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.

DECLARATION OF ROBERT GIACHETTI

REGARDING

U.S. Patent No. 10,080,472

TABLE OF CONTENTS

I. Introduction....1
II. Background and Qualifications....2
III. Documents and Materials Considered....10
IV. Legal Principles....10
V. Person of Ordinary Skill in the Art....14
VI. Technology Background....14
VII. Background of the '472Patent....15
A. Summary of The '472Patent's Specification....15
B. Prosecution History of the '472Patent....16
C. Priority Date of the Challenged Claims....17
VIII. Background of the Prior Art....18
A. Butler....18
B. Oh....21
C. Organ....22
D. Eriksson-Jons....23
E. Martelliere....26
IX. Claim Construction....27
X. Invalidity Opinions: '472Patent....27
A. Ground 1: Butler Render Claims 1-4, 8-17, and 21-25 Obvious....28
1. Butler Teaches A Single Vacuum Cleaner System With Interchangeable Components, But To The Extent PO Argues Otherwise, A POSA Would Have Been Motivated To Combine Them....28
2. Butler Renders Claims [1]/[14] Obvious....30
3. Butler Renders Claims [2]/[15] Obvious....84
4. Butler Renders Claims [3]/[16] Obvious....88
5. Butler Renders Claims [4]/[17] Obvious....90
6. Butler Renders Claims [8]/[21] Obvious....93
7. Butler Renders Claims [9] Obvious....100
8. Butler Renders Claims [10]/[22] Obvious....103
9. Butler Renders Claims [11]/[12]/[23]/[24] Obvious....106
10. Butler Renders Claims [13]/[25] Obvious....109
B. Ground 2: The Butler and Oh Combination Renders Claims 1-2, 5, 7, 9-15, 17-18, 20, and 22-25 Obvious....110
1. A POSA Would Have Been Motivated to Combine Butler and Oh....111
2. The Combined Teachings of Butler and Oh Render Obvious Claims [1]/[14]....119

3. The Combined Teachings of Butler and Oh Render Obvious Claims [2]/[15] 133
4. The Combined Teachings of Butler and Oh Render Obvious Claims [5]/[18] 134
5. The Combined Teachings of Butler and Oh Render Obvious Claims [7]/[20] 136
6. The Combined Teachings of Butler and Oh Render Obvious Claims [9] 139
7. The Combined Teachings of Butler and Oh Render Obvious Claims [10]/[22] 140
8. The Combined Teachings of Butler and Oh Render Obvious Claims [11]/[12]/[23]/[24] 141
9. The Combined Teachings of Butler and Oh Render Obvious Claims [13]/[25] 142
10. The Combined Teachings of Butler and Oh Render Obvious Claims [17] 143

C. Ground 3: The Butler, Oh, and Organ Combination Renders Claims 6 and 19 Obvious 145
1. A POSA Would Have Been Motivated to Combine Butler, Oh, and Organ 145
2. The Combined Teachings of Butler Oh, and Organ Render Obvious Claims [6]/[19] 147

D. Ground 4: The Eriksson-Jons and Martelliere Combination Renders Claims 1-25 Obvious 148
1. A POSA Would Have Been Motivated to Combine Eriksson-Jons and Martelliere 148
2. Eriksson-Jons and Martelliere Render Claims [1]/[14] Obvious 153
3. Eriksson-Jons and Martelliere Render Claims [2]/[15] Obvious 182
4. Eriksson-Jons and Martelliere Render Claims [3]/[16] Obvious 185
5. Eriksson-Jons and Martelliere Render Claims [4]/[17] Obvious 190
6. Eriksson-Jons and Martelliere Render Claims [5]/[18] Obvious 192
7. Eriksson-Jons and Martelliere Render Claims [6]/[19] Obvious 196
8. Eriksson-Jons and Martelliere Render Claims [7]/[20] Obvious 199

9. Eriksson-Jons and Martelliere Render Claims [8]/[21] Obvious 201
10. Eriksson-Jons and Martelliere Render Claim [9] Obvious.....205
11. Eriksson-Jons and Martelliere Render Claims [10]/[22] Obvious 207
12. Eriksson-Jons and Martelliere Render Claims [11]/[12]/[23]/[24] Obvious 208
13. Eriksson-Jons and Martelliere Render Claims [13]/[25] Obvious 210
XI. Secondary Considerations Of Non-Obviousness 211

I. INTRODUCTION

1. My name is Robert Giachetti. I have been retained by Dyson Technology Limited and Dyson, Inc. (collectively, "Dyson" or "Petitioners") as an independent expert in this proceeding.

2. I understand that Dyson is challenging the validity of claims 1-25 of U.S. Patent No. 10,080,472 (the "'472Patent") in this petition for *inter partes* review ("IPR"). I refer to these as the "Challenged Claims."

3. I have been asked to consider whether certain references invalidate the Challenged Claims.

4. Fusion is being compensated for my time in connection with this matter at the consulting rate of $410 per hour. My compensation is not affected by the content of my opinions, testimony, or the outcome of this matter.

5. The prior art references on which my opinions are based are:

    - PCT Publication No. 2007/084543 to Butler et al. ("Butler")
    - U.K. Patent Application No. 24,003,209 to Oh et al. ("Oh")
    - U.K. Patent Application No. 2, 372,431 to Organ ("Organ")
    - U.S. Patent No. 2,149,135 ("Eriksson-Jons")
    - French Patent No. 1,094,603 ("FRMartelliere") and its Certified English Translation ("Martelliere")

6. In my opinion, the Challenged Claims are invalid based on the following:

    - Butler renders claims 1-4, 8-17, and 21-25 obvious.

- The combination of Butler and Oh renders claims 1–2 5, 7, 9–15, 17–18, 20, and 22–25 obvious.
- The combination of Butler, Oh, and Organ renders claims 6 and 19 obvious.
- The combination of Eriksson-Jons and Martelliere renders claims 1-25 obvious.

II. BACKGROUND AND QUALIFICATIONS

7. I am a Licensed Professional Engineer in Illinois and Oklahoma, with over 20 years of experience in mechanical engineering. My experience in machinery and mechanisms spans numerous industries; I have worked directly designing mechanical systems and machinery, and I have consulted on the operation of machinery in various fields, including consumer products, commercial products, and industrial products.

8. I am employed by Fusion Engineering, LLC, where I have worked since November of 2020. Fusion is an engineering firm that provides multidisciplinary engineering consulting services.

9. I am currently the Senior Vice President at Fusion. In this role, I am responsible for providing engineering consulting services in mechanical engineering, coordinating client outreach, coordinating marketing materials, and recruiting.

10. I am currently a Member of ASTM (American Society for Testing and Materials) and ASME (American Society of Mechanical Engineers) where

I sit on several committees, including the Power Transmission Gearing Committee (ASME), which looks at transferring movement with belts and gears. I am also on ASTM's F15 Consumer Product Committee, which handles matters such as consumer product safety guidelines. I am also a member of the ICPHSO (International Consumer Products Health & Safety Organization) group, and attend ICPHSO conferences, which cover health and safety issues relevant to consumer products.

11. I hold a Bachelor's, Master's, and Ph.D. degree in Mechanical Engineering. I have Minors in Physics (as an undergraduate) and Mechanics and Aeronautics (as a graduate student). I have taught courses in Physics, Mechanical Engineering, and Biomechanics across three universities.

12. I have been recognized as an expert in mechanical power transmission equipment, and I serve on the American Society of Mechanical Engineers (ASME) Power Transmission and Gearing Committee. I have also participated, by invitation, in the National Council of Examiners for Engineering and Surveying (NCEES) Mechanical Professional Activities and Knowledge Studies (PAKS) committee. This committee reviews and evaluates the problems and problem types that appear on the Mechanical Engineering Professional Engineering exam for licensure as a Professional

Engineer.

13. For the past 30 years, I have been involved in the area of machine design and applications of machine design. These machines and products have ranged from children's mattresses to garden hoses, pressure cookers, electronic tire/raft inflators, and industrial equipment including conveyors.

14. In approximately 1993-1994, I was a part of a team that developed and built a functioning autonomous, battery-powered vacuum cleaner. This design and development project involved analyzing the layout and inclusion of various vacuum-cleaner components, such as surface agitators, air filtration units, motors, fluid flow paths, batteries, and other electronic and mechanical components.

15. From 2003-2008, I was employed by the University of Wisconsin-Madison's Biomechanics laboratory in the Department of Kinesiology, where I was also a teaching assistant in biomechanics. While there, my research responsibilities included designing equipment with ergonomic handles for efficient use. While teaching biomechanics at the University of Wisconsin-Madison, I regularly instructed on the proper use of canes, crutches, and arm crutches in relationship to biomechanical principles, taking into consideration user ergonomics.

16. From 2008-2020, I was employed by Exponent, Inc., where I worked as a

Senior Managing Engineer. At Exponent, I worked on various mechanical engineering projects that frequently related to consumer product design, machinery design, product and machinery performance, and human interaction with consumer products and industrial equipment.

17. In approximately 2010-2013, I conducted an engineering analysis of vacuum cleaner products. In particular, I single-handedly developed tests to assess the dust-collection efficacy of various physical-media filters used in bagless, cyclonic vacuum cleaners. My work on this project included product tear-downs to analyze the efficacy and safety of these vacuum cleaners and their filters. I also developed a protocol for nationwide in-home testing of vacuum cleaner filtration system efficacy across climates, as well as a protocol for analyzing the materials collected by the vacuum cleaners and their filters. This analysis considered, among other things, the size of particulates that were collected by vacuum cleaner cyclones and filters.

18. In approximately 2010-2014, I conducted an analysis of collets—a pipe and tube connection device—under dynamic fluid pressurization conditions. After initial and traditional methods of testing the collets, which included X-Rays and geometric measurements, failed to identify the source of collet failure, I developed novel tests intended to mimic real-

world conditions. These novel tests involved a hydro-static test and a dynamic test. The hydro-static test involved exposing the collets to extended periods of pressurized conditions. The dynamic test involved development of a computer-controlled manifold system that could selectively pressurize, de-pressurize, and drain collets in various sequences to determine the difference in performance. The novel tests I developed successfully determined the root cause of the collet failures.

19. In approximately 2012-2017, I performed a wholistic safety and efficacy analysis of various consumer vacuum-sealer products. In particular, I conducted tear-down analyses, reviewed the vacuum-sealers' performance for safety and functionality considerations, analyzed the function and operation of vacuum pumps, analyzed fluid flow paths, and analyzed the operation of small valves. I further worked with an electrical engineer to review the safety of the products' internal electronics.

20. Since approximately 2013 to the present, I have used principles of biomechanics, as well as principles of physics, to analyze the effect on a user or nearby operator of pressure cookers that failed, ejecting hot liquid. This work involved analyses of, among other things, forces that are applied to pressure cookers, the physics involved in the operation of pressure cookers, and biomechanical principles.

21. In approximately 2013-2016, I used industry testing methods and developed and designed novel experiments and testing related to fluid flow analysis for a consumer garden hose. The analysis involved testing the hose's strength, durability, environmental performance (temperature and UV exposure), and material selection in connection with user operation. I further designed computer-controlled pressurization and de-pressurization systems for these garden hoses. The system was initially powered pneumatically with compressed air driven through a manifold in conjunction with a tank of water. When scaled, the system involved two parallel pumps that pressurized two groups of manifolds using computer-controlled valves in series to pressurize and de-pressurize expandable garden hoses. Developing this system involved, among other things, selecting the appropriate fluid power components and optimizing fluid flow paths.

22. In approximately 2015, I applied my biomechanical background to the use of cane handles, which involved assessing the amount of force to be applied to the handle and developing a handle that could both support that amount of force reliably and house a battery for novel electronics that were embedded in the cane.

23. In approximately 2015-2017, I investigated various properties of a garden

hose ball valve. I worked as a part of a team to investigate valve properties, including materials, geometry, and seal selection. We further investigated fluid flow through the valve to ensure that the flow was optimized by analyzing valve shape with the Bernoulli equation.

24. In approximately 2016, I conducted an analysis of a cordless, handheld consumer leaf blower. In particular, I analyzed the functioning, operation, and failure of blower motors and fans in relation to the direction of fluid flow within a consumer leaf blower. This analysis concerned, among other things, consideration of fluid flow and mechanical design of leaf blowers, specifically regarding fan blade failure and its potential impact on the consumer-operator.

25. In approximately 2017-2018, I conducted an efficacy analysis of hand grips for ergonomic handheld hose nozzles. This analysis included a review of handheld nozzles in the marketplace that were advertised as ergonomic, as well as biomechanically modelling postures expected to be associated with the ergonomic handheld nozzles. To biomechanically model these handheld nozzles, I used a program called 3DSSPP, which models, among other things, human balance and effort levels. This program can be used calculate human joint torque based on operator input, which I used (and continue to use) to analyze the ergonomics of holding

various handles, including handles for household consumer products.

26. I further used 3DSSPP to model biomechanics for use in household consumer products and industrial products. For example, in my paper, *Analytical Model for Estimating Knee Loads During Ladder Climbing*, published in the 2013 edition of the ASME International Mechanical Engineering Congress Exposition, I discussed how force output at the hands based on arm posture influences the forces within the knee joint. At a high level, this involved analyzing the ergonomics of how posture influences likely force output of limbs, particularly in connection with household consumer products, specifically ladders.

27. In approximately 2018-2020, I analyzed the operation of computer-controlled blowers, manifolds, valves, and sensors in consumer air mattresses. In particular, the analysis concerned the ability to control and maintain constant air pressure within air mattresses at particular pressure set points. This analysis concerned, among other things, fluid dynamics, fluid flow, fluid path selection, and changes in pressure.

28. In 2021, I published a paper, *Characterization of the Release of Heated and Pressurized Water from a Pressure Cooker*, in the Journal of Burns. In this paper, I analyzed and described how fluid is ejected from a pressure cooker as a result of a flash boil event. In this analysis, I considered the

operation of an exemplary household pressure cooker, analyzing fluid dynamics resulting from the trade-off between volume of liquid and pressure on fluid dynamics and its effect on consumer-users.

29. I have provided my full background in the curriculum vitae that is attached as Ex1003.

III. DOCUMENTS AND MATERIALS CONSIDERED

30. In forming the opinions expressed in this Declaration, I relied upon my education, training, knowledge, and experience in the relevant field of the art, as well as information pertaining to the documents described below.

31. In preparing this Declaration, I have reviewed the ’472Patent and its file history, as well as the Butler, Oh, Organ, Eriksson-Jons, Martelliere, and Ishii prior art references on which my opinions are based. Other references I have reviewed are mentioned below. These references and documents reflect the state of the relevant art at the time of the alleged invention and the background knowledge of a POSA.

32. I have also reviewed the Patent Owner (“PO”)’s infringement contentions served in the related litigation, *SharkNinja Operating LLC v. Dyson, Inc.*, No. 1:23-cv-12372 (D. Mass.) (the “Litigation”).

IV. LEGAL PRINCIPLES

33. Dyson’s counsel has informed me of certain legal standards. I have applied

these understandings in my analysis as detailed below. I am not an attorney and offer no legal opinions.

34. I have been informed and understand that a patent claim is invalid if it is obvious, and that obviousness requires that the claim be obvious from the perspective of a person of ordinary skill in the relevant art at the time of the alleged invention. I have been informed and understand that a claim may be obvious in view of a single prior art reference, or may be obvious in view of a combination of two or more prior art references.

35. I have been informed and understand that the level of ordinary skill in the art may be determined by considering such factors as the education level of those working in the field, the sophistication of the technology, the types of problems encountered in the art, the prior art solutions to those problems, and the speed at which innovations are made. I have been informed and understand that not all of these factors need be considered and that one or more of these factors may control.

36. I have been informed and understand that an obviousness analysis is based on several factors, including the scope and content of the prior art, what differences, if any, existed between the alleged invention and the prior art, and the level of ordinary skill in the pertinent art at the time of the alleged invention.

37. I have been informed and understand that to determine whether a claim is obvious, it is appropriate to consider, among other factors:

38. (1) whether the teachings of the prior art references disclose known concepts combined in familiar ways, and when combined, would yield predictable results; (2) whether a person of ordinary skill in the art could implement a predictable variation, and would see the benefit of doing so; (3) whether the claimed elements represent one of a limited number of known design choices, and would have a reasonable expectation of success by those skilled in the art; (4) whether a person of ordinary skill would have recognized a reason to combine known elements in the manner described in the claim; (5) whether there is some teaching or suggestion in the prior art to make the modification or combination of elements claimed in the patent; and (6) whether the innovation applies a known technique that had been used to improve a similar device or method in a similar way.

39. I further have been informed and understand that while it may be helpful to identify a reason for this combination, common sense should guide and no rigid requirement of finding a teaching, suggestion, or motivation to combine is required.

40. I further have been informed and understand that certain factors called secondary considerations may be considered in evaluating the obviousness

of a claim. I understand that such secondary considerations include, among other things, commercial success of the alleged invention, skepticism of those having ordinary skill in the art at the time of the alleged invention, unexpected results of the alleged invention, any long-felt but unsolved need in the art that was satisfied by the alleged invention, the failure of others to make the alleged invention, praise of the alleged invention by those having ordinary skill in the art, and copying of the alleged invention by others in the field. I have been informed and understand that there must be a nexus—a connection—between any such secondary considerations and the alleged invention. I also have been informed and understand that contemporaneous and independent invention by others is a secondary consideration tending to show obviousness.

41. I have been informed and understand that a prior art reference may expressly or inherently describe a limitation of a claim. I have been informed and understand that if the prior art necessarily includes or functions in accordance with a claim's limitation, then the prior art inherently discloses that limitation. I have been informed and understand that to establish inherency, the evidence must make clear that the missing descriptive matter is necessarily present in the item of prior art and that it would be so recognized by persons of ordinary skill in the art.

V. PERSON OF ORDINARY SKILL IN THE ART

42. In my opinion, a Person of Ordinary Skill in the Art ("POSA") in the subject matter of the '472Patent would have had a bachelor's degree in mechanical engineering or a similar field and 2-3 years of experience in machine design, including machines that include fluid dynamics or fluid paths, such as vacuum cleaners. Additional education could offset less experience and vice versa, and a POSA could have also obtained similar knowledge and experience through other means.

43. I have been a POSA since at least 2003. The opinions I am offering are from the perspective of a POSA at the time of the alleged invention. For the purposes of my opinions below, I have been asked to assume that the relevant time frame is the relevant priority date for the Challenged Claims.

