal opinions. However, counsel for Patent Owner has informed me as to certain legal principles that I have applied in performing my analysis and arriving at my technical opinions in this matter. I understand that an issued U.S. Patent is presumed valid.

16. I further understand that Petitioners have the burden of showing invalidity through facts supported by clear and convincing evidence. I am informed that the “clear and convincing evidence” standard means evidence that produces an abiding conviction that a factual contention is highly probable.

B. Person of Ordinary Skill in the Art

17. I understand that the validity of an issued patent is assessed from the perspective of a POSA. I am informed that a POSA is a hypothetical person of ordinary creativity, not an automaton, who is presumed to have knowledge of the priority date of the patents-in-suit.

18. Consistent with my statement in my opening report, it is my opinion that a POSA at the time of the alleged invention would have had at a bachelor’s degree in mechanical engineering or a closely related field and have two years of experience in the design and implementation of vacuum/surface cleaning technology (or similar technology relating to fluid flow). Extensive experience in general mechatronic design and implementation could substitute for specific

vacuum/surface cleaning technology experience. Similarly, significant professional experience could substitute for formal education.

19. As of the priority date of each of the Asserted Patents, I met (and exceeded) the qualifications of a POSA.

C. Claim Construction

20. Petitioners wrote that they “do not believe any claim construction is necessary to resolve the parties’ controversy in this Petition, and the claims should be given their plain and ordinary meaning for purposes of this IPR.” Petition at 21-22. In this declaration, I have used the plain and ordinary meanings of the claim terms.

D. Anticipation

21. I have been informed that determining if a patent claim is valid requires a comparison of the claim language, properly construed, to the prior art on an element-by-element basis. I understand that a prior art reference “anticipates,” and renders a patent claim invalid, only if every element of the claim is expressly or inherently disclosed in a single prior art reference. In other words, it is my understanding that in determining whether a single prior art reference anticipates a patent claim, one should take into consideration not only what is expressly disclosed in that reference, but also what was necessarily and therefore inherently present in the prior art

E. Obviousness

22. I have been informed that in order to show that a patent claim is invalid for obviousness, the Petitioners must show by clear and convincing evidence that the subject matter of the claim, taken as a whole, would have been obvious to a POSA as of the priority date of the patent-in-suit.

23. I further understand that obviousness is determined based on: (1) the scope and content of the prior art; (2) the difference or differences between the subject matter of the claim and the prior art; (3) the level of ordinary skill in the art at the time of the alleged invention of the subject matter of the claim; and (4) any relevant objective evidence indicating non-obviousness.

24. I am informed that an invention can be the recognition of a problem itself, and that even an obvious solution to a problem does not render an invention obvious, if the problem solved was previously unknown. In other words, if a problem was not known or reasonably suggested by the prior art, then an invention that solves that problem is not obvious.

25. I have been informed that a combination of references does not render a claimed invention obvious unless there is clear and convincing evidence that a POSA would have had a reason to select and combine the teaching of the prior art references to achieve the claimed invention, and that the POSA would have had a reasonable expectation of success in doing so. Thus, a claim is not made obvious by

the mere fact that it includes different elements that independently exist in the prior art.

26. I further understand that an invention may be invalid as obvious to try where a POSA would have chosen from a finite number of identified, predictable solutions, with a reasonable expectation of success. However, I am informed that an invention is not obvious to try where the prior art merely discloses a broad selection of choices for further investigation and/or gives only general guidance as to the particular form of the invention or how to achieve it.

27. I understand that, in assessing obviousness, hindsight must be avoided and it is improper to rely upon knowledge of the patent claims to pick and choose elements from the prior art and combine them to yield the claimed invention. I am informed that it is also improper to pick and choose from any prior art reference only so much of it as will support a given position, to the exclusion of other parts of the reference that are necessary to appreciate fully what the reference would have fairly taught or suggested to a POSA. I understand that, accordingly, it is necessary in an obviousness analysis to consider the scope and content of the prior art as a whole.

28. I am informed that the length of time a prior art reference was available to the public may be considered in an obviousness analysis. For example, the fact that a prior art reference may have been available for several years, but no one sought

to combine it with other prior art references, may show that an alleged motivation to combine the references is based on impermissible hindsight.

V. CLAIM LANGUAGE

A. 120 Patent

29. I understand that the Petition is challenging all claims (1-20) of the 120 Patent (“Challenged Claims”). The claims of the 120 Patent are as follows:

1. A surface cleaning apparatus comprising:
 - a. a dirt inlet;
 - b. a handle;
 - c. a cyclone separator having an outer wall, a fluid inlet downstream from the dirt air inlet and a fluid outlet;
 - d. a plate having a cyclone chamber surface and positioned between a cyclone chamber and a dirt collection chamber, the dirt collection chamber having an openable end, the plate being moveable between an in use position and an emptying position when the openable end is opened wherein, in the emptying position, the plate is in a position to permit dirt in the cyclone chamber and the dirt collection chamber to be removed concurrently; and,
 - e. a fluid flow motor.
2. The surface cleaning apparatus of claim 1 wherein a flow director having a flow directing surface that extends inwardly and downwardly into the cyclone chamber from the outer wall of the cyclone chamber to a position above the plate.
3. The surface cleaning apparatus of claim 1 wherein the openable end of the dirt collection chamber is a bottom.

4. The surface cleaning apparatus as claimed in claim 1 wherein the plate is automatically moved to the emptying position when the openable end is opened.
5. The surface cleaning apparatus as claimed in claim 1 wherein the plate is supported by the openable end.
6. The surface cleaning apparatus as claimed in claim 1 wherein the openable end is removable from the cyclone separator.
7. The surface cleaning apparatus as claimed in claim 1 wherein the openable end is pivotally mounted to the cyclone separator.
8. The surface cleaning apparatus as claimed in claim 1 further comprising a cyclonic stage downstream from the cyclone separator and comprising a plurality of cyclones in parallel wherein at least some of the plurality of cyclones is each provided with a divider plate.
9. A surface cleaning apparatus comprising:
 - (a) a dirt inlet;
 - (b) a handle;
 - (c) a cyclone separator comprising a cyclone chamber and a dirt collection chamber, the cyclone separator having a fluid inlet downstream from the dirt air inlet, an openable end and a fluid outlet;
 - (d) a plate positioned between the cyclone chamber and the dirt collection chamber at an openable end, the plate is moveably mounted between an in use position and an emptying position wherein the plate is in a position to permit dirt in the cyclone chamber and the dirt collection chamber to be removed concurrently; and
 - (e) a fluid flow motor.