VI. TECHNOLOGY BACKGROUND

44. The Challenged Claims are directed to vacuum cleaner configurations and features, including, alignment of airflow path segments, a rigid air flow conduit, a handle, and an electrical connector. *See* Ex1001, Claims.

45. I have reviewed the '472Patent's specification and these configurations do not purport to solve a technical problem.

46. I have also reviewed the file history of the '472Patent. While Organ, which I rely on as a secondary reference, was before the United States Patent and

Trademark Office during prosecution, it was not substantively discussed or referenced by the Examiner. None of the other references I rely on were before the United States Patent and Trademark Office during prosecution.

47. In my opinion, as set forth in more detail below, these undisclosed references invalidate every claim of the '472Patent.

VII. BACKGROUND OF THE '472PATENT

48. The '472Patent is titled "Hand Carriable Surface Cleaning Apparatus." Ex1001, Title. The '472Patent issued on September 25, 2018, from U.S. Patent Application No. 15/051,272, which was filed on February 23, 2016. *Id.*, Cover. The '472Patent claims priority, through multiple applications, to U.S. Patent Application No. 12/722,705, which was filed on March 12, 2010. *Id*. at Related U.S. Application Data.

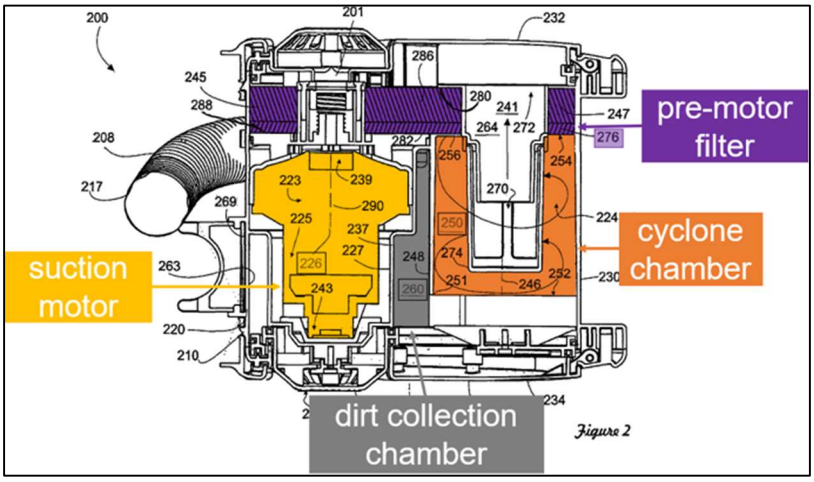
A. Summary of The '472Patent's Specification

49. The '472Patent "relates to surface cleaning apparatuses, such as vacuum cleaners." Ex1001, 1:18-19.

50. The '472Patent's large specification identifies that typical hand vacuum cleaners have "a pre-motor filter." Ex1001, 1:52-53. However, while a "pre-motor filter reduces the level of entrained dirt … the filter will become clogged with use. Increasing the surface area of the upstream side of the pre-motor filter extends the lifetime of the pre-motor filter …."

Ex1001, 1:62-67. The '472Patent purports to solve this by "configuring the pre-motor filter to overlie part of one or more additional components" such that the "surface area of the upstream side is increased." Ex1001, 2:6-9.

51. The '472Patent teaches an air flow path which includes a "suction motor," "[a]t least one cyclone chamber" with "an associated dirt collection chamber, a cyclone air inlet and a cyclone air outlet" and a "pre-motor filter [] positioned downstream of the cyclone chamber and upstream of the suction motor." Ex1001, 1:35-41. The pre-motor filter "overlies at least a portion of the suction motor and the cyclone chamber," *id.*, 2:42-43, and the "air flow passage extend[s] from a dirty air inlet to a clean air outlet." *Id.*, 2:33-35.



Ex1001, Fig. 1.

B. Prosecution History of the '472Patent

52. The prosecution of the ’472Patent included over 350 references. *See generally* Ex1001 at References Cited. The Examiner rejected pending claims four times before issuing an allowance. The Applicant made several amendments to overcome these rejections, including amending then-pending claims 1 and 14 to require that “the hand vacuum cleaner comprises a handle connected to the hand vacuum cleaner at first and second locations, wherein the first location is at a position of the suction motor in the main housing and a first handle portion is connected at the first location, wherein a projection of the first handle portion extends through the suction motor.” *See* Ex1004, 67, 69 The Applicant also amended the specification and the drawings to describe the handle and handle locations. *See* Ex1004, 151-162.

C. Priority Date of the Challenged Claims

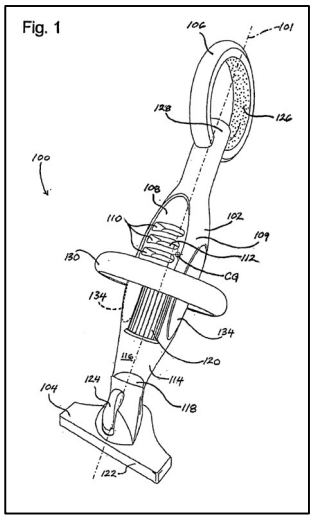
53. I understand that the priority date of a patent is used to judge whether a reference qualifies as prior art for the purposes of anticipation or obviousness. I understand that a patent may rely on the filing date of an earlier application for its priority date only if the earlier application discloses support for the claims of the later application. I also understand that if even a single feature of a claimed invention was not disclosed or was not inherent in the earlier application, then the claim is not entitled to

priority based on that earlier application. For the purposes of my analysis, I have been instructed to apply a priority date of March 12, 2010, for the Challenged Claims.

VIII. BACKGROUND OF THE PRIOR ART

A. Butler

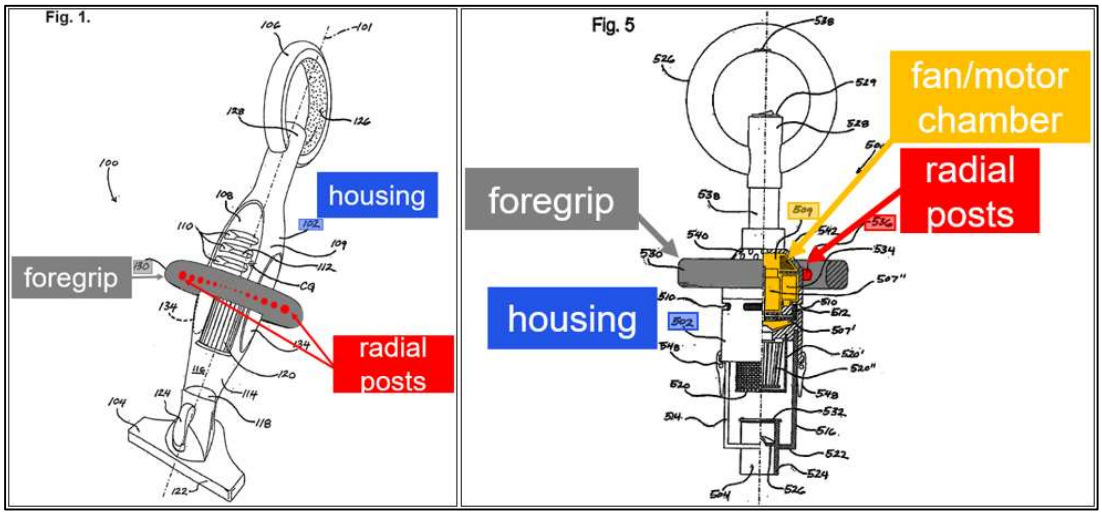
54. Butler is titled "Stair Cleaning Vacuum Cleaner." Ex1005, Title. It generally describes an "improved vacuum cleaner for cleaning raised and vertical surfaces," as shown in Butler Figure 1 below. Ex1005, 3:10-12. Butler is a published PCT application that was filed January 17, 2007, and published July 26, 2007.



Ex1005, Fig. 1.

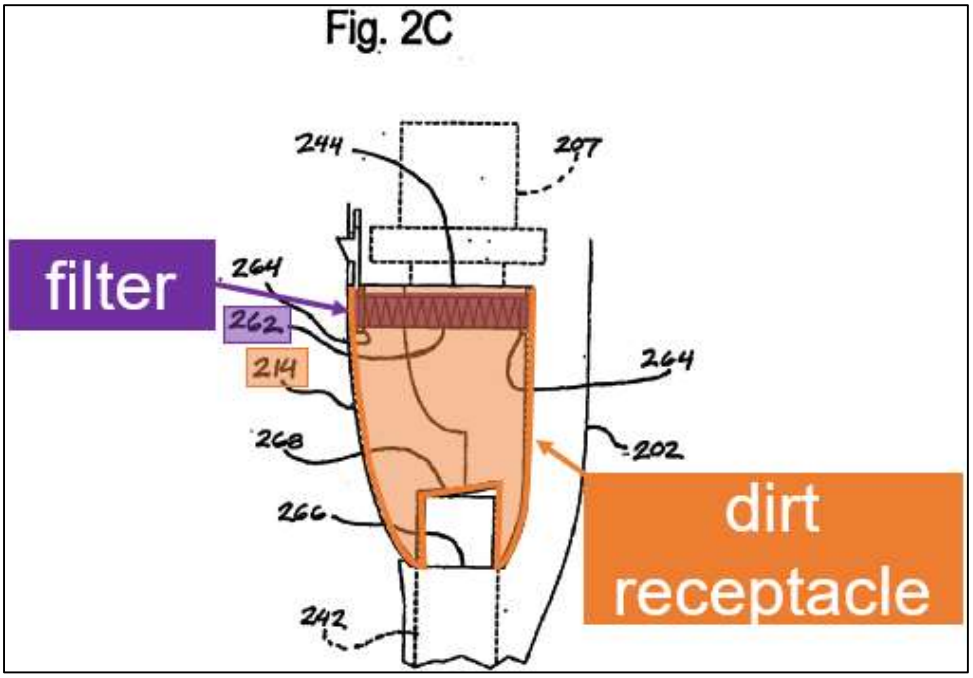
55. Butler's "improved vacuum cleaner" contains a "**foregrip 530** [that] surrounds the **fan/motor chamber 509** in which the **fan/motor 507** is located." Ex1005, 20:12-13. The **foregrip** "is formed into an elliptical,

circular, or otherwise continuous loop-like shape that surrounds the **housing**" and "[o]ne or more **radial posts** … are provided between the **foregrip []** and the **housing**," as shown in the annotated figures below:



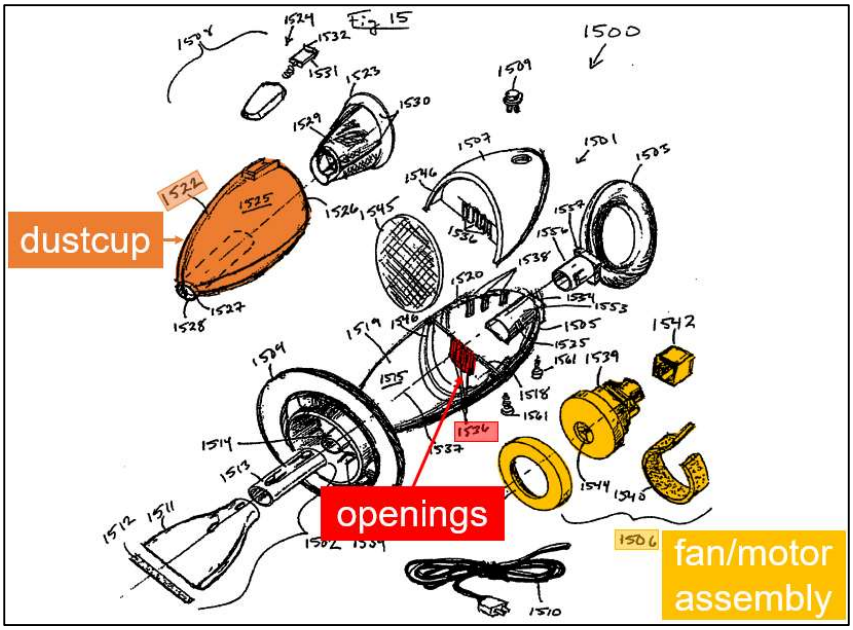
Ex1005, 11:26-12:2, Fig. 5.

56. Butler also teaches "a **filter 262** is positioned in the top of the **dirt receptacle** to filter air passing therethrough" and that the "**dirt receptacle 214** may be covered by an access panel or door," as shown in the annotated figure below:



Ex1005, 17:17-19, 18:26-27, Fig. 2C.

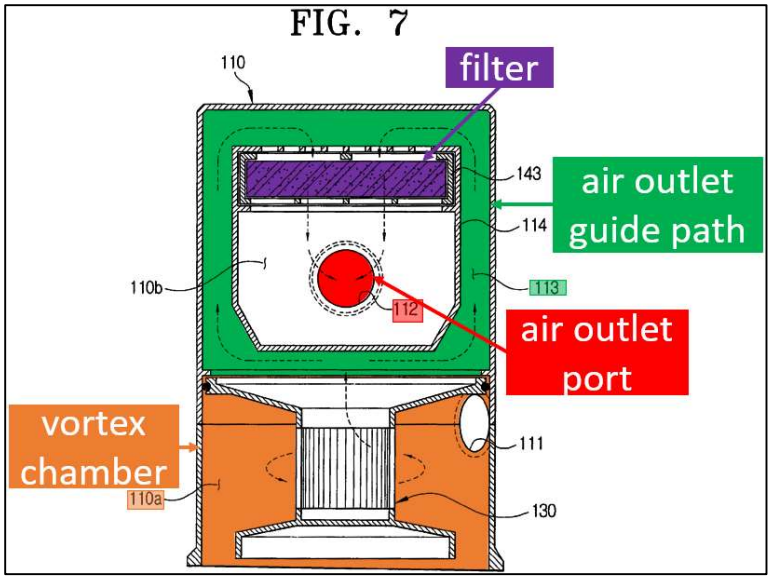
57. Butler's "**dustcup 1522** provides storage of collected refuse and debris, and may comprise a bag chamber, a non-cyclonic cup, or a cyclonic separation chamber." Ex1005, 36:2-4. "**[O]penings 1536** … allow air to pass from the **dustcup 1522** to the **fan/motor assembly 1506**," as shown in the annotated figure below:



Ex1005, 35:16-19, Fig. 15.

B. Oh

58. Oh is titled "[c]yclone-type dust collecting apparatus for a vacuum cleaner." Ex1006, Title. Oh is a British patent that was filed July 30, 2003, and published October 13, 2004. Ex1006, Title. Oh teaches that "dust contained in the air is separated by the centrifugal force of the vortex current in the **vortex chamber 110a**" and that "air flows along the **air outlet guide path 113** … and then flows from the upper portion towards the lower portion of the **filter 140**, and is finally exhausted through the **air outlet port 112** to the outside," as shown in the annotated figure below:



Ex1006, 6:31-7:1, 7:3-7, Fig. 7.

C. Organ

59. Organ is titled "Air bleed valve arrangement in a vacuum cleaner." Ex1007, Title. Organ is a British patent that was filed February 24, 2001, and published August 28, 2002. Ex1007, Cover.

60. Organ teaches "vacuum cleaner, particularly of the cyclone separator type, and having a filter" and a filter which "is characterized in that a **duct** is provided which passes through the **filter** itself, and that the **bleed valve** is provided in this **duct**," as shown in the annotated figure below:

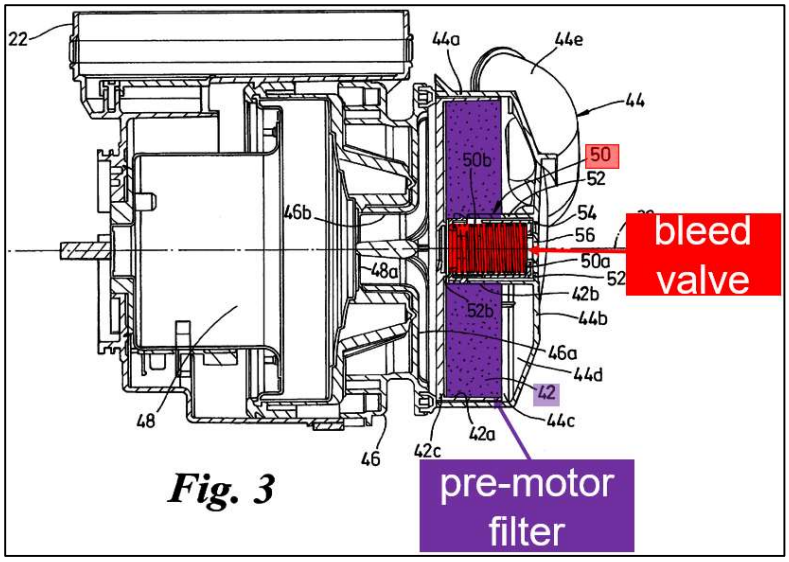


Fig. 3

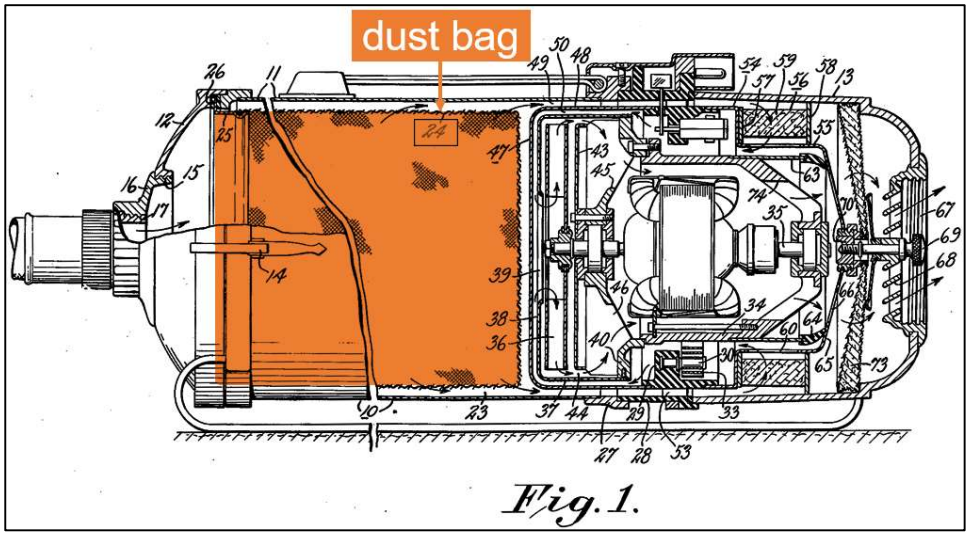
Ex1007, Abstract, Fig. 3.

D. Eriksson-Jons

61. Eriksson-Jons is titled "Vacuum Cleaner." Ex1008, Title. It describes a vacuum cleaner "wherein a dust separating member, such as a dust bag, is located ahead of the fan with respect to the direction of air flow …." Ex1008, 1(left):4-10[1]. Eriksson-Jons is a U.S patent filed December 31, 1936 and issued February, 28, 1939. Ex1008, Cover.

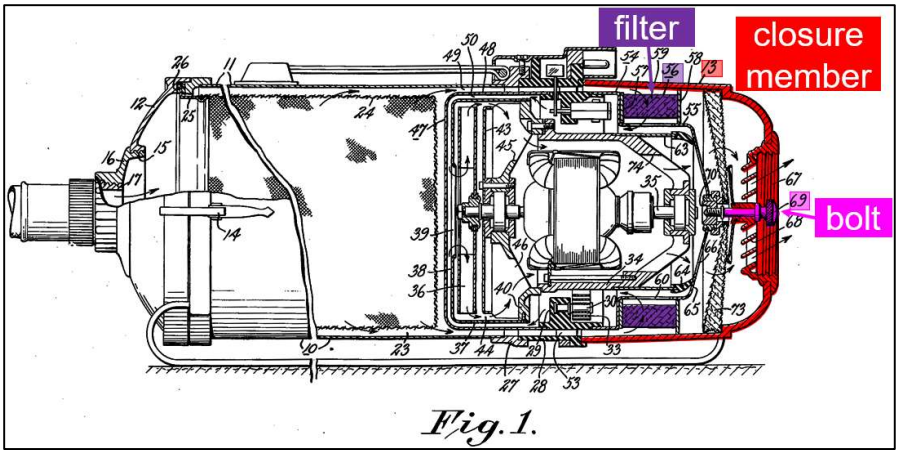
62. Eriksson-Jons teaches a "dust separating chamber 23 within which is removably received a **dust bag 24** or other dust separating member," as shown in the annotated figure below: Ex1008, 1(right): 19-22.

[1] Because Eriksson-Jons does not include column numbers, the citation format: [page][side of page]:[line] for this reference will be used herein.



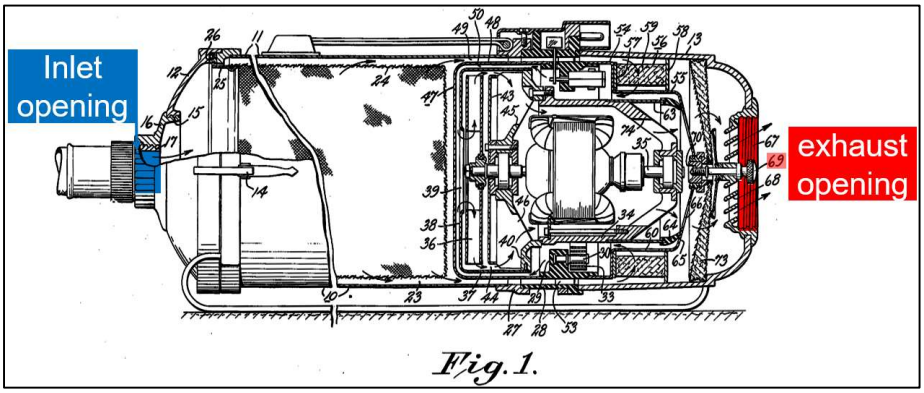
Ex1008, 1(right):19-22, Fig. 1.

63. Eriksson-Jons teaches "an additional **filter** between the dust bag and the fan for the purpose of removing [] fine particles." Ex1008, 1(left):14-17. To "remove **filter 56** … it is merely necessary to unscrew **bolt 69** and remove **closure member 13**. Thereupon, **filter 56** is freely accessible and may be removed by slipping it off the reduced portion 55," as shown in the annotated figure below:



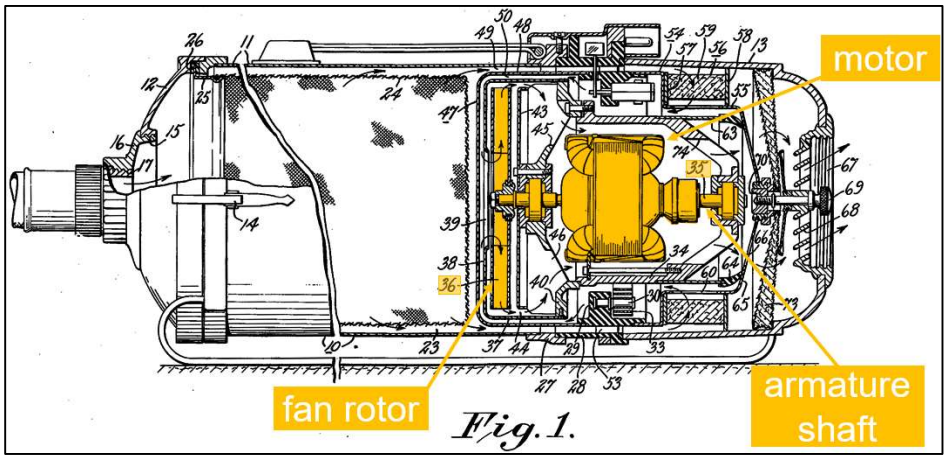
Ex1008, 2(right):16-21, Fig. 1.

64. Eriksson-Jons has "an **inlet opening** at one end and a closure member removably secured to the other end." Ex1008, Claim 10. The "**closure member 13**" has an "**exhaust opening 67**," as shown in the annotated figure below:



Ex1008, 2(left):46-50, Fig. 1.

65. Eriksson-Jons further teaches a motor "with the usual **armature shaft 35** to one end of which is secured a **fan rotor 36**," as shown in the annotated figure below:



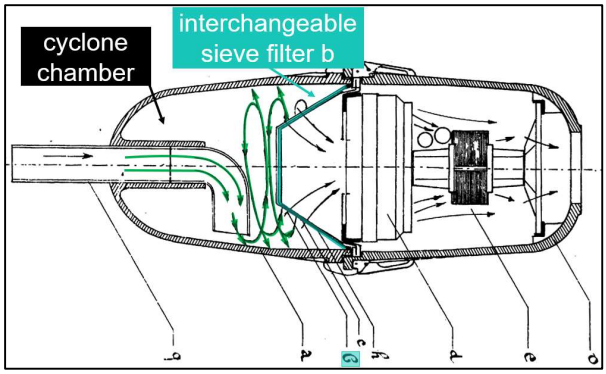
Ex1008, 1(right):43-45, Fig. 1.

E. Martelliere[2]

66. Martelliere is titled "Improved dust vacuums." Ex1010, Cover. It describes a "broom type vacuum cleaner model, where the device is held vertically or slightly inclined" and that "app[lies] the 'Whirlwind' principle" to separate dust from air, which a POSA would have understood is a cyclonic hand vacuum cleaner. Ex1010, 1. Martelliere is a French patent that was filed on December 16, 1953, was issued on December 8, 1954, and published on May 23, 1955. Ex1010, Cover.

67. Martelliere teaches a chamber upstream of the "**interchangeable sieve filter b**" where "the 'Whirlwind' principle" is applied such that a POSA would have understood the chamber to be a **cyclone chamber**, as shown in the annotated figure below:

[2] Ex1010 is a certified English translation of Ex1009, originally published in French. Citations to Ex1010 are to the page, as the English translation does not include column or line numbers.



Ex1010, 1, Fig. 1.

IX. CLAIM CONSTRUCTION

68. I understand that Petitioners and Patent Owner have submitted claim construction briefing for certain terms in the '472Patent. *See* Case No. 1:23-cv-12372, Dkts. 121-122. I am unaware of any claim construction determinations related to the '472Patent.

69. For purposes of this proceeding, I have considered whether the Challenged Claims are invalid as anticipated or obvious under their plain and ordinary meaning. In my opinion, the Challenged Claims are invalid under this construction.

X. INVALIDITY OPINIONS: '472PATENT

70. In my opinion, the Challenged Claims of the '472Patent are invalid based on the following references and combinations: claims 1-4, 8-17, and 21-25 are anticipated and/or rendered obvious by Butler; claims 1-2, 5, 7, 9-15, 17-18, 20, and 22-25 are rendered obvious by the combination of Butler and Oh; claims 6 and 19 are rendered obvious by the combination of

Butler, Oh, and Organ; and claims 1-25 are rendered obvious by the combination of Eriksson-Jons and Martelliere.

71. As part of my obviousness analysis, I have considered the scope and content of the prior art, and whether any differences between the alleged invention and the prior art are such that the subject matter, as a whole, would have been obvious to a person having ordinary skill in the art at the time of the alleged invention. I took the time of the alleged invention to be March 12, 2010 for the Challenged Claims of the '472Patent, as discussed above. I have also considered the level of ordinary skill in the pertinent art.

72. I describe in detail below the scope and content of the prior art, as well as any differences between the alleged invention and the prior art, on an element-by-element basis for each Challenged Claim of the '472Patent.

A. Ground 1: Butler Render Claims 1-4, 8-17, and 21-25 Obvious.

1. Butler Teaches A Single Vacuum Cleaner System With Interchangeable Components, But To The Extent PO Argues Otherwise, A POSA Would Have Been Motivated To Combine Them

73. In my opinion, Butler teaches a single vacuum system that is configurable, including various optional handles and cleaning tools.

74. Butler teaches that its components (handles, grips, dirt receptacles, filters, and tools) "may be interchangeable with one another to provide the user

with various cleaning options," and Butler teaches that, as it relates to the arrangement of these components, they may be "used individually or in various other inventive combinations." Ex1005, 16:25-29, 43:29-44:3, 4:17-28, 18:22-28, 19:9-15, 34:12-13 (components are combinable).

75. Butler further teaches that its invention "may be used with any type of dirt separation system using any theory of operation," and, accordingly, "various different types of dirt receptacle[s] may be used, and may be interchangeable with one another." *Id.*, 16:25-28.

76. Therefore, as described in further detail below, in my opinion, a POSA would have found it obvious to combine Butler's components. For example, in my opinion, a POSA would have understood that combining Butler's components would have involved combining known prior art elements (vacuum handles, grips, filters, cleaning tools, and dust chambers) according to known methods and techniques (straightforward component rearrangement) to yield predictable results (effective cleaning for different uses). It is also my opinion that combining Butler's components would have involved the simple substitution of these known elements taught by Butler, which Butler expressly teaches are interchangeable. Ex1005, 4:17-28, 16:25-29, 18:22-28, 19:9-15, 34:12-13, 43:20-44:3. In my opinion, configuring Butler's interchangeable

components for different uses by would have at least been obvious to try as there were a finite number of identified, predictable solutions for arranging Butler's well-known, interchangeable components.

77. Further, in my opinion, a POSA would have reasonably expected success in combining Butler's components. For example, these components, which are all taught by Butler, were well known in the art. Further, Butler expressly teaches that the components are interchangeable to reconfigure for various uses, which would have further given a POSA a reasonable expectation of success.

2. Butler Renders Claims [1]/[14] Obvious

78. In my opinion, Butler renders claims 1 and 14 obvious.

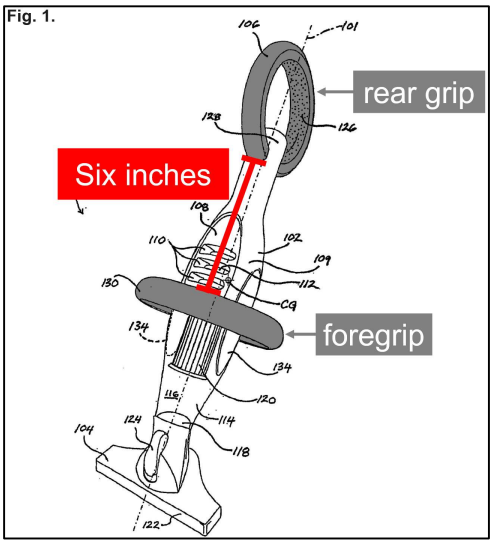
a. [1pre]/[14pre]

Reference Number	Claim Limitation
[1pre]	"A hand vacuum cleaner having a front end, a rear end, and comprising:"
[14pre]	"A hand vacuum cleaner having a front end, a rear end and comprising:"

79. In my opinion, to the extent the preambles are limiting, Butler teaches a hand vacuum cleaner having a front end and a rear end.

80. To start, in my opinion, Butler teaches a hand vacuum cleaner. Butler teaches "a vacuum cleaner" that is designed to be used by hand and is a

hand vacuum cleaner. Ex1005, Title, Fig. 1, Abstract. Butler's vacuum cleaner includes a "**rear grip**" and "one or more **foregrips**," and Butler teaches a range of "compact" sizes, including a distance between foregrip and rear grip of **six inches**, and an overall vacuum length of eighteen inches:



Id., 15:5-6, 26:1-10, Fig. 1.

81. Butler explains how the invention is proportioned so as to be manipulated by hand:

> Considering the general build of many users, in one embodiment, the distance between the grips is about six to thirty inches. In a more preferred embodiment, the foregrip 130 is spaced from the most distant graspable portion of the rear grip 106 by about eight to twenty-four inches. These distances are expected to allow the user to comfortably grasp both grips and operate the vacuum cleaner 100 at about a 30 to

60 degree angle on the surface being cleaned, while remaining in a generally upright, comfortable standing position.

Id., 15:5-11.

82. In addition, Butler describes the maneuverability of its hand vacuum cleaner:

> Embodiments of the present invention address these shortcomings by providing a relatively compact vacuum cleaner that is long enough to allow typical users to clean elevated stairs without excessive stooping, yet short enough to still provide ergonomic grip and control of the device, and the ability to maneuver in tight spaces, such as enclosed stairwells. As an ancillary benefit, this length may also prove to be better adapted for cleaning in confined spaces, such as closets. In a preferred embodiment, the vacuum cleaner of the present invention has an overall length of about 18 to 46 inches, and more preferably about 20 to 24 inches.

Id., 26:1-10.

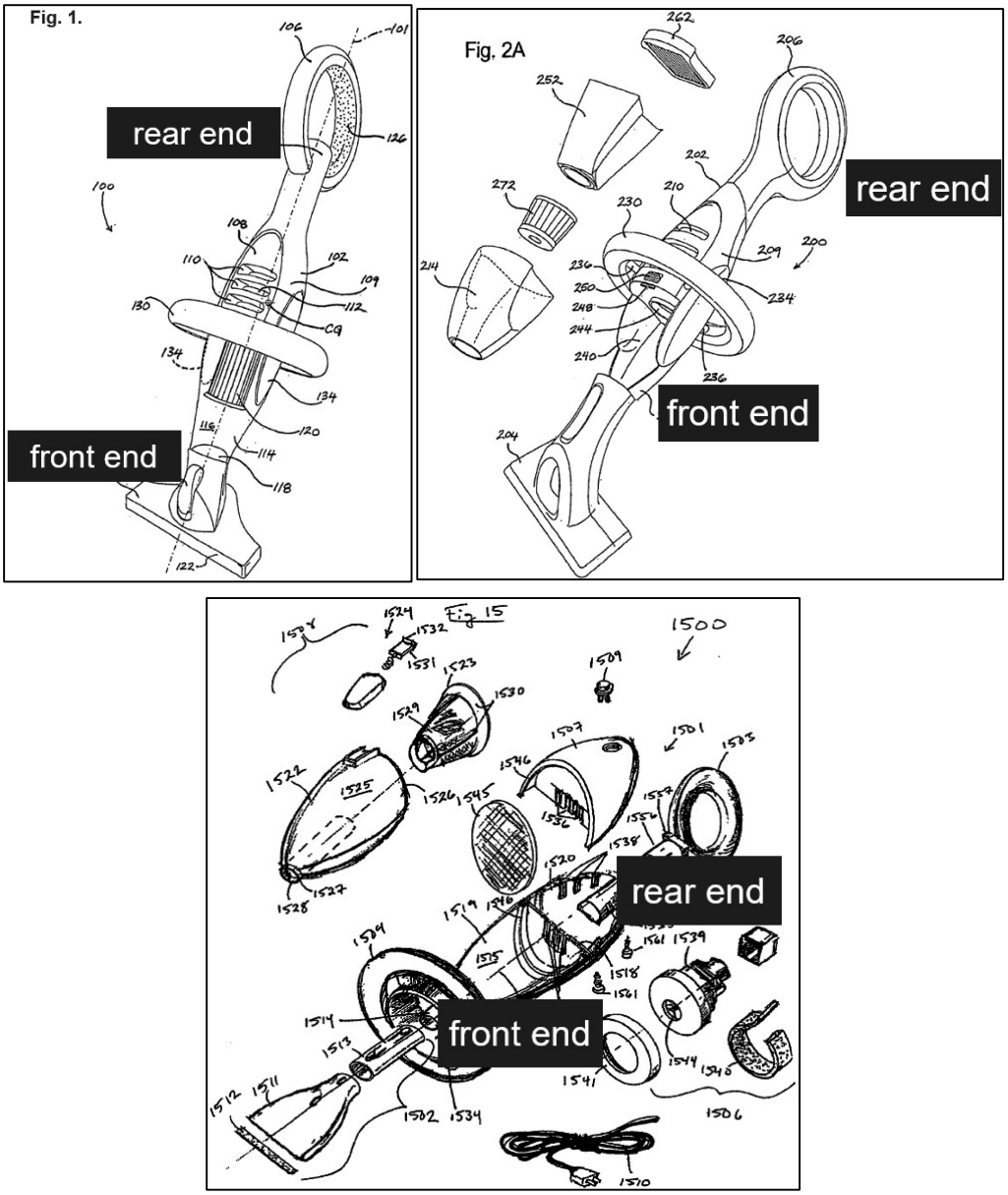
83. Butler further explains that "[w]hile the foregoing lengths are preferred, it may be desirable in some instances to make the vacuum cleaner longer or shorter," Ex1005, 26:11-16.

84. Butler also teaches that its vacuum cleaner is "compact" and "maneuverable," "adapted for cleaning … stairwells and other confined spaces," and teaches telescoping handgrip members and extension tubes to

reach the floor. Ex1005, Abstract, 1:2-3, 26:1-5, 27:12-29. Butler's cleaner is also designed to have an optimal "center of gravity" and to "remov[e] excess weight." *Id*., 13:1-19, 15:12-18. In my opinion, a POSA would understand that these design features and considerations apply to hand vacuum cleaners, and that Butler's vacuum is a hand vacuum cleaner.