10. The surface cleaning apparatus of claim 9 wherein the plate has a hand grip portion.

11. The surface cleaning apparatus of claim 10 wherein the hand grip portion comprises a shaft extending away from the plate.

12. The surface cleaning apparatus of claim 9 wherein the dirt collection chamber extends under the plate.

13. The surface cleaning apparatus of claim 9 wherein a flow director having a flow directing surface that extends inwardly and downwardly into the cyclone chamber from the outer wall of the cyclone chamber to a position above the plate.

14. The surface cleaning apparatus as claimed in claim 9 wherein the surface cleaning apparatus is selected from the group consisting of a vacuum cleaner, a sweeper and a carpet extractor.

15. The surface cleaning apparatus of claim 9 wherein the plate is moveable subsequent to the openable end being opened.

16. A surface cleaning apparatus comprising:

(a) a dirt inlet;

(b) a handle;

(c) a cyclone separator comprising a cyclone chamber and a dirt collection chamber, the cyclone separator having a fluid inlet downstream from the dirt air inlet, an openable end and a fluid outlet;

(d) a plate positioned between the cyclone chamber and the dirt collection chamber, wherein the plate is pivotally mounted to the outer wall of the cyclone separator; and,

(e) a fluid flow motor.

17. The surface cleaning apparatus as claimed in claim 16 wherein the plate is pivotally mounted to the cyclone chamber.

18. A surface cleaning apparatus comprising:

- (a) a dirt inlet;
- (b) a handle;
- (c) a cyclonic unit comprising a cyclone chamber and a dirt collection chamber and having an openable end;
- (d) the cyclone chamber having an outer wall, a fluid inlet downstream from the dirt air inlet and a fluid outlet;
- (e) a plate positioned at the openable end and having a cyclone chamber surface and positioned between the cyclone chamber and the dirt collection chamber, the plate being supported by the openable end; the plate is moveably mounted between an in use position and an emptying position wherein, in the emptying position, the plate is in a position to permit dirt in the cyclone chamber and the dirt collection chamber to be removed concurrently and,
- (f) a fluid flow motor.

19. The surface cleaning apparatus as claimed in claim 18 wherein the plate is moveable to a emptying position when the openable end is opened.

20. The surface cleaning apparatus as claimed in claim 18 further comprising a cyclonic unit comprising a plurality of cyclones in parallel and a plurality of divider plates.

VI. 120 PATENT VALIDITY ANALYSIS

30. With respect to the 120 Patent, I understand that the Dr. Giachetti applies a priority date of March 10, 2006. Ex. 2002 at para 61. For the purposes of this declaration only, I will apply Dr. Giachetti's date of March 10, 2006 when considering the validity of the challenged claims.

A. The 120 Patent Is Not Invalid Over the Prior Art

31. The Petition sets forth the following grounds in challenging the Challenged Claims:

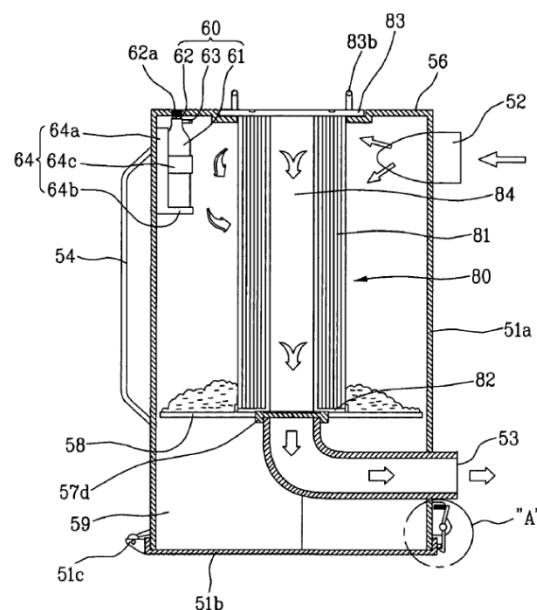
Ground	Challenge	Reference(s)	Claims
1	Anticipation	Jung	[1]/[3]-[5]/[7]/[9]-[12]/[14]- [19]
2	Anticipation	Min	[1]/[3]-[5]/[7]/[9]-[12]/[14]- [19]
3	Obviousness	Jung	[1]/[3]-[7]/[9]-[12]/[14]- [19]
4	Obviousness	Min	[1]/[3]-[7]/[9]-[12]/[14]- [19]
5	Obviousness	Jung with Jeong	[8]/[20]
6	Obviousness	Min with Jeong	[8]/[20]
7	Obviousness	Jung with Davis	[2]/[13]

8	Obviousness	Min with Davis	[2]/[13]
9	Anticipation	Soler	[1]/[3]-[5]/[9]/[12]/[14]- [15]/[18]-[19]

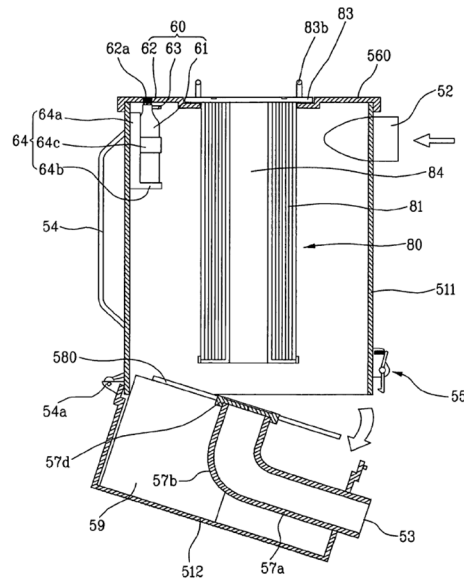
1. Ground 1: Jung Does Not Anticipate Any Claims 120 Patent

a. Jung Overview

32. Jung is a US Patent that issued as number 7,669,282. It was filed on Dec. 8, 2004, and assigned to LG Electronics Inc. Jung discloses dust collecting assemblies that are removably present in upright or canister vacuum cleaners. Jung describes a dust collecting assembly that is divided into an upper inner space and a lower inner space by a fixed separation plate (element 58 in the below), and describes dust collecting in both the upper and lower inner space:



Jung at Fig 6. Jung shows multiple ways of opening the dust collecting assembly – through a detachable top plate on the assembly, a detachable or openable bottom plate on the assembly (i.e. element 51b above), or by separating the assembly at the interface of the upper and lower inner space (shown below):



Jung at Fig. 11.

b. Jung does not have an openable end.

33. Jung does not anticipate the Challenged Claims of the 120 Patent, for at least the reason that it does not have an openable end as required by each Challenged Claim.

34. Claim 1 of the 120 Patent requires, among other things, “a plate having a cyclone chamber surface and positioned between a cyclone chamber and a dirt collection chamber, the dirt collection chamber having an openable end.” Each claim that depends from claim 1 thus require this same element.

35. Claim 9 of the 120 Patent requires, among other things, “a cyclone separator comprising a cyclone chamber and a dirt collection chamber, the cyclone separator having a fluid inlet downstream from the dirt air inlet, an openable end and a fluid outlet.” Each claim that depends from claim 9 thus require this same element.

36. Claim 16 of the 120 Patent requires, among other things, “the cyclone separator having a fluid inlet downstream from the dirt air inlet, an openable end and a fluid outlet.” Each claim that depends from claim 16 thus require this same element.

37. Claim 18 of the 120 Patent requires, among other things, “a cyclonic unit comprising a cyclone chamber and a dirt collection chamber and having an openable end.” Each claim that depends from claim 18 thus require this same element.

38. The Petition asserts that the embodiment of Jung that is shown in Figures 10 and 11 of that patent anticipates the Challenged Claims. Dr. Giachetti asserts that the upper part of dust collection assembly is the claimed cyclone chamber, the lower part of the dust collection assembly is the claimed dirt collection chamber, and that element 58 is the plate positioned between them:

lid” to be the openable end of the dirt collection chamber. Ex. 1002 ¶ 105. This interpretation makes no sense – the dirt collection chamber cannot be the openable end of itself. Moreover, the interpretation is at odds with the figures. The Jung embodiment shows the whole “lower part/bottom lid” moving. There is no end of the alleged dirt collection chamber (no top, bottom or side) that is openable.

41. Dr. Giachetti appears to be asserting that the bottom lid is the same element as the lower part, which he claims is a dirt collection chamber. Ex. 1002 ¶ 96. To the extent that he is distinguishing the bottom lid as the wall at element 512 from the lower part as a whole, that interpretation does not meet the claims either. The wall at element 512 is not openable, and so is not an openable end of the dirt collection chamber or cyclone separator.

42. With regard to the requirement of claims 9, 16, and 18 that the cyclone separator or cyclonic unit has an openable end, Dr. Giachetti likewise points to the lower part as an openable end. Ex. 1002 ¶ 102 (“Jung discloses that its dust collecting assembly has a “bottom lid 512 for opening and closing the bottom of the top container 511.”). Here Dr. Giachetti has misinterpreted the claim language. Claims 9 and 16 requires that the *cyclone separator* has an openable end, not that the *cyclone chamber* has an openable end. Likewise, claim 18 requires that the *cyclonic unit* has an openable end. As stated in the Jung quote that Dr. Giachetti includes, the bottom lid (even if it could be consider an “end”) is “for opening and

closing the bottom of *the top container*.” *Id.* And Dr. Giachetti clearly indicates that the “top container corresponds to the upper part”, which he has identified as the cyclone chamber. Ex. 1002 ¶ 103. Thus, Jung states that it is the cyclone chamber, not the entire cyclone separator, that has an openable “end.”

43. The images in Jung are consistent with that description in the Jung specification, and are not consistent with Dr. Giachetti’s assertion. The pivot point shown in Figure 11 allows the lower part to pivot away from the upper part. This is an alternate approach to having an end (a top, bottom or even side surface or wall) that opens. The interior of alleged cyclone separator in Jung is accessed by separating the two components (the upper and lower parts), not by opening an end. Later in his report, Dr. Giachetti admits that “Jung teaches opening at and below the interface between the dirt collection chamber and cyclone chamber.” Ex. 1002 ¶ 113.

c. **Jung’s separation plate does not move to a to permit dirt in the cyclone chamber and the dirt collection chamber to be removed concurrently**

44. Independent claims 1, 9 and 18 each require that the plate is moveable to a position to permit dirt in the cyclone chamber and the dirt collection chamber to be removed concurrently:

- a. Claim 1: the plate being moveable between an in use position and an emptying position when the openable end is opened wherein, in the emptying

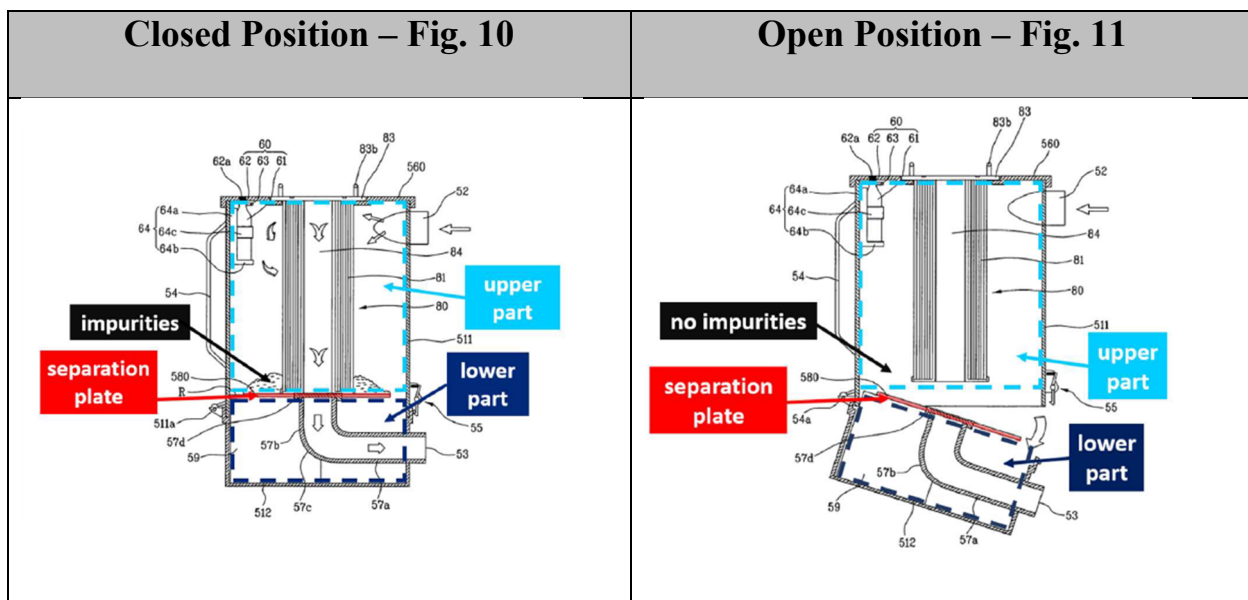
position, the plate is in a position to permit dirt in the cyclone chamber and the dirt collection chamber to be removed concurrently;

b. Claim 9: the plate is moveably mounted between an in use position and an emptying position wherein the plate is in a position to permit dirt in the cyclone chamber and the dirt collection chamber to be removed concurrently;

c. Claim 18: the plate is moveably mounted between an in use position and an emptying position wherein, in the emptying position, the plate is in a position to permit dirt in the cyclone chamber and the dirt collection chamber to be removed concurrently.

This element is not present in Jung's embodiments.

45. According to the Dr. Giachetti, Jung's embodiment includes the claim element that the plate is moveable because the "lower part" can be pivoted away from the "upper part" as shown in Figures 10 and 11:



Ex. 1002 ¶117 (Fig. 10 and 11 from Jung with Dr. Giachetti annotations). According to Dr. Giachetti, the images above show that, in the open position, “when the separation plate rotates into the open (i.e., ‘emptying’) position, the impurities collected in the upper part are discharged.” Ex. 1002 ¶ 117. While that may be true for the *upper part*, which Dr. Giachetti correlates to the cyclone chamber, the plate has not moved into an emptying position relative to the *lower part*, which Dr. Giachetti correlates to the dirt collection chamber. The plate does not move relative to the lower part at all – it is covering the same portion of the “lower part” in both images above. Thus, as understood by a POSA, in the Jung embodiment the plate has not moved to a position to permit dirt to be removed from the dirt collection chamber concurrently with the cyclone chamber, as required by Claims 1, 9 and 18. As the plate has not moved relative to the lower part, the only way to empty dirt could be through the dirt inlet. Emptying the lower part would require inverting the lower part and shaking it to try to get dirt to exit through the dirt inlet opening.

2. Ground 2: Min Does Not Anticipate Any Claim of the 120 Patent

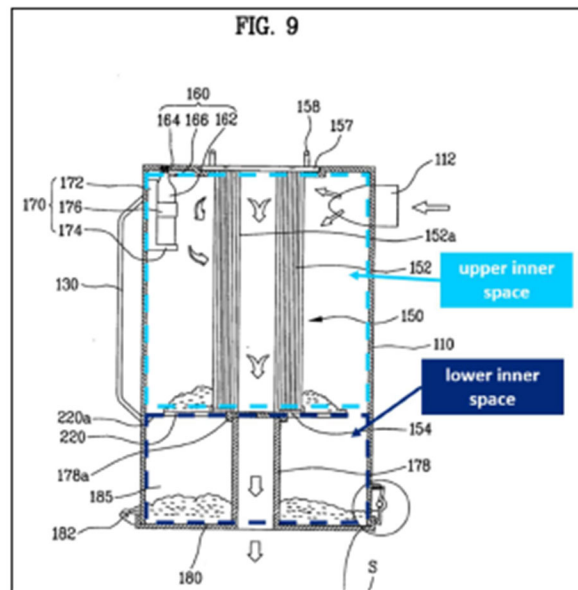
a. Min Overview

46. Min is a US Patent Application that was published at Pub. No. 2005/0198771. As with Jung, it was filed on Dec. 8, 2004, and assigned to LG Electronics Inc. Min never issued as a patent but was abandoned. Like Jung, Min

b. Min does not disclose the claimed cyclone separator and dirt collection chamber

47. Min does not anticipate the Challenged Claims of the 120 Patent, as it does not disclose a cyclone separator with a cyclone chamber and dirt collection chamber.

48. Dr. Giachetti asserts that a POSA would understand Min's dust collector assembly to be a cyclone separator comprising a cyclone chamber and a dirt collection chamber. Ex. 1002 ¶ 181. In particular, Dr. Giachetti asserts that a POSA would understand Min's upper inner space to be "a cyclone chamber" and Min's lower inner space to be "a dirt collection chamber."



Ex. 1002 ¶ 181-182 (annotating Fig. 9 of Min).