85. In my opinion, a POSA would understand that Butler's small, maneuverable, and hand-held vacuum cleaner is a hand vacuum cleaner.

86. Next, in my opinion, Butler's hand vacuum cleaner has a front end and a rear end. Because Butler's hand vacuum is a three-dimensional object, it is my opinion that a POSA would understand Butler's hand vacuum has a **front end** and **rear end**, as shown in the annotated figures below:



Ex1005, Figs. 1, 2A, 15, Abstract, 3:20-23.

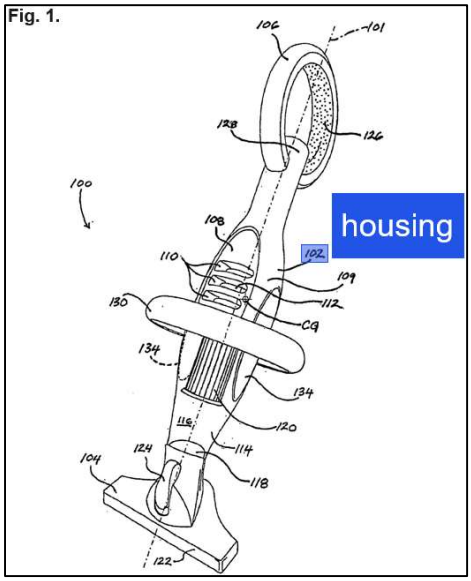
87. Thus, in my opinion, a POSA would have understood that Butler teaches a hand vacuum cleaner having a front end and a rear end.

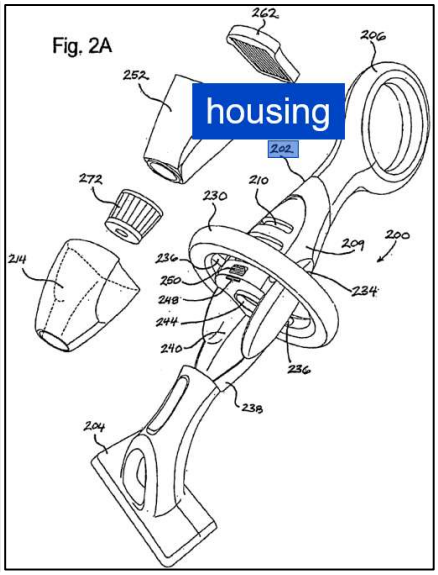
b. [1a]/[14a]

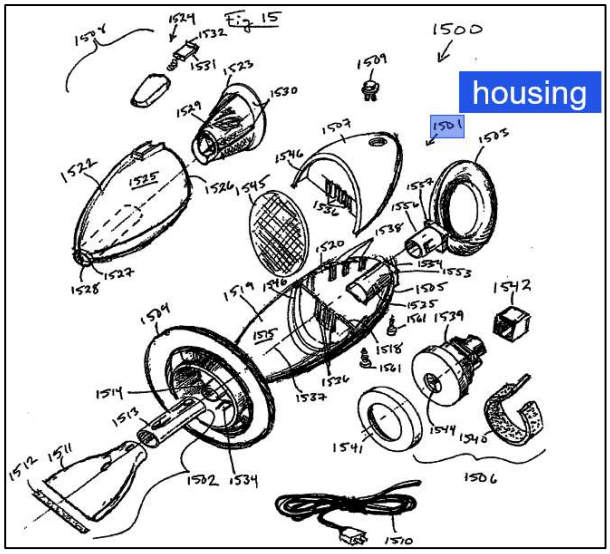
Reference Number	Claim Limitation
[1a]	"a main housing;"
[14a]	"a main housing;"

88. In my opinion, Butler teaches a main housing.

89. Butler teaches that its hand vacuum has a main housing, "**housing 102**"/"**housing 202**"/"**housing 1501**":







Ex1005, Figs. 1, 2A, 15, 7:14-17, 15:20-22, 34:20-23, 35:4-8.

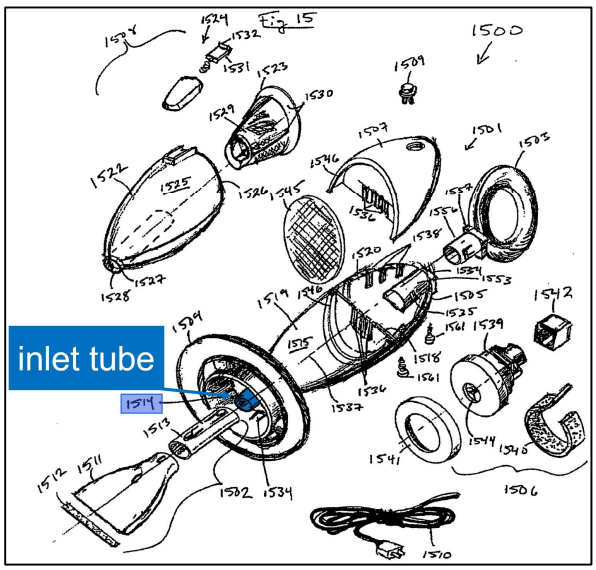
90. Thus, in my opinion, a POSA would have understood that Butler teaches a main housing.

c. [1b]/[14b]

Reference Number	Claim Limitation
[1b]	"a dirty fluid inlet;"
[14b]	"a dirty fluid inlet;"

91. In my opinion, Butler teaches a dirty fluid inlet.

92. For example, Butler teaches a dirty fluid inlet, "**inlet tube 1514**," which "serves as an inlet for a dirt and dust laden airstream coming into the vacuum," as shown in the annotated figure below:



Ex1005, Fig. 15, 35:8-11, 36:9-12; *see also* Fig. 2D (depicting "inlet air passage 242" and "inlet port 270").

93. Based on these teachings, in my opinion, a POSA would have understood that Butler's "**inlet tube 1514**" is a dirty fluid inlet. That is, it is a tube

that serves as the vacuum cleaner's inlet for dirty air.

94. Accordingly, in my opinion, a POSA would have understood that Butler's "**inlet tube 1514**" is a dirty fluid inlet.

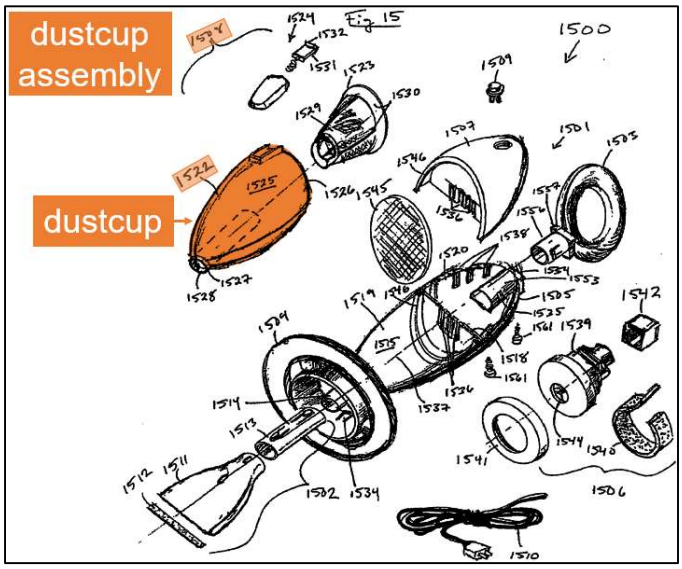
d. [1c]/[14c]

Reference Number	Claim Limitation
[1c]	"a cyclone bin assembly comprising a cyclone chamber downstream of the dirty fluid inlet, the cyclone chamber comprising a first end, a second end, a cyclone axis, a cyclone air inlet and a cyclone air outlet wherein the cyclone air outlet is located at the second end;"
[14c]	"a cyclone bin assembly comprising a cyclone chamber downstream of the dirty fluid inlet, the cyclone chamber comprising a first end, a second end, a cyclone air inlet, a cyclone axis, and a cyclone air outlet that is located at the second end;"

95. In my opinion, Butler teaches a cyclone bin assembly comprising a cyclone chamber downstream of the dirty fluid inlet, the cyclone chamber comprising a first end, a second end, a cyclone axis, a cyclone air inlet and a cyclone air outlet wherein the cyclone air outlet is located at the second end. (Limitation [1c]).

96. It is also my opinion that Butler teaches a cyclone bin assembly comprising a cyclone chamber downstream of the dirty fluid inlet, the cyclone chamber comprising a first end, a second end, a cyclone air inlet, a cyclone axis, and a cyclone air outlet that is located at the second end. (Limitation [14c]).

97. To start, in my opinion, Butler teaches a cyclone bin assembly (**dustcup assembly 1508**). Butler's cyclone bin assembly comprises a cyclone chamber (**dustcup 1522**'s cyclonic separation chamber): "**dustcup assembly 1508** comprises a **dustcup 1522**," which "may comprise … a cyclonic separation chamber":



Ex1005, 35:27-36:4, Fig. 15; *see also* Fig. 2D ("dirt receptacle 214"), 18:3-10 ("dirt receptacle 214 [that] comprises a cyclone separation chamber").

98. Butler explains the configuration of these components in the quote below:

> "The **dustcup assembly 1508** comprises a **dustcup 1522**, a filter assembly 1523 and a latch assembly 1524. The dustcup 1522 comprises one or more sidewalls 1525 that form an open top 1526 and taper to an inlet 1528 at the bottom of the **dustcup 1522**. The inlet 1528 is generally smaller than the open top 1526 and has one or more inlet sidewalls 1527 that extend past the dustcup sidewalls 1525 and may

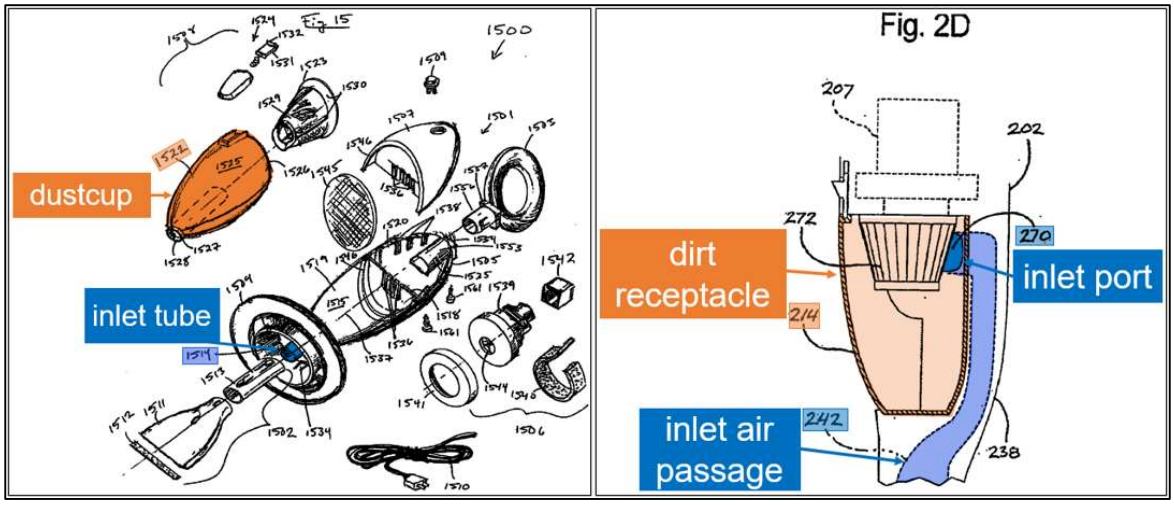
also extend into the dustcup interior. The dustcup 1522 provides storage of collected refuse and debris, and may comprise a bag chamber, a non-cyclonic cup, or a cyclonic separation chamber. A generally frusto-conical filter assembly 1523 extends into the dustcup 1522. The filter assembly 1523 comprises a filter 1529 and a frame 1530. The frame 1530 sealingly engages with the open top 1526 and is held in place by the attachment of the dustcup 1522 to the body 1505."

Id., 35:27-36:7.

99. In my opinion, a POSA would have understood that "**dustcup assembly 1508**" is a cyclone bin assembly. This is because it is a group of interconnected components that comprises the "**dustcup 1522**," which itself comprises a "cyclonic separation chamber." *Id.*

100. Also, in my opinion, a POSA would have understood that Butler's "**dustcup 1522**"'s "cyclonic separation chamber" is a cyclone chamber.

101. It is also my opinion that Butler teaches a cyclone chamber (**dustcup 1522**'s cyclonic separation chamber) downstream of the dirty fluid inlet, based on Butler's annotated figures below:



Ex1005, 17:26-27, 18:7-10, 35:14-24; Figs. 15, 2D.

102. Butler explains the construction and operation of its **inlet tube 1514**:

> "The **inlet tube 1514** is attached to the housing 1501 at an end adjacent to the dustcup chamber 1519 and forms an air passage into the dustcup chamber 1519."

Id., 35:22-24; *see also id.*, 35:4-6 (describing the "housing 1501" and the "main body 1505"); *id.*, 35:12-14 (describing the "body 1505" and the "dust cup chamber 1519").

103. As depicted in the figures above, Butler teaches that "**dustcup 1522** is removably installed in the dustcup chamber 1519," and "**inlet tube 1514**" is attached "at an end adjacent to the dustcup chamber 1519 and forms an air passage into the dustcup chamber 1519." *Id.*, 35:14-16, 35:22-24, Figs. 15, 2D.

104. Therefore, in my opinion, a POSA would have understood that the cyclone chamber is downstream of the dirty fluid inlet because Butler teaches that

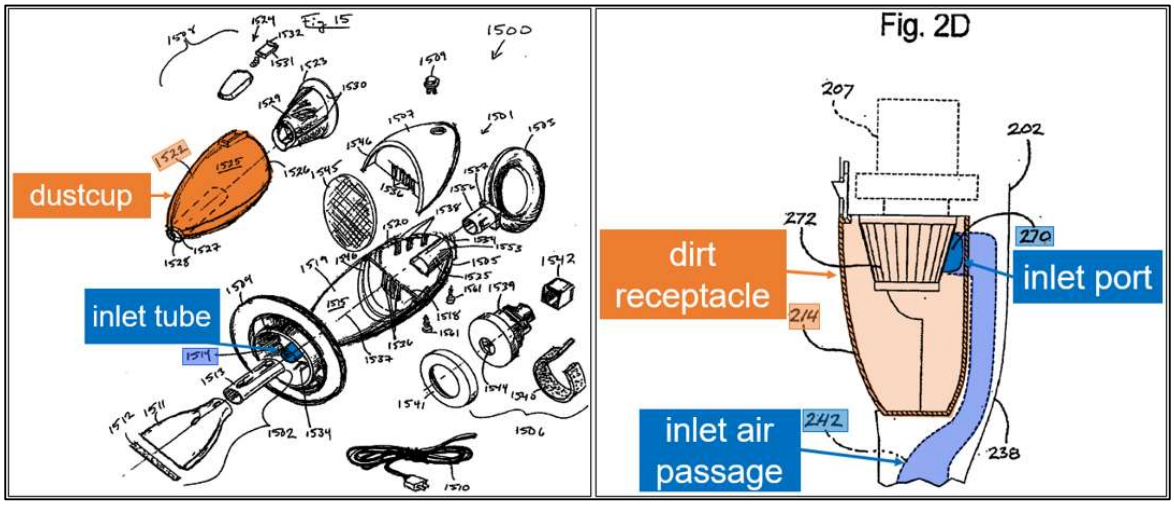
"**inlet tube 1514**" forms an air passage in the dustcup chamber 1519, dustcup chamber 1519 has "**dustcup 1522**" installed in it, and "**dustcup 1522**" houses the "cyclonic separation chamber," resulting in "**inlet tube 1514**" forming an air passage into the "cyclonic separation chamber." *Id.*, 35:14-16, 35:22-24. The "cyclonic separation chamber" is therefore downstream of the "**inlet tube 1514**."

105. Also, Butler teaches that the "**dirt receptacle 214** comprises a cyclone separation chamber"—a cyclone chamber. *Id.* at 18:3-5. Butler further teaches that "air enters the **dirt receptacle 214** from the **inlet air passage 242**" and "**inlet air passage 242** enters or terminates at an **inlet port 270** through the **dirt receptacle** sidewall." *Id.*, 17:26-27, 18:7-10.

106. In my opinion, a POSA would have understood that a cyclone chamber to be downstream of **inlet air passage 242** because **inlet air passage 242** "terminates through the **dirt receptacle**" into the "cyclone separation chamber."

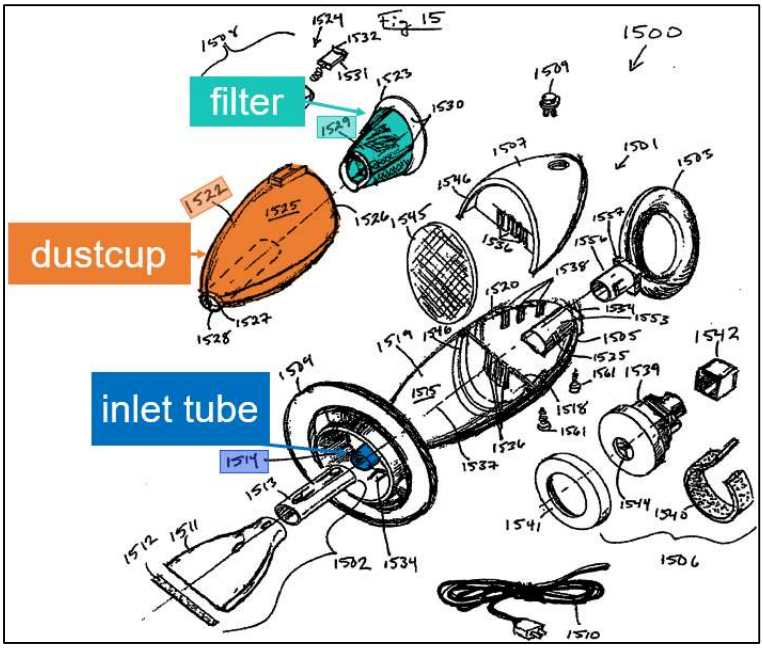
107. Next, in my opinion, Butler teaches a cyclone air inlet. For example, in my opinion, a POSA would have understood that the point at which Butler's dirty fluid inlet tube (**inlet tube 1514/inlet air passage 242**) "terminates at an inlet port" (**inlet port 270** or the "end" of Butler's **inlet tube 1514**) is "adjacent to the dustcup chamber 1519 and forms an air

passage into the dustcup chamber 1519." It is my opinion that a POSA would have understood that this is a cyclone air inlet, because it is the inlet through which the "dirt and dust laden airstream" enters Butler's cyclone chamber:



Ex1005, 17:26-27, 18:7-10, 35:14-16, 35:22-24, Figs. 15, 2D.

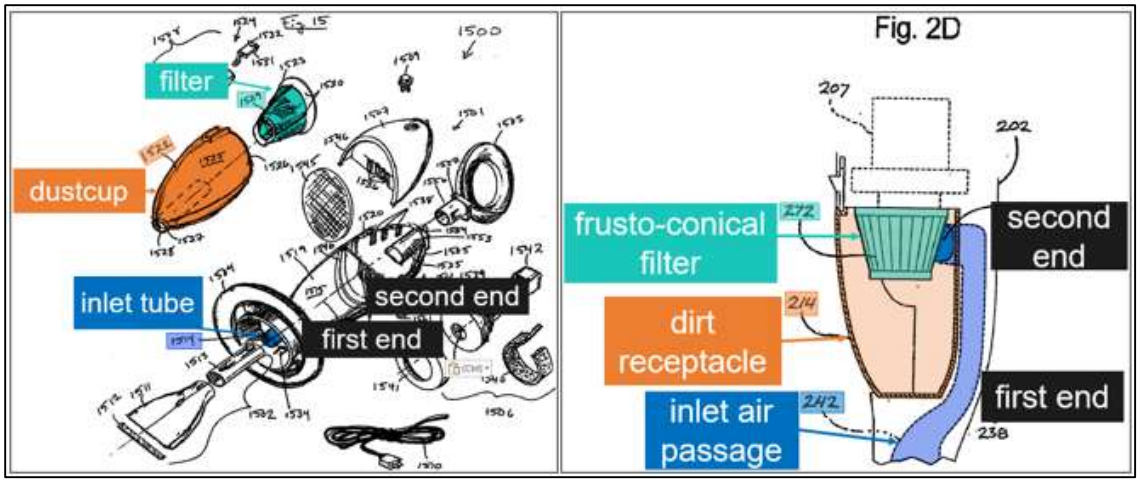
108. Next, in my opinion, Butler teaches a cyclone air outlet. For example, Butler teaches that, in its vacuum cleaner, air exits the cyclone chamber through the "**filter 1529**" of a "generally frusto-conical filter assembly 1523 [that] extends into the **dustcup 1522**," as shown in the annotated figure below:



Ex1005, 36:4-5 ("filter assembly 1523 comprises a **filter 1529** and a frame 1530"), Fig. 15; *see also* Fig. 2D, 18:10-12 (air exiting the cyclone chamber through "frusto-conical filter 272").

109. Thus, in my opinion, a POSA would have understood that the point at which air leaves Butler's cyclone unit (through "filter assembly 1523"'s "**filter 1529**") is Butler's cyclone air outlet because a POSA would have understood cyclonic airflow is disrupted when air passes through **filter 1529** and that the airflow is in another, downstream, section of the vacuum once air has passed through the filter.

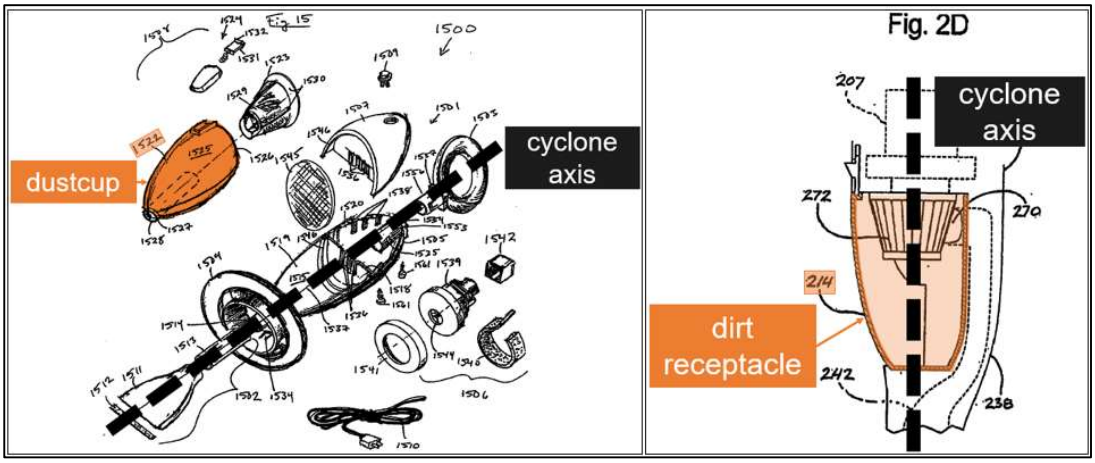
110. Next, in my opinion, a POSA would have understood that Butler's cyclone chamber has a **first end** and a **second end** because it is a three-dimensional object as shown in the annotated figures below:



Ex1005, Figs. 15, 2D; *see also id.*, Fig. 2C.

111. Also, in my opinion, a POSA would have understood that Butler's cyclone air outlet is located at Butler's cyclone chamber's **second end**, as shown in the annotated figure above.

112. Next, in my opinion, a POSA would have understood that Butler's cyclone chamber (**dustcup 1522/dirt receptacle 214**'s cyclonic separation chamber) has a **cyclone axis**. For example, Butler teaches that, in its cyclone chamber, "[w]orking airflow is swirled," which, in my opinion, a POSA would understand creates a **cyclone axis**, as shown in the annotated figures below:



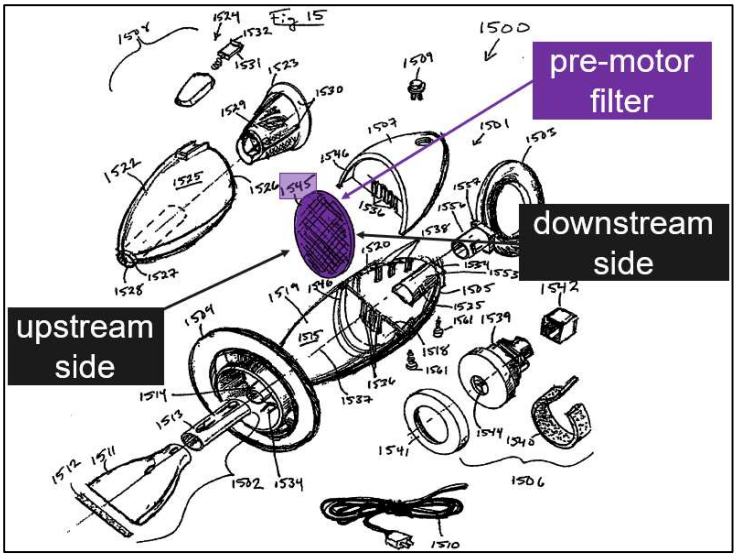
Ex1005, 18:3-5, Figs. 15, 2D; *see also id.*, Fig. 2C.

e. [1d1]/[14d1]

Reference Number	Claim Limitation
[1d1]	"a pre-motor filter comprising an upstream side and a downstream side,"
[14d1]	"a pre-motor filter comprising an upstream side and a downstream side,"

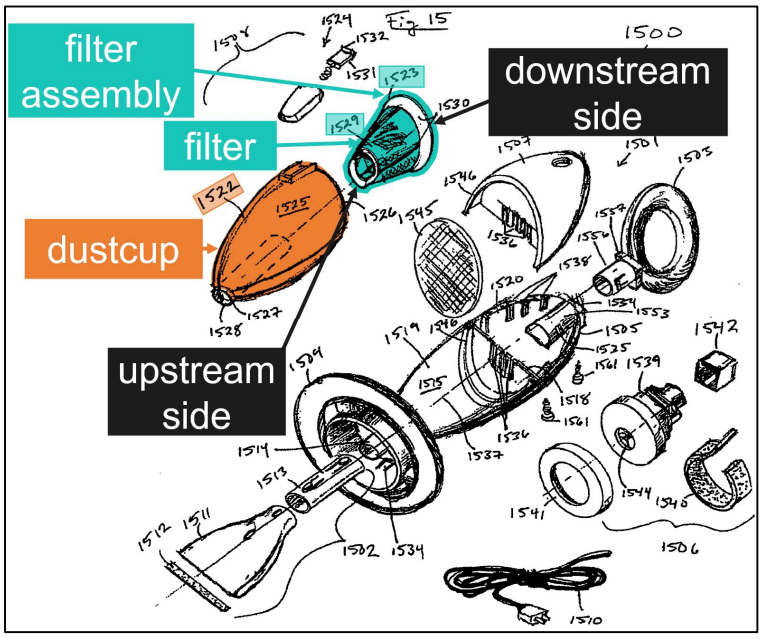
113. In my opinion, Butler teaches a pre-motor filter comprising an upstream side and a downstream side.

114. First, in my opinion, Butler teaches a "**pre-motor filter 1545**" with an **upstream side** and a **downstream side**, as shown in the annotated figure below:



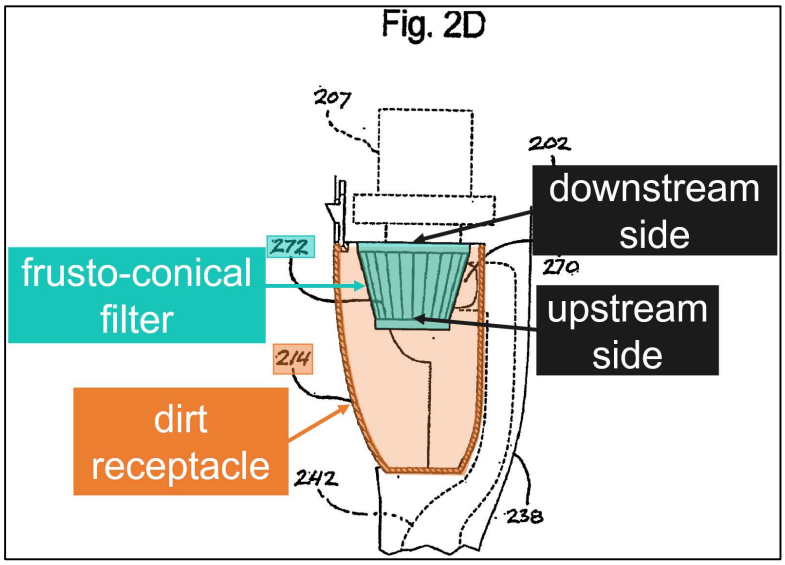
Ex1005, 35:14-22, Fig. 15.

115. Also, Butler teaches "[a] generally frusto-conical **filter assembly 1523** [that] extends into the **dustcup 1522**," which "comprises a **filter 1529**," has an **upstream side** and a **downstream side**, and is upstream of the motor, as shown in the annotated figure below:



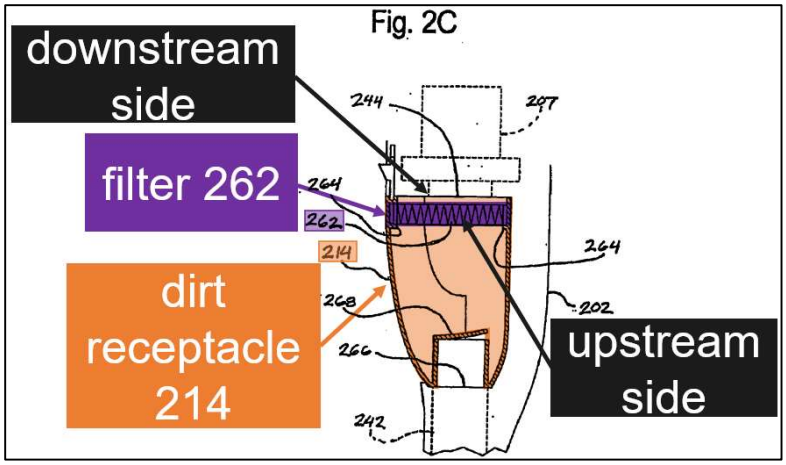
Ex1005, 36:4-5, Fig. 15.

116. Also, Butler teaches a "**frusto-conical filter 272**" with an **upstream side** and a **downstream side** that is used with "**dirt receptacle 214**," and "prevent[s] dirt and debris that is not separated by cyclonic action from entering the fan/motor 207," as shown in the annotated figure below:



Ex1005, 18:10-12, Fig. 2D; *see also id.*, 15:20-26 (identifying location of "fan/motor chamber 209, with a fan/motor 207" as downstream of filter 272).

117. Butler also teaches "**filter 262**" with an **upstream side** and a **downstream side** in "**dirt receptacle 214**" and is upstream of Butler's motor, as shown in the annotated figure below:



Ex1005, Fig. 15, 17:15-25 ("**filter 262** is positioned in the top of the **dirt receptacle [214]**"); *see also id.*, 15:20-26 (identifying location of "fan/motor chamber 209, with a fan/motor 207" as downstream of **filter 262**).

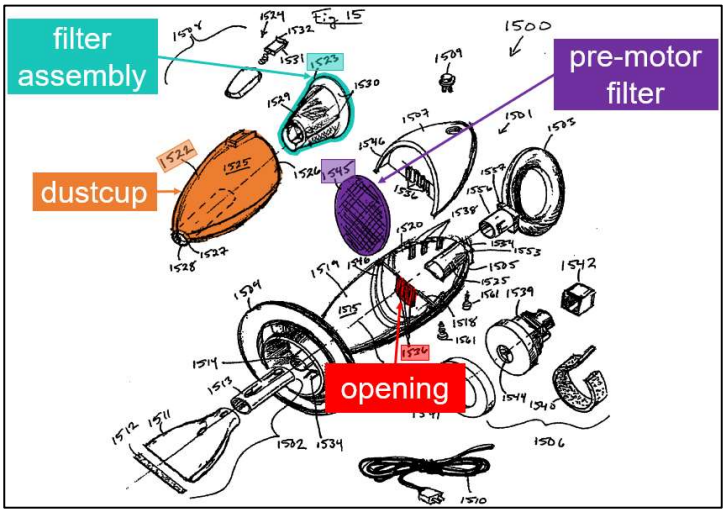
118. In my opinion, each of these filters (**pre-motor filter 1545**, **filter assembly 1523**, **frusto-conical filter 272**, and **filter 262**) is a pre-motor filter comprising an **upstream side** and a **downstream side**. Further, Butler teaches that "any alternative filter shape, material, construction or filtration grade may be used, and multiple filter layers may also be used." Ex1005, 18:12-14. In my opinion, based on these teachings, a POSA would have understood that Butler teaches various physical filters that filter air upstream of Butler's motor, which are interchangeable pre-motor filters with an upstream side and a downstream side.

f. [1d2]/[14d2]

Reference Number	Claim Limitation
[1d2]	"the pre-motor filter is positioned in a pre-motor filter housing having an openable cover,"
[14d2]	"the pre-motor filter is positioned in a pre-motor filter housing having an openable cover;"

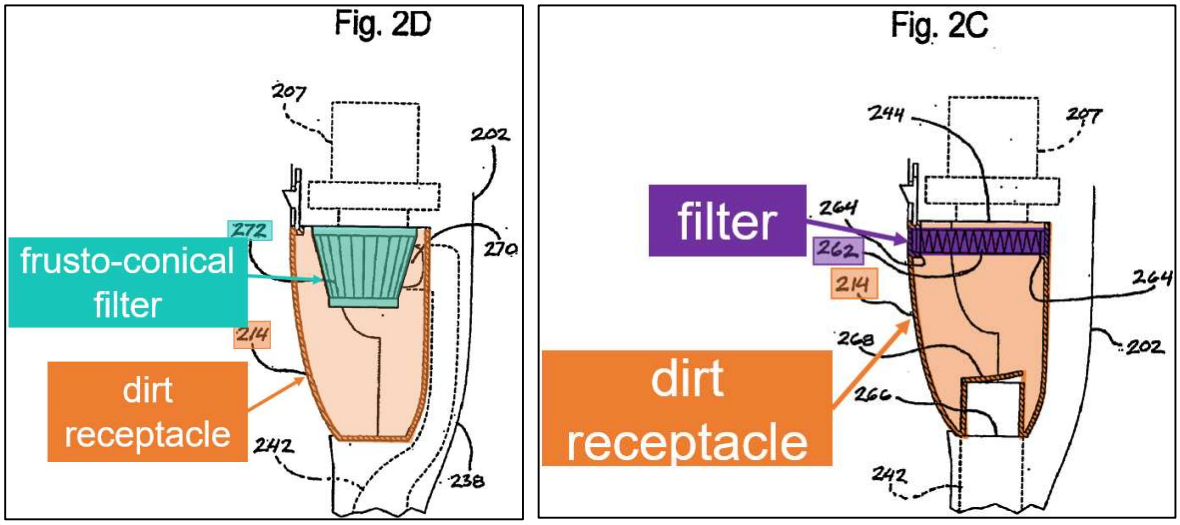
119. In my opinion, Butler teaches and renders obvious the pre-motor filter positioned in a pre-motor filter housing having an openable cover.

120. First, in my opinion, Butler teaches a pre-motor filter that is positioned in a pre-motor filter housing. For example, in Figure 15, Butler teaches both a "frusto-conical **filter assembly 1523**" that "comprises a filter 1529 and a frame 1530" and "extends into the **dustcup 1522**," and a "**pre-motor filter 1545**" that "may be located to cover the vent **opening 1536** and attached in any known way," as shown in the annotated figure below:



Ex1005, 36:4-5, 35:20-22, Fig. 15.