49. Dr. Giachetti quotes Min as saying that its dust collector assembly filters impurities "by using a cyclone using centrifugal force." Ex. 1002 ¶ 181, citing Min at ¶ 59. But Dr. Giachetti truncates the quote from Min. The sentence at issue actually states that "[t]he dust collector assembly 100 filters impurities by using a cyclone using centrifugal force, or a separate filter." Min at ¶ 59. While Min discloses that a cyclone may be used, Figure 9, on which Dr. Giachetti relies, does

not show a cyclone. The air entering through inlet 112 is not shown as being directed downward in order to start cyclonic flow, but rather is shown free flowing up and down. The air then flows through the filter 152, into the central channel and out of the dust collector assembly. The curved arrows shown in this figure, to the left of the filter, show the dirt that falls to the bottom of the assembly after the air is filtered, as described by Min in paragraph 79: “In more detail, the impurities with relatively large masses drawn into the dust collector 110 drop down toward the lower inner space of the dust collector 110 by gravity.”

50. Regardless of whether a POSA would choose to use “a cyclone using centrifugal force, or a separate filter” in Min’s upper space, thus making it a “cyclone chamber”, the lower inner space is not a dust collection chamber that is part of a cyclone separator. Nor is the lower inner space a dust collection chamber with a plate positioned between it and a cyclone chamber as required by each independent claim of the 120 Patent. The 120 Patent teaches and claims that both the cyclone chamber and the dust collection chamber are part of the cyclone separator, separated only by a plate that allows the dirt to be conveyed by cyclonic action from the cyclone chamber. *See, e.g.*, 120 Patent at 1:51-55 (“The plate, in conjunction with the structure of the cyclone separator, produces a passage that connects the cyclone chamber and the dirt collection chamber in communication such that dirt that enters the cyclone chamber is conveyed to the dirt collection chamber.”). The upper and

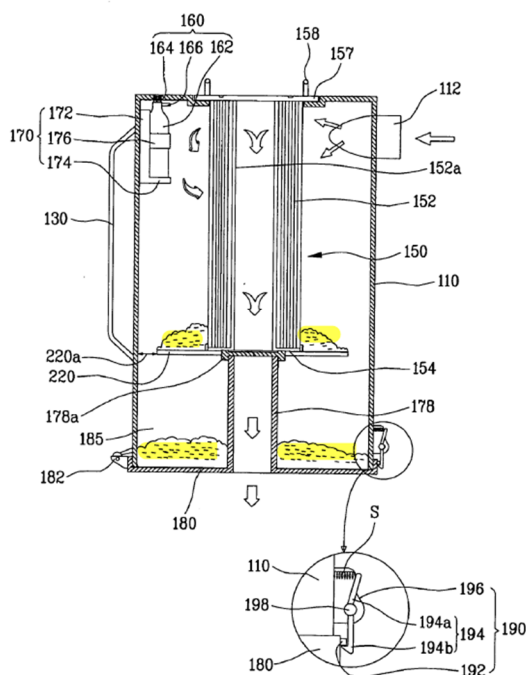
lower space in Min are not in communication in this way, as described by Min. Ex. 1011 ¶ 71.

51. In the Min embodiment, however, the dust that collects in the dust collection chamber is there as a result of gravity, not as a result of cyclonic flow. Min at ¶ 79. There is no evidence in Min, whether in the text of the specification or in Figure 9, that there is any cyclonic flow down into and within the lower inner space. On the contrary, the shape of inlet 112, and the accompanying air flow arrows, indicates to a POSA that the air flow is not directed in a cyclonic manner around and down the upper inner space toward the lower inner space.

52. As such, a POSA would understand Min does not disclose a dust collection chamber with cyclonic flow into it, and would conclude that the lower inner space is not the claimed dirt collection chamber.

53. The locations of the dirt shown in Figure 9 are further evidence of the above. Figure 9 shows substantial dirt collecting on top of the plate 220 as well as bottom wall 180.

FIG. 9



Min, Fig. 9 (highlighted). A POSA would recognize that dust as demonstrating what Min described in paragraph 59, that the dust is falling by gravity toward the bottom of the upper inner space as well as into the lower inner space. By contrast, in the claimed cyclone separator, the vast majority of the dirt would flow into the dirt collection chamber, and only fine particles would remain in the cyclone chamber, trapped in the filter.

54. Because Min does not disclose the claimed cyclone separator or the claimed dirt collection chamber, it does not anticipate any of claims 1, 9, 16 or 18. Because Min does not anticipate any independent claim of the 120 Patent, it does not anticipate any dependent claim.

3. Ground 3: Jung Does Not Render Obvious the Challenged Claims of the 120 Patent

55. For the reasons I discuss for Ground 1 above, Jung does not render obvious the Challenged Claims of the 120 Patent.

56. Neither the Petitioners nor Dr. Giachetti identifies any claim elements relevant to my above discussion of Jung in Ground 1 that they believe need to be supplied by another reference or piece of knowledge in combination with Jung, so I cannot evaluate any supposed combination, or the motivation to attempt any such combination. Ex. 1002 ¶ 238-239.

4. Ground 4: Min Does Not Render Obvious Any Claims of the 120 Patent

57. For the reasons I discuss for Ground 2 above, Min does not render obvious Claims 2, 7, 14, and 15 of the 120 Patent.

58. Neither the Petitioners nor Dr. Giachetti identifies any claim elements relevant to my above discussion of Min in Ground 2 that he believes need to be supplied by another reference or piece of knowledge in combination with Min, so I cannot evaluate any supposed combination, or the motivation to attempt any such combination. Ex. 1002 379, 380.

5. Ground 5: Jung in Combination with Jeong Does Not Render Obvious the Challenged Claims of the 120 Patent

59. The Petitioners and Dr. Giachetti assert that Jung in combination with Jeong render obvious claims 8 and 20. Claims 8 and 20 are dependent claims that add additional elements of a plurality of cyclones in parallel and divider plates.

60. I do not admit that Jeong discloses those additional elements, or that a POSA would be motivated to combine Jung and Jeong. But for the purposes of this declaration for the patent owner's preliminary response, Jung in combination with Jeong do not render obvious claims 8 and 20 because Jung does not disclose the elements of claims 1 and 18, as I explain above for Ground 1. Neither the Petition nor Dr. Giachetti suggest that Jeong teach any element of claim 1 or 18.