121. Similarly, in Butler's Figures 2C-2D, Butler teaches a "**frusto-conical filter 272**" that is housed in Butler's "**dirt receptacle 214**," and Butler also teaches a "**filter 262**" that is "positioned in the top of the **dirt receptacle [214]**" with "[s]uitable ridges 264 or other features [t]o hold the **filter 262** in place," as shown in the annotated figures below:

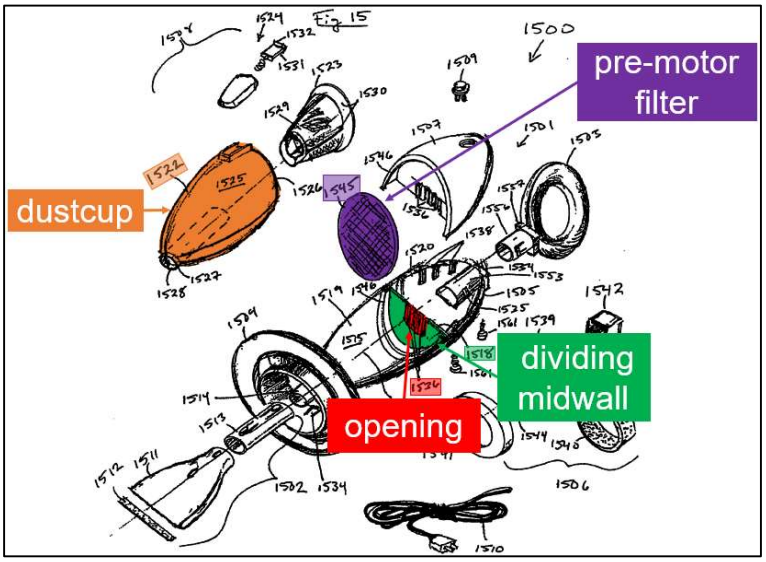


Ex1005, Fig. 2C, 2D, 17:15-25.

122. Further, in my opinion, a POSA would have understood that Butler's "**dirt receptacle 214**"/"**dustcup 1522**" are interchangeable pre-motor filter housings because they house Butler's pre-motor filters, as shown above.

123. While, in my opinion, "**pre-motor filter 1545**" is not housed within "**dustcup 1522**," it is also my opinion that to the extent Patent Owner argues "**pre-motor filter 1545**" is not housed within "**dustcup 1522**," it

would have been obvious to extend "**dustcup 1522**" to house "**pre-motor filter 1545**" for several reasons. First, Butler Figure 2C depicts this arrangement (which Butler describes as a "known way" to attach the pre-motor filter) and Butler teaches that "dirt receptacle 214" and "dustcup 1522" are interchangeable. Ex1005, 16:25-29 ("various different types of **dirt receptacle 214** may be used, and may be interchangeable with one another"). A POSA also would have found it obvious to extend "**dustcup 1522**" to the "**dividing midwall 1518**" and "**opening 1536**" (such that the dustcup housed "**pre-motor filter 1545**") because Figure 15 shows "dustcup chamber 1519" extending to "**dividing midwall 1518**" and Butler teaches that "**dustcup 1522** is … installed in the dustcup chamber 1519," as shown in the annotated figure below:

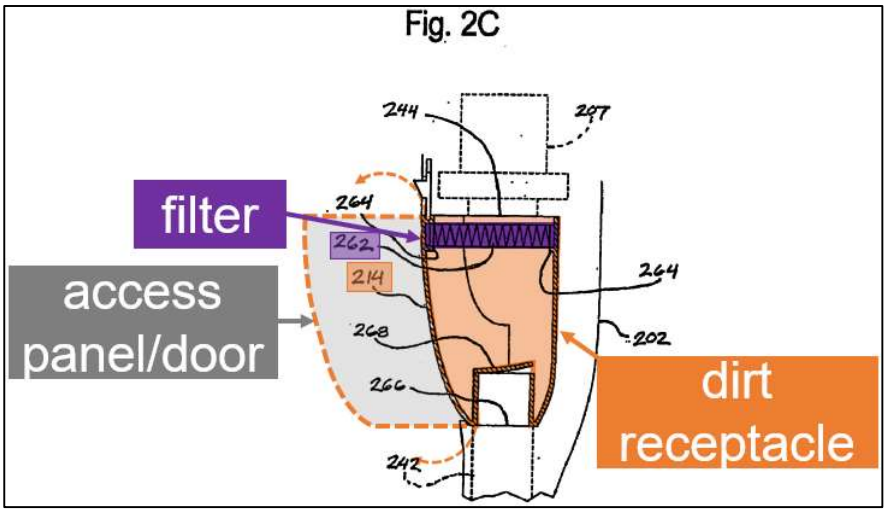


Ex1005, Fig. 15, 35:16-22.

124. Further, in my opinion, a POSA would have understood that connecting at

the "**dividing midwall 1518**" would facilitate a tight seal, which has several known benefits, including improving suction and avoiding accidental dirt spillage, which would therefore motivate a POSA to make such a modification, as Figure 2C teaches by depicting "**dirt receptacle 214**" as extending to the fan/motor inlet opening 244. Ex1005, Fig. 2C.

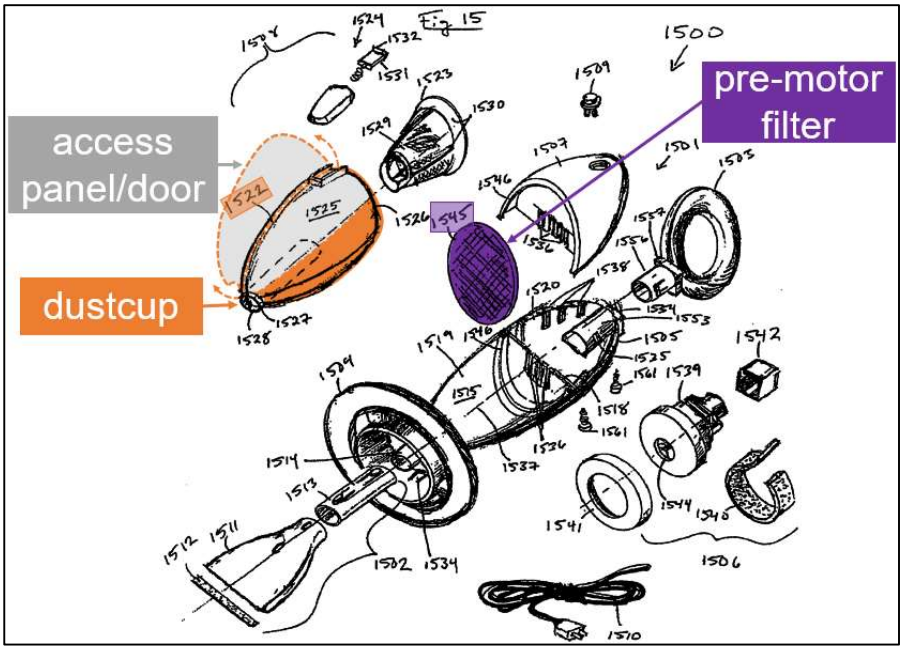
125. Butler teaches that the pre-motor filter housing has an openable cover. For example, Butler teaches that its "**dirt receptacle 214** may be covered by an **access panel or door**," which a POSA would understand is an openable cover, as shown in the annotated figure below:



Ex1005, 18:26-27, 18:27-19:5, Fig. 2C (modified).

126. In my opinion, a POSA would have understood that Butler's openable cover (**access panel or door**) allows access to the interior of the dirt receptacle and to the pre-motor filter for cleaning, removal, or unclogging,

and, to the extent not expressly taught by Butler, a POSA would have found such an openable cover obvious for these same reasons. *See* Ex1005, 8:15-17 (noting need to service filters). Further, in my opinion, because Butler teaches that "various different types of **dirt receptacle 214** may be used, and may be interchangeable with one another to provide the user with various cleaning options," Ex1005, 16:25-29, a POSA would have understood that Butler's "**dirt receptacle 214**" and Butler's "**dustcup 1522**" are interchangeable and therefore that Butler's "**access panel or door**" teachings may also be used with Butler's "**dustcup 1522**." And, in my opinion, a POSA also would have found it obvious to implement an openable cover on Butler's "**dustcup 1522**," given Butler's teachings of interchangeability and to allow a user to access the interior of Butler's "**dustcup 1522**" for cleaning (e.g., to dislodge fibrous material), filter servicing, or to retrieve an object. Butler therefore teaches and renders obvious that "**dustcup 1522**," like "**dirt receptacle 214**," is a pre-motor filter housing having an openable cover as shown in the annotated figure below:

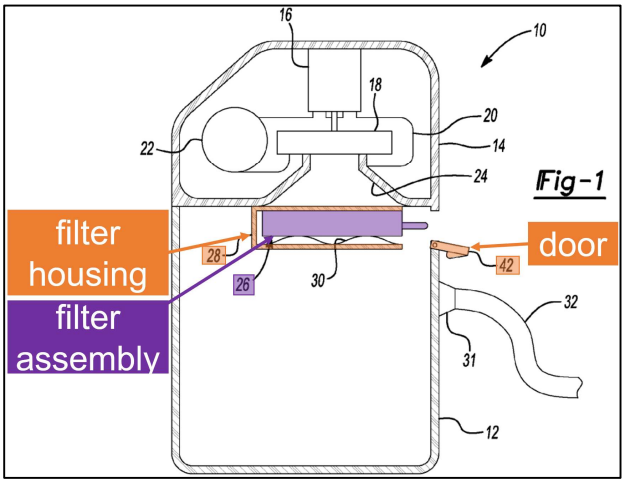


Ex1005, Fig. 15 (modified).

127. To the extent Patent Owner argues that Butler's pre-motor filter is not housed in a "pre-motor filter housing having an openable cover," it is my opinion that it would have been obvious to modify Butler to include a housing having an openable cover specifically for Butler's pre-motor filter. For example, such a pre-motor filter housing, independent of dustcup 1522, would have certain known benefits, including supporting and protecting the pre-motor filter while providing the ability to access the pre-motor filter without exposing the dirty contents of the dustcup directly to the user or environment.

128. Such pre-motor filter housings were well known in the art. For example, US2008/0115315 teaches a "**filter housing 28**" and an openable "**door 42**"

(collectively a pre-motor filter housing having an openable cover) that facilitates access to the "**filter assembly 26**" "from the exterior of the housing" thus making cleaning less "cumbersome and messy" as shown in the annotated figure below:



Ex1015, Fig. 1, ¶¶ 4, 21, 25.

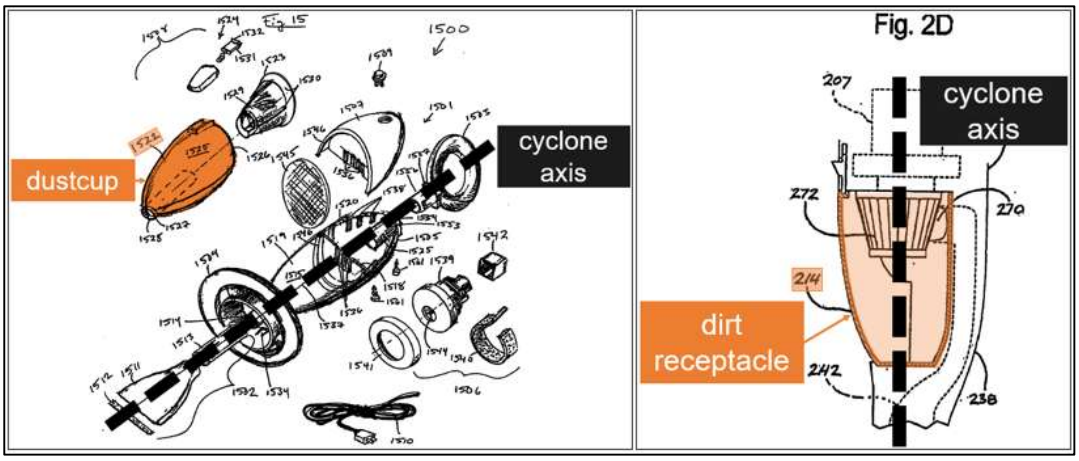
129. In my opinion, a POSA would have understood that this modification would have required the straight-forward addition of a filter housing wall for Bulter's pre-motor filter with an openable door, and it would have involved combining these known prior art elements according to known methods to yield predictable results (including, for example, improved access to the pre-motor filter).

g. [1d3]

Reference Number	Claim Limitation
[1d3]	"the cyclone axis extends through the pre-motor filter housing;"

130. In my opinion, Butler teaches that the cyclone axis extends through the pre-motor filter housing.

131. In my opinion, a POSA would have understood that Butler's **cyclone axis** extends through Butler's pre-motor filter housing (**dustcup 1522**/**dirt receptacle 214**), as shown in the annotated figures below:



Ex1005, Figs. 15, 2D; *see also* Ground 1, [1c]/[14c], [1d1]/[14d1].

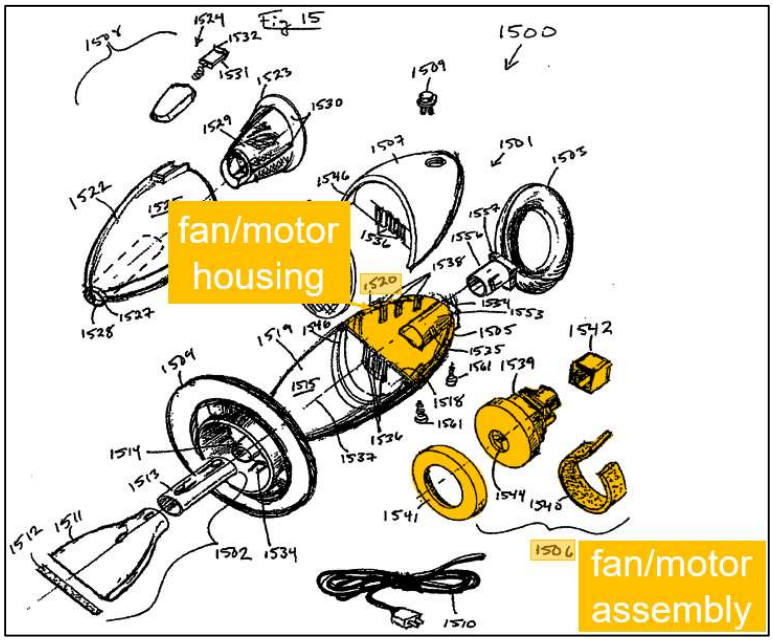
132. It is my opinion that this limitation is also met if Butler is modified to include a separate pre-motor filter housing as described for [1d2], because the cyclone axis would still extend through the pre-motor filter housing as modified.

h. [1e]/[14e]

Reference Number	Claim Limitation
[1e]	"a suction motor positioned in the main housing and located downstream of the pre-motor filter and rearward of the cyclone bin assembly;"
[14e]	"a suction motor positioned in the main housing and located downstream of the pre-motor filter and rearward of the cyclone bin assembly;"

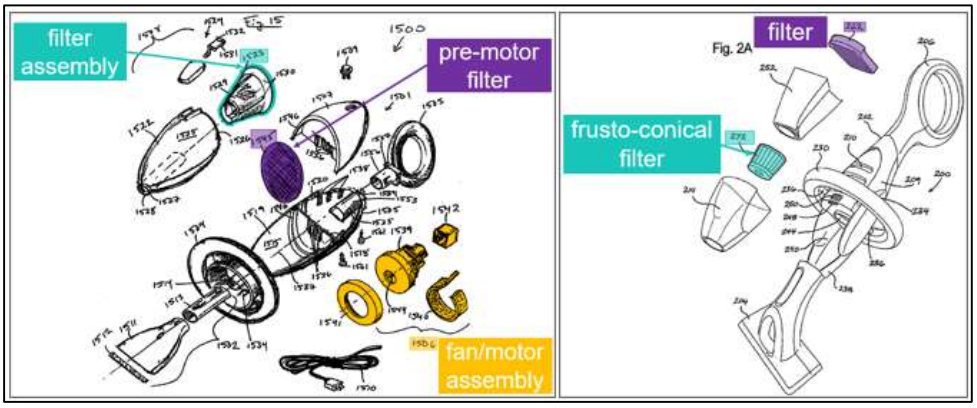
133. In my opinion, Butler teaches a suction motor positioned in the main housing and located downstream of the pre-motor filter and rearward of the cyclone bin assembly.

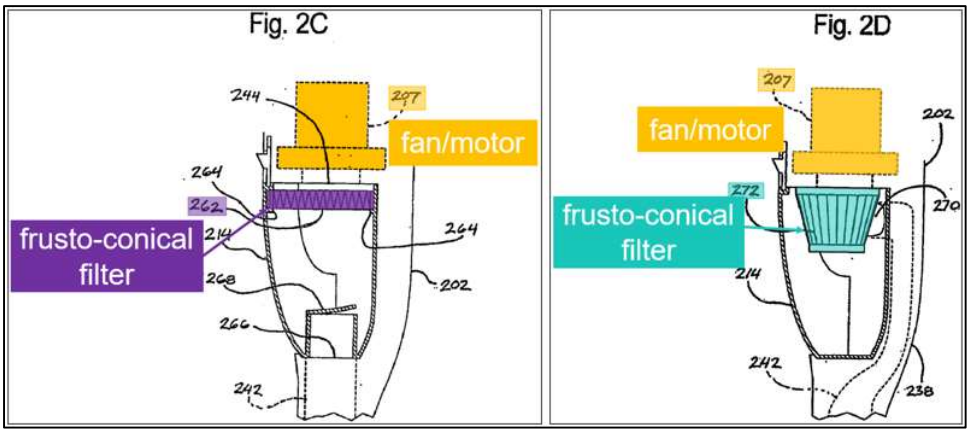
134. In my opinion, Butler teaches a **suction motor** that is positioned in the main housing, and is downstream of the pre-motor filter and is rearward of the cyclone bin assembly, as shown in the annotated figure below:



See Ex1005, Fig. 15, Abstract, 7:17-19; 15:19-24; 35:4-15; *see also id.*, Figs. 2C, 2D ("fan/motor 207").