6. Ground 6: Min in Combination with Jeong Does Not Render Obvious Any Claims of the 120 Patent

61. The Petitioners and Dr. Giachetti assert that Min in combination with Jeong render obvious claims 8 and 20. Claims 8 and 20 are dependent claims that add additional elements of a plurality of cyclones in parallel and divider plates.

62. I do not admit that Jeong discloses those additional elements, or that a POSA would be motivated to combine Min and Jeong. But for the purposes of this declaration for the patent owner's preliminary response, Min in combination with Jeong do not render obvious claims 8 and 20 because Min does not disclose the

elements of claims 1 and 18, as I explain above for Ground 2. Neither the Petition nor Dr. Giachetti suggest that Jeong teach any element of claim 1 or 18.

7. Ground 7: Jung in Combination with Davis Does Not Render Obvious the Challenged Claims of the 120 Patent

63. The Petitioners and Dr. Giachetti assert that Jung in combination with Davis render obvious claims 2 and 13. Claims 2 and 13 are dependent claims that add additional elements concerning a flow director flow director having a flow directing surface that extends inwardly and downwardly into the cyclone chamber from the outer wall of the cyclone chamber to a position above the plate.

64. I do not admit that Davis discloses those additional elements, or that a POSA would be motivated to combine Jung and Davis. But for the purposes of this declaration for the patent owner's preliminary response, Jung in combination with Davis do not render obvious claims 2 and 13 because Jung does not disclose the elements of claims 1 and 9, as I explain above for Ground 1. Neither the Petition nor Dr. Giachetti suggest that Davis teach any element of claim 1 or 9.

8. Ground 8: Min in Combination with Davis Does Not Render Obvious Any Claims of the 120 Patent

65. The Petitioners and Dr. Giachetti assert that Min in combination with Davis render obvious claims 2 and 13. Claims 2 and 13 are dependent claims that add additional elements concerning a flow director flow director having a flow

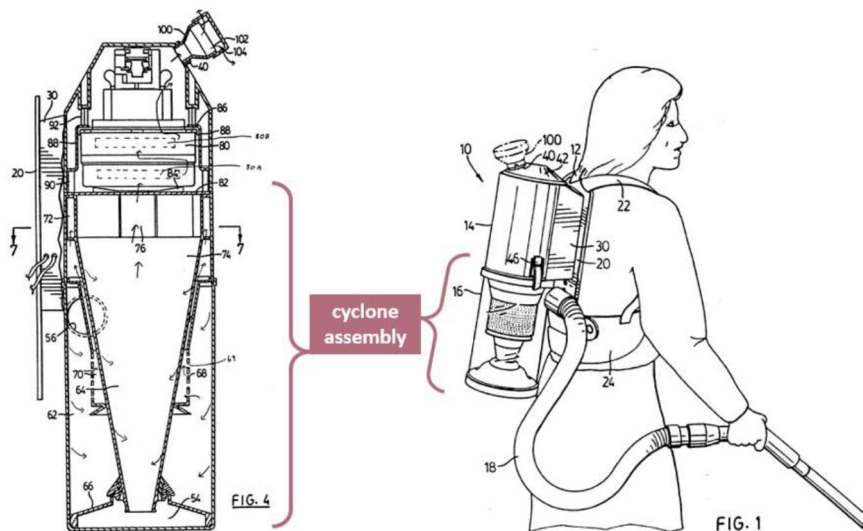
directing surface that extends inwardly and downwardly into the cyclone chamber from the outer wall of the cyclone chamber to a position above the plate.

66. I do not admit that Davis discloses those additional elements, or that a POSA would be motivated to combine Min and Davis. But for the purposes of this declaration for the patent owner's preliminary response, Min in combination with Davis do not render obvious claims 2 and 13 because Min does not disclose the elements of claims 1 and 9, as I explain above for Ground 2. Neither the Petition nor Dr. Giachetti suggest that Davis teach any element of claim 1 or 9.

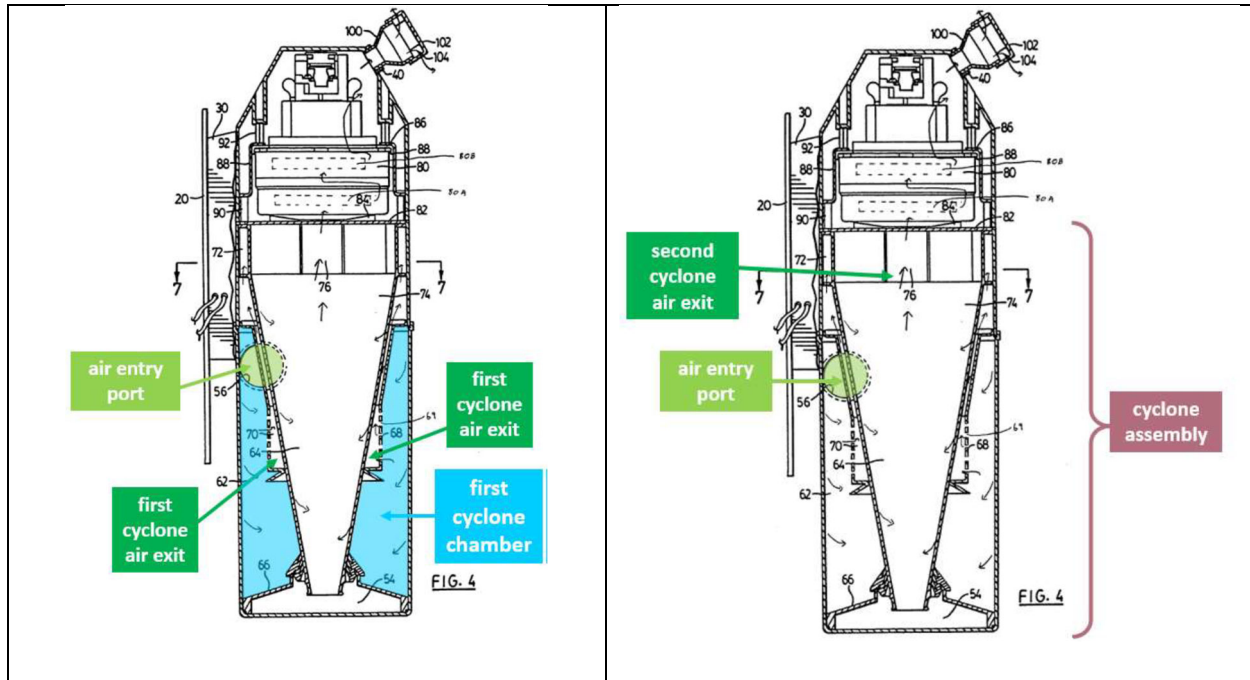
9. Ground 9: Soler Does Not Anticipate Claims Any Claims of the 120 Patent