135. In my opinion, in Butler's vacuum cleaner, air flows from the pre-motor filter ("**pre-motor filter 1545**"/"**filter 262**"/"**filter 272**"/"**filter assembly 1523**") downstream to the suction motor ("**fan/motor assembly**") in Butler as shown in the annotated figures below:

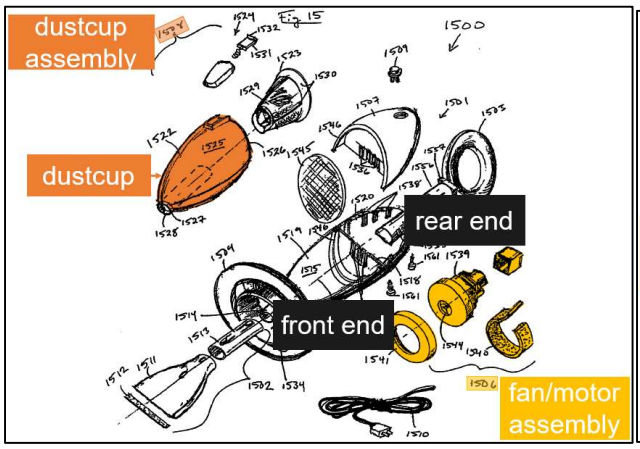


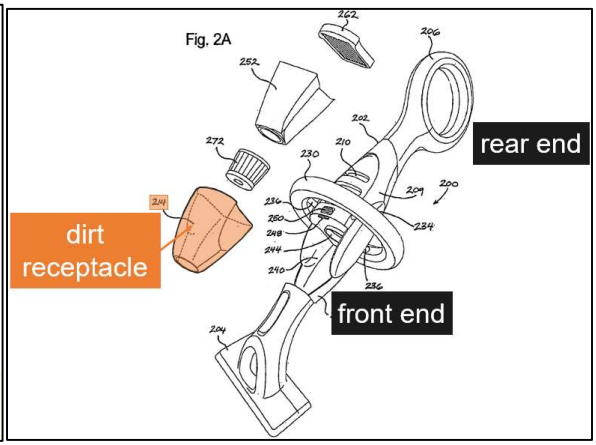


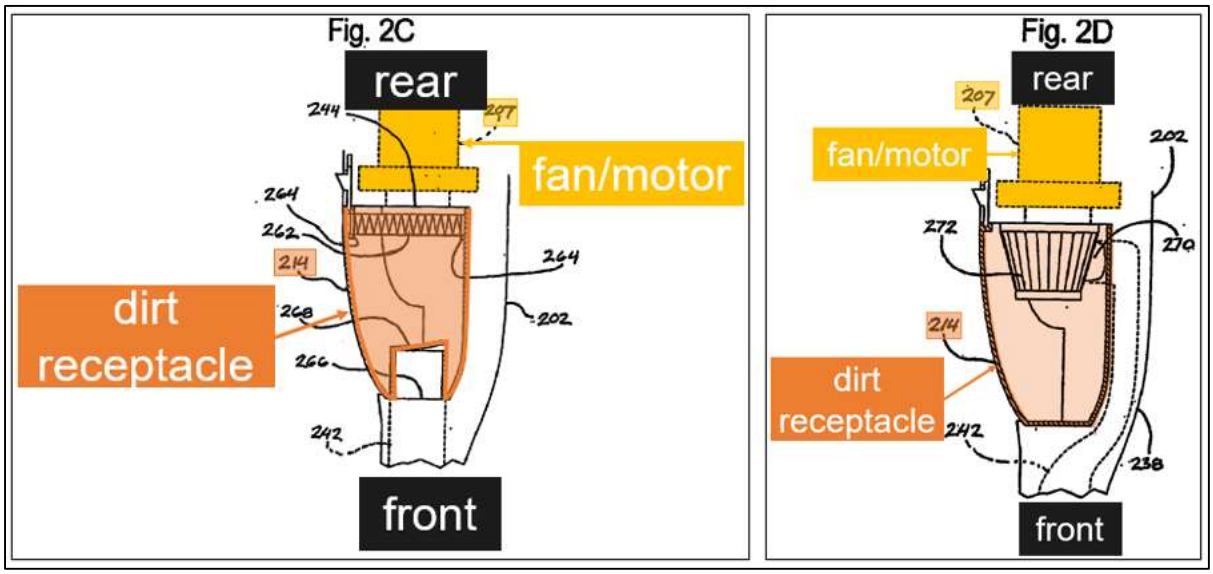
Ex1005, 35:16-19, 35:20-21, Figs. 15, 2A, 2C-2D; *see also id.*, Figs. 3-5, 16.

136. Further, in my opinion, Butler's suction motor ("**fan/motor assembly**") is rearward of Butler's cyclone bin assembly ("**dustcup assembly**

1508"/"dirt receptacle 214") at least because it is nearer the **rear end** of the vacuum as shown in the annotated figures below:







Ex1005, Figs. 15, 2A, 2C-2D; Ground 1, [1pre]/[14pre] [1c]/[14c].

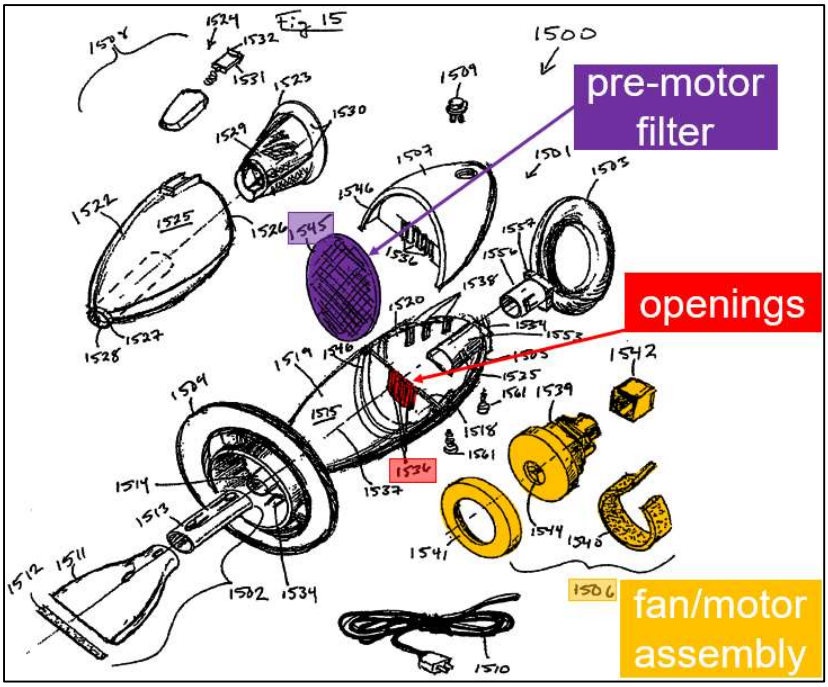
137. Therefore, in my opinion, Butler teaches a suction motor positioned in the main housing and located downstream of the pre-motor filter and rearward of the cyclone bin assembly.

i. [1f]/[14f]

Reference Number	Claim Limitation
[1f]	"an air flow path extending from the pre-motor filter to the suction motor;"
[14f]	"an air flow path extending from the pre-motor filter to the suction motor;"

138. In my opinion, Butler teaches an air flow path extending from the pre-motor filter to the suction motor.

139. Butler teaches that, in its vacuum cleaner, air flows from Butler's "**pre-motor filter**" (Ground 1, [1d1]/[14d1]) to the suction motor, "**fan/motor assembly**" (Ground 1, [1e]/[14e]), through the "**openings 1536**," as shown in the annotated figure below:



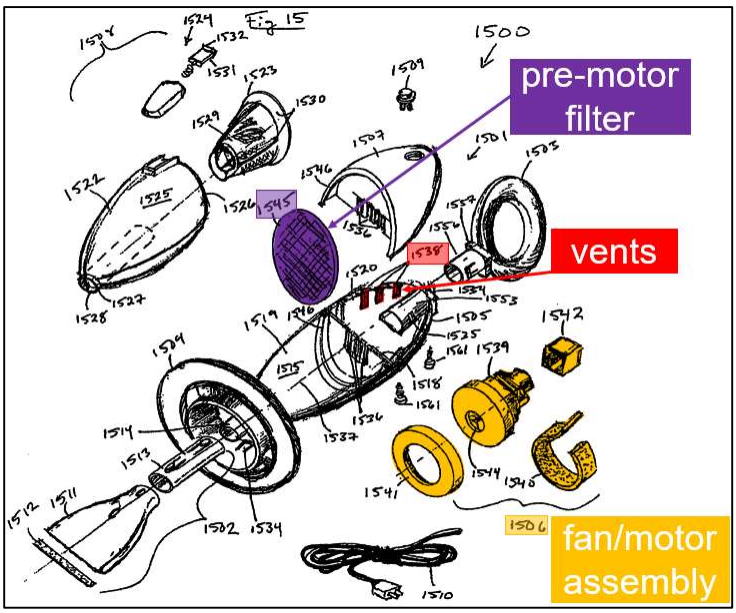
Ex1005, Fig. 15, 35:18-19, 35:20-21; *see also id.*, Figs. 2A, 2C-2D, 3-5, 16, 18:24-26 ("**dirt receptacle 214**" "connected by suitable air conduits" to "**fan/motor 207**").

j. [1g]/[14g]

Reference Number	Claim Limitation
[1g]	"a clean air outlet downstream of the suction motor; and,"
[14g]	"a clean air outlet downstream of the suction motor; and,"

140. In my opinion, Butler teaches a clean air outlet downstream of the suction motor.

141. For example, Butler teaches that the "exhaust path for the **fan/motor assembly 1506**" includes "**vents 1538**," as shown in the annotated figure below:



Ex1005, 35:19-20, Fig. 15.

142. Similarly, Butler teaches using "**outlet apertures 210** to exhaust the working airflow from the **fan/motor chamber 209** to the atmosphere." Ex1005, 15:24-27.

143. In my opinion, a POSA would have understood that the air exhausted from "**vents 1538/outlet apertures 210**" is clean air because it has been cleaned by the cyclone and filters. Therefore, in my opinion, a POSA would have understood that Butler's "**vents 1538/outlet apertures 210**" are a clean air outlet downstream of the suction motor.

k. [1h1]/[14h1]

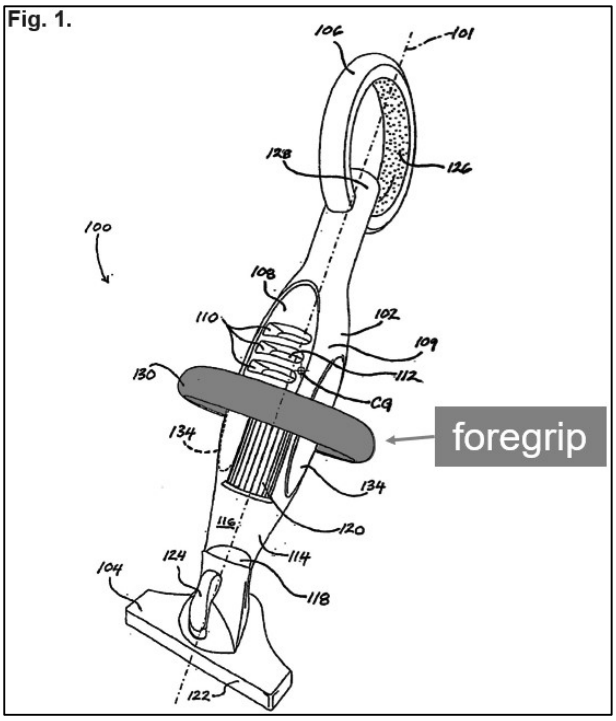
Reference Number	Claim Limitation
[1h1]	"a handle connected to the hand vacuum cleaner at first and second locations, wherein the first location is at a position of the suction motor in the main housing and a first handle portion is connected at the first location,"
[14h1]	"a handle connected to the hand vacuum cleaner at first and second locations wherein the first location is at a position of the suction motor in the main housing, the handle has a first handle portion provided at the first location,"

144. In my opinion, Butler teaches and renders obvious a handle connected to the hand vacuum cleaner at first and second locations, wherein the first location is at a position of the suction motor in the main housing and a first handle portion is connected at the first location. (Limitation [1h1]).

145. In my opinion, Butler teaches and renders obvious a handle connected to

the hand vacuum cleaner at first and second locations wherein the first location is at a position of the suction motor in the main housing, the handle has a first handle portion provided at the first location. (Limitation [14h1]).

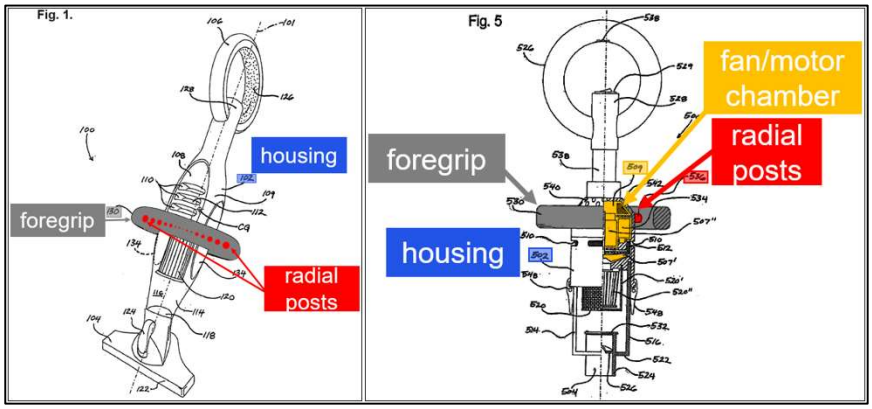
146. First, Butler teaches a handle, "**foregrip**":



Ex1005, Fig. 1, 3:28-4:1.

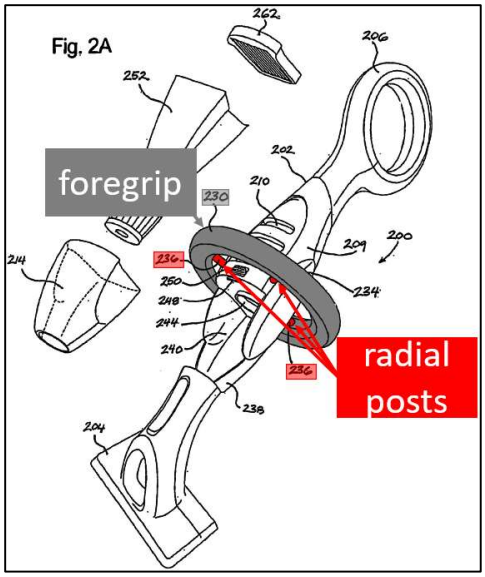
147. In my opinion, Butler teaches that its "**foregrip**" and its "radial posts" can take on various configurations, each of which is connected to the hand vacuum at first and second locations, wherein the first location is at a position of the suction motor in the main housing and a first handle portion is connected at the first location.

148. For example, Butler teaches the "**foregrip**" can be "formed into an elliptical, circular, or otherwise continuous loop-like shape that surrounds the **housing**," and "[o]ne or more **radial posts** … are provided between the **foregrip** [] and the **housing**," as shown in the annotated figures below:



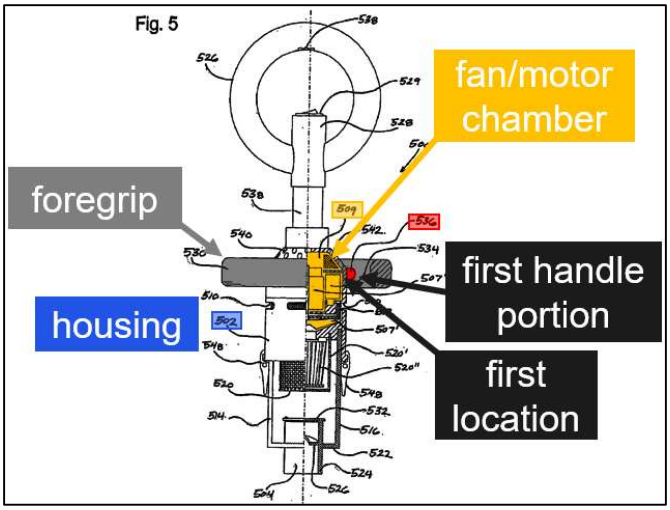
Ex1005, 11:26-12:2, Figs. 1, 5.

149. In my opinion, this "continuous loop" "**foregrip**" is a handle connected to the hand vacuum cleaner at multiple locations (where the "**radial posts**" are attached), two of which are at first and second locations (the location at which any two of the "**radial posts**" are attached):



Ex1005, Fig. 2A.

150. Further, in my opinion, Butler's suction motor is in the main housing (Ground 1, [1e]/[14e]), and the "**foregrip** [] surrounds [the] **fan/motor chamber** [] in which the **fan/motor** [] is located." Ex1005, 20:12-13. A **first location** is at a position of the suction motor ("**fan/motor**" in the "**fan/motor chamber**") and the **first handle portion** (one of the "**radial posts**") is connected at the first location, as shown in the annotated figure below:



Ex1005, Fig. 5.

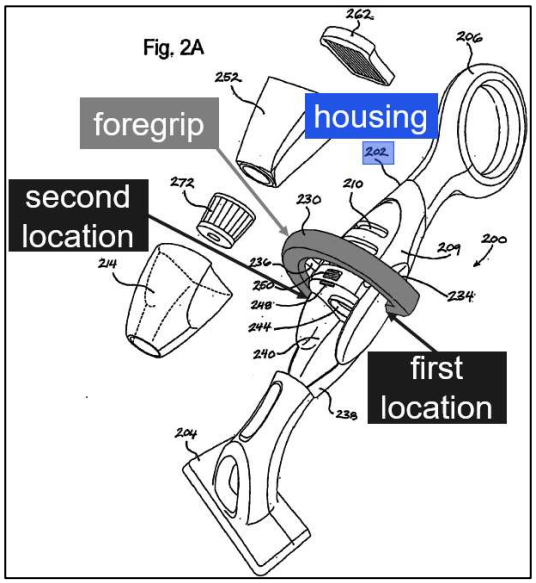
151. In my opinion, a POSA would have understood that the "**radial posts**" are a handle portion at least because Butler teaches that the posts "provide one or more gaps between the foregrip 130 and the housing 102 into which the user may fit his or her fingers or hand," Ex1005, 11:28-12:2, and one of the purposes of fitting a user's fingers or hand into those gaps is for a user to use the **post** as an affordance.

152. Further, in my opinion, a POSA would have found it obvious to use the "**radial posts**" as handle portions because one of Butler's goals is to "provide a user with multiple hand positions around the perimeter of the housing," Ex1005, Abstract, and using the "**radial posts**" as handle portions provides even more hand position options for a user.

153. Butler further teaches that its **foregrip** may also "be formed as a partial

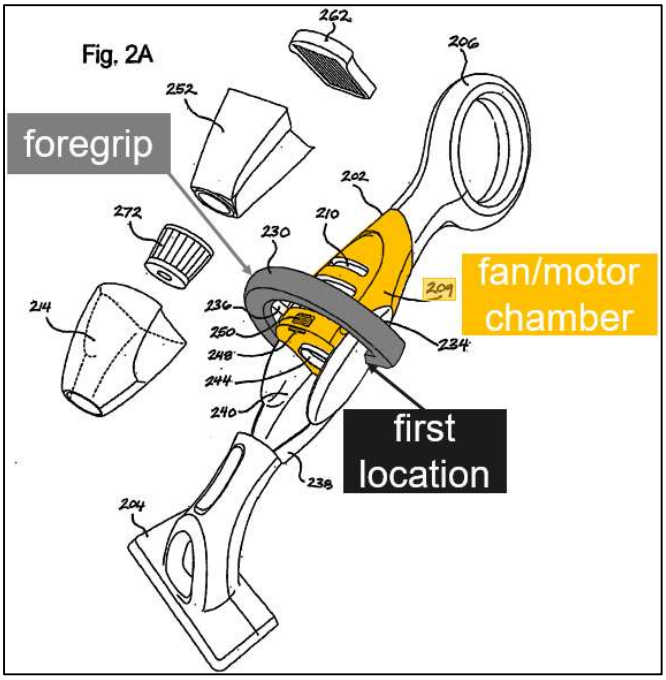
loop." Ex1005, 19:15-17.