a. Soler Overview

67. Soler discloses a backpack-style vacuum system that has a dual cyclone system, with two cyclone separators.



Ex. 1002 ¶ 323. Dr. Giachetti has annotated the figures from Soler to show the two cyclone separators:



Ex. 1002 ¶ 326, 328. Soler describes its two cyclones as removing different types of dirt from the intake air:

The first or outer cyclone is designed to remove the larger and heavier dirt particles which are entrained in the intake air and the second or inner cyclone is used to remove the finer and lighter particles which are entrained in the exhaust air from the first cyclone.

Ex. 1009 at 2:30-35.

- b. Soler does not have a plate positioned between a cyclone chamber and a dirt collection chamber as claimed.

68. Soler does not anticipate any of the Challenged Claims of the 120 Patent for at least the reason that it does not have a plate positioned between a cyclone chamber and a dirt collection chamber as is required by each of independent claim: 1, 9, and 18. Because it is missing a claim limitation from each independent claim, it cannot anticipate any claim dependent from claim 1, 9, or 18. I note that the Petition does not assert Soler as part of any ground against claims 16 or 17.

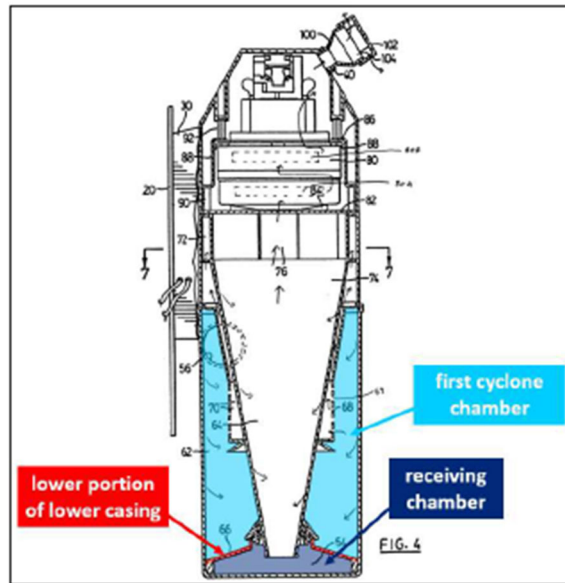
69. The 120 Patent describes its invention in the Summary of the Invention:

In accordance with a first embodiment, a cyclone chamber for a vacuum cleaner may have a plate positioned intermediate the opposed ends (the top end and the bottom end) of the casing of a cyclone separator so as to divide the interior of the cyclone casing into an upper cyclone chamber and a lower dirt collection area or chamber positioned beneath the upper cyclone chamber. The plate, in conjunction with the structure of the cyclone separator, produces a passage that connects the cyclone chamber and the dirt collection chamber in communication such that dirt that enters the cyclone chamber is conveyed to the dirt collection chamber. All, or at least a portion of the passage, extends laterally or outwardly.

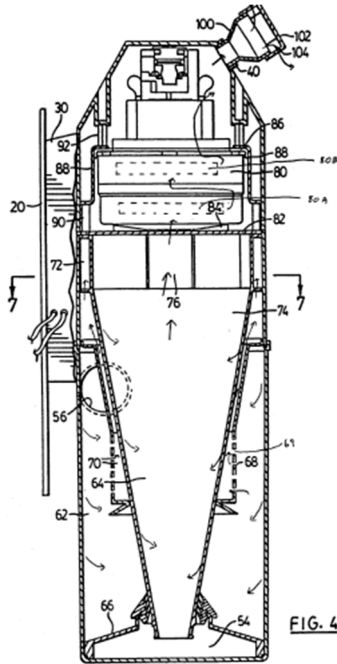
120 Patent at 1:45-56. A POSA reading the 120 Patent would understand the purpose of the plate to divide an interior of a cyclone casing into a cyclone chamber and dirt collection chamber, where the cyclone chamber and dirt collection chamber are in communication such that dirt from the cyclone chamber is communicated to

the dirt collection chamber through a passage. In other words, as described in the abstract, the plate *substantially* divides a volume into a cyclone chamber and dirt collection chamber – where a passage allows dirt particles to pass to the dirt collection chamber but the dirt particles are inhibited from returning to the cyclone chamber by the plate. Although the paragraph quoted above refers to a “first embodiment,” there are no embodiments of the inventive plate that are not positioned in this way. A POSA reading the Challenged Claims of the 120 Patent would understand the claimed plate is positioned to allow dirt to pass from the claimed cyclone chamber to the claimed dirt collection chamber.

70. Dr. Giachetti ignores this plain understanding of the invention in order to fit the claim language onto Soler. As Dr. Giachetti explains, Soler has two cyclone separators. In his analysis, Dr. Giachetti alleges that the cyclone chamber of *the first cyclone separator* is the claimed “cyclone chamber” and that dirt receiving chamber of *the second cyclone separator* is the claimed “dirt collection chamber.” Ex. 1002 ¶ 334-335:



Ex. 1002, ¶ 334. The “dirt collection chamber” to which Dr. Giachetti points receives its dirt from the second cyclone chamber, not from the first cyclone chamber. Soler explains that the air first enters the first cyclone chamber, where larger and heavier dirt is separated and collects on top of the lower casing, which is labeled as 66 in Figure 4:

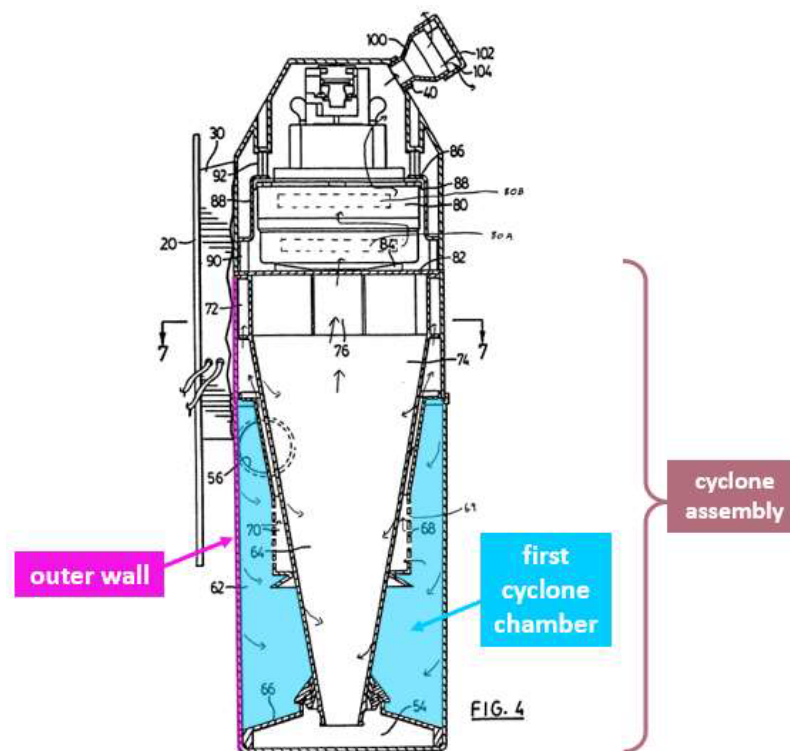


Ex. 1009 at 6:16-25; Fig 4. The air then leaves the first cyclone chamber and travels to the second cyclone chamber. In the second cyclone chamber, finer dirt particles are separated which then are deposited in the receiving chamber, labeled as 54. Id. at 6:25-37. In other words, the first cyclone chamber and the later “dirt collection chamber” are not in communication as described by the patent.

71. Dr. Giachetti does not allege that the second cyclone chamber, which is in communication with the receiving chamber [the alleged “dirt collection chamber”], is the claimed cyclone chamber. He does not allege this because he cannot – there is no plate or other element that divides the second cyclone chamber from its receiving chamber. Therefore, he has to rely on the first cyclone chamber and the later receiving chamber.

72. The receiving chamber is located near the bottom of the backpack unit. But as I state above, the receiving chamber receives dirt from the secondary cyclone chamber, not the first cyclone chamber. There is no passageway for dirt to pass from the first cyclone chamber into the receiving chamber.

73. In order to argue that the first cyclone chamber and the later receiving chamber are the single “cyclone separator” claimed in claims 1, 9 and 16, or the single cyclonic unit in claim 18, Dr. Giachetti just points generally to Soler’s total “cyclone assembly”:



Ex. 1002 ¶ 325-326. But as I explain above, in the context of the 120 Patent, a POSA would understand a cyclone separator unit to be a cyclone chamber and its collection bin. The Soler embodiment multiple cyclone separators, but a POSA would not

consider the first cyclone chamber and the later receiving chamber together as a single cyclone separator. Thus, Dr. Giachetti has not identified, and Soler does not disclose, a cyclone separator or cyclone unit comprising “a cyclone chamber and a dirt collection chamber” with “a plate positioned between the cyclone chamber and the dirt collection chamber.” Ex. 1002 ¶ 324. Although Dr. Giachetti focuses his analysis on claims 9 and 16, he states that claim 1 would be met “for the same reasons.” Ex. 1002 ¶ 324, fn. 12. But claim 1 is not anticipated for the same reasons that I explain above. A POSA would understand claim 1 to require the plate to be positioned in a cyclone separator between the cyclone chamber and dirt collection chamber.

74. I note further that the 120 Patent does describe and claim cleaning apparatuses with multiple cyclones, but describes each individual cyclone as having a divider plate. *See, e.g.*, 120 Patent at claim 8, claim 20. This would further support a POSA’s understanding that the inventive plate is one that divides a single cyclone unit.

75. Even if a POSA were to consider the first cyclone chamber and the unrelated receiving chamber as a cyclone separator, a POSA would not consider there to be a plate between them as that term is used in the claims of the 120 Patent. For example, the lower portion of lower casing has no passage by which dirt can

pass between the first cyclone chamber and the receiving chamber, defeating the purpose of the plate in the 120 Patent. *See, e.g.*, 120 Patent at Abstract, 1:45-56.

76. Finally, the Soler vacuum is emptied by removing the casing from the upper portion of the vacuum. The “lower portion of lower casing” that Dr. Giachetti describes as a plate does not move in any way relative to the first cyclone chamber or the dirt collection chamber, and thus is not moveable as required by claims 1 and 9 of the 120 Patent.

VII. CONCLUSION

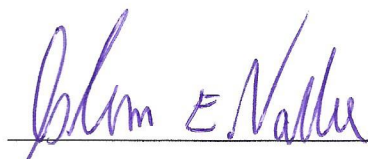
77. For the above reasons, it is my opinion that none of the Challenged Claims of the 120 Patent are invalid as anticipated or obvious.

I declare under penalty of perjury under the laws of the United States of America that the foregoing is true and correct.

I also 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 and that willful false statements and the like so made could jeopardize the validity of the patent at issue in this proceeding.

Executed on December 12, 2024

By:



Glenn Vallee, Ph.D.