154. In my opinion, a POSA would have understood that this "partial loop" "**foregrip**" would attach to the main housing at **first** and **second locations** at each end of the partial loop, including as illustrated in modified figure below:



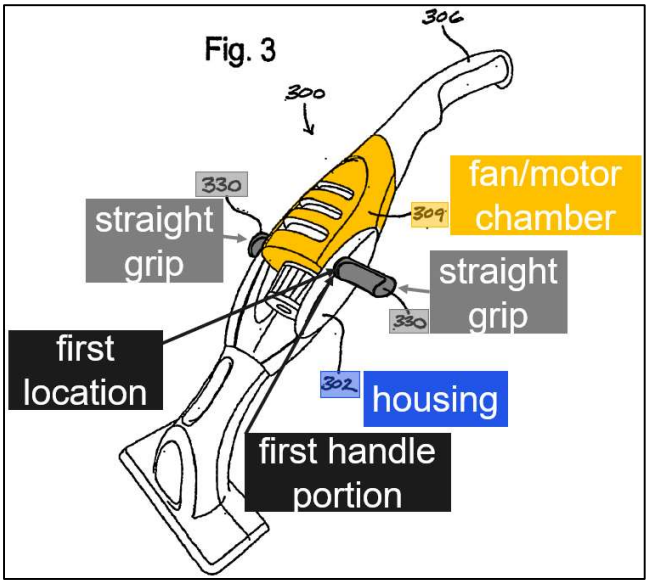
Ex1005, Fig. 2A (modified).

155. Therefore, in my opinion, a POSA would have understood that the **first location** of the "partial loop" "**foregrip**" would connect to the hand vacuum at a position of the suction motor in the main housing because the handle forms a "partial loop" around the suction motor, such as that depicted in modified figure below:



Ex1005, Fig. 2A (modified).

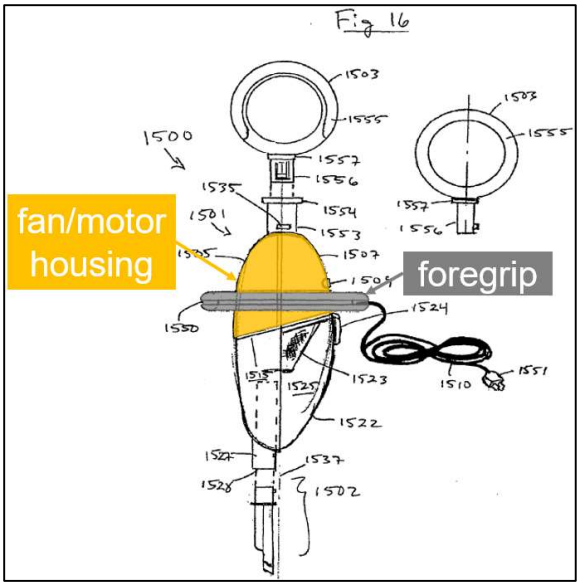
156. Butler also teaches another configuration having a "**foregrip** compris[ing] two separate **straight grips 330** that extend generally radially from the vacuum cleaner **housing 302** at a location adjacent … the **fan/motor chamber 309**," as shown in the modified figure below:



Ex1005, 19:18-22, Fig. 3.

157. In my opinion, a POSA would have understood that the "**straight grips 330**" are a handle consisting of two handle portions, connected to the hand vacuum at first and second locations, where the **first handle portion** is connected at the **first location**, which is at a position adjacent to the suction motor in the main housing, shown above.

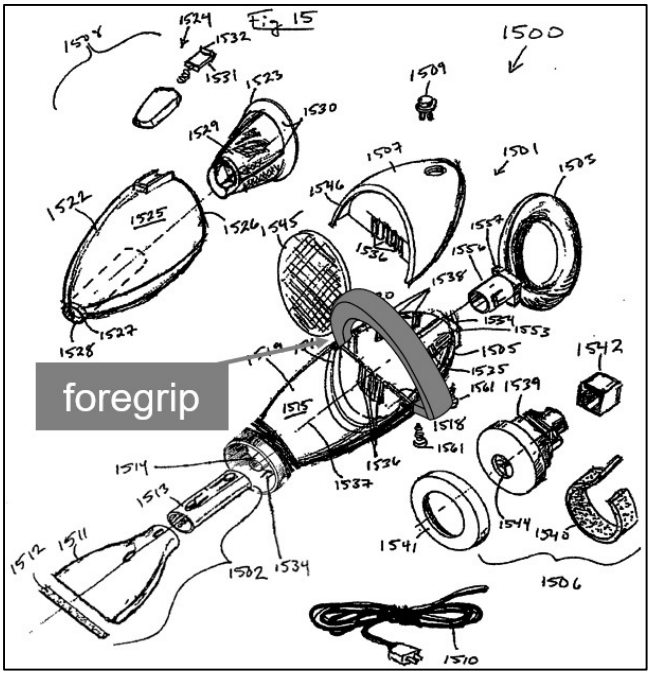
158. Butler further teaches that the handle ("**foregrip**") configuration shown in Figures 15-16 may be at a location surrounding the **fan/motor chamber**, as shown in the annotated figure below:



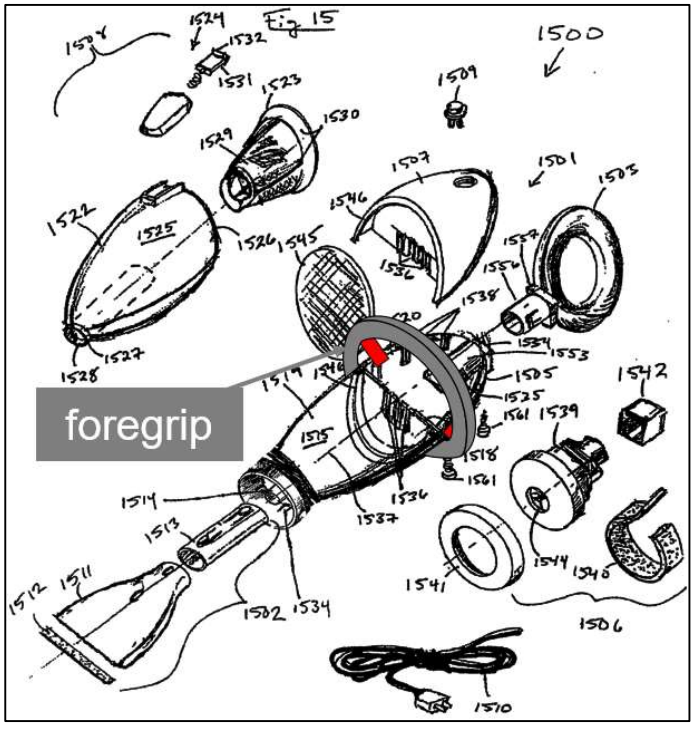
Ex1005, Fig. 16, 5:24-25 ("Figure 16 depicts the embodiment of Figure 15 …."); *see also id.*, Figs. 20B, 21, 23.

159. Further still, Butler teaches that its grips are interchangeable and versatile—they "may have any shape suitable for" "maneuver[ing] the back of the vacuum cleaner," and "may be replaced by any combination of rear grip and foregrip that provide the user with hand positions to ergonomically maneuver the device." Ex1005, 10:17-19, 19:9-12. Therefore, in my opinion, a POSA would have understood that each of the handle configurations described above could be used to replace Figure 15's **foregrip 1504** at a location surrounding the suction motor and would have found such configurations obvious for the same reasons. Such handle configurations used in Figure 15 are emphasized in the modified figures

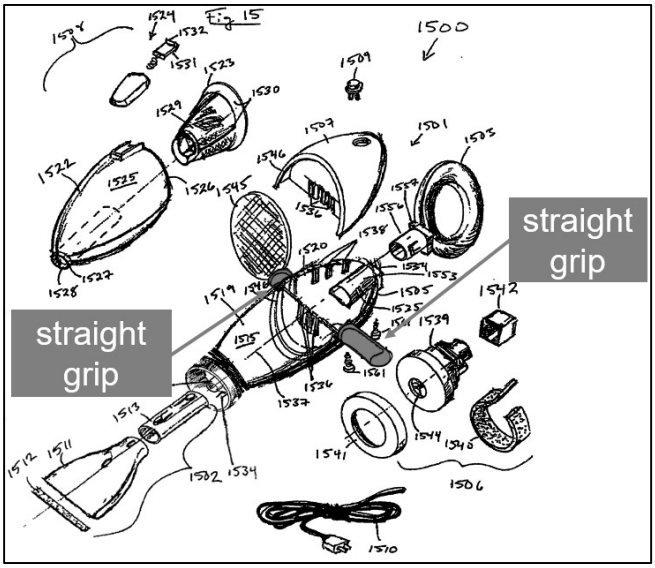
below:



Ex1005, Figs. 15, 2A (modified).



Ex1005, Figs. 15, 5 (modified).



Ex1005, Figs. 15, 3 (modified).

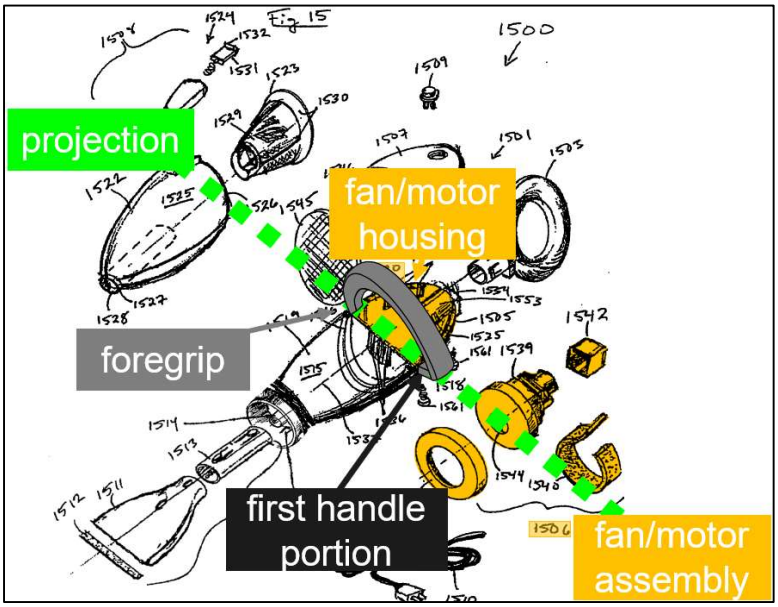
160. In my opinion, a POSA would therefore have understood all of the above configurations to meet the limitations described in Claims [1h1] and [14h1].

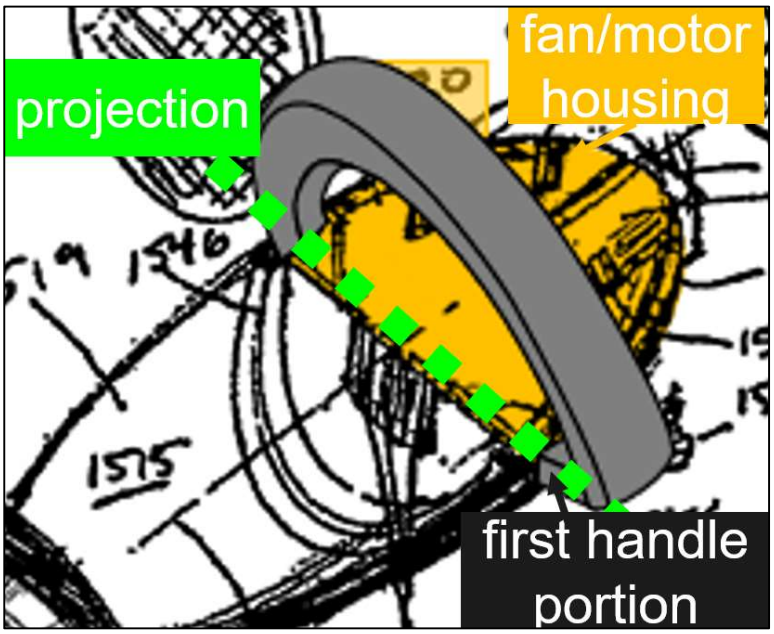
l. [1h2]/[14h2]

Reference Number	Claim Limitation
[1h2]	"wherein a projection of the first handle portion extends through the suction motor,"
[14h2]	"a projection of the first handle portion extends through the suction motor, and"

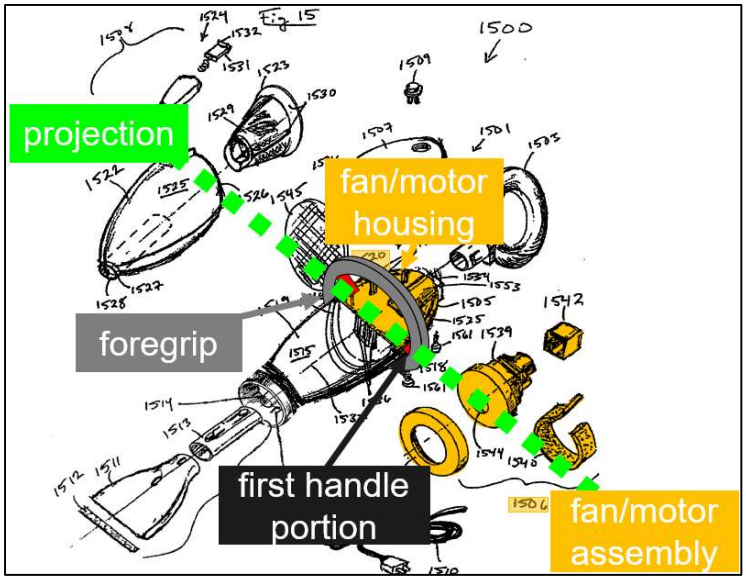
161. In my opinion, Butler teaches a handle wherein a projection of the first handle portion extends through the suction motor.

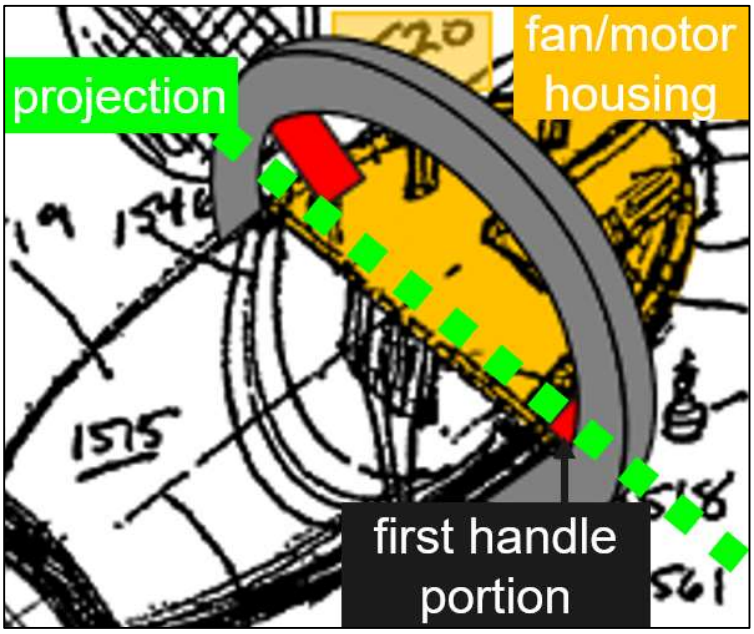
162. In my opinion, in each of Butler's handle configurations discussed in Ground 1, [1h1]/[14h1], a projection of the **first handle portion** extends through the suction motor ("**fan/motor assembly**"), as shown in the annotated and modified figures below:



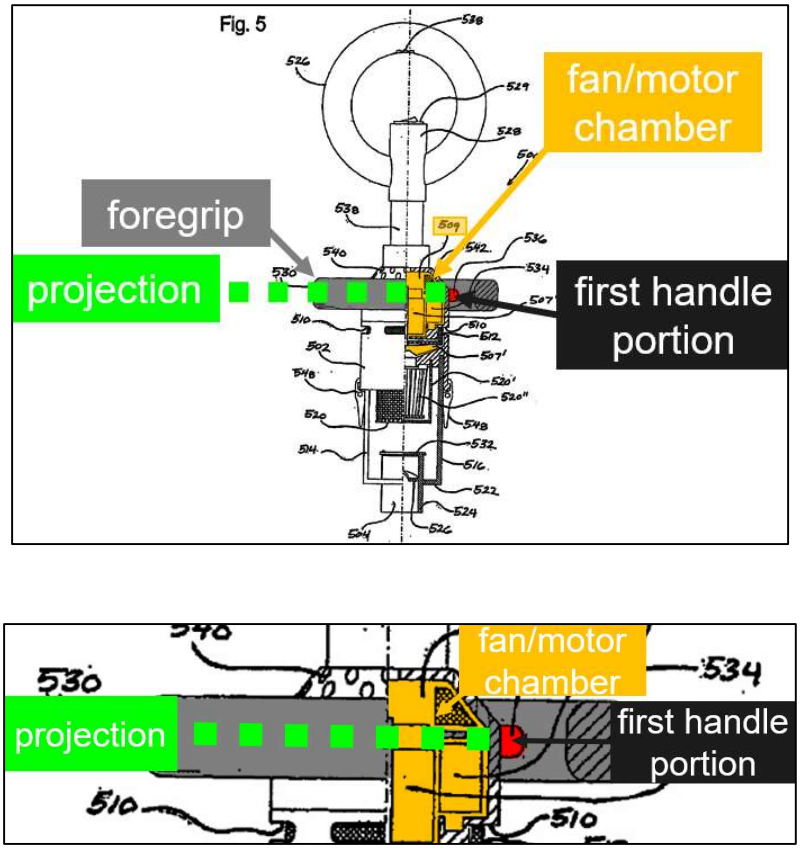


Ex1005, Figs. 15, 2A (modified).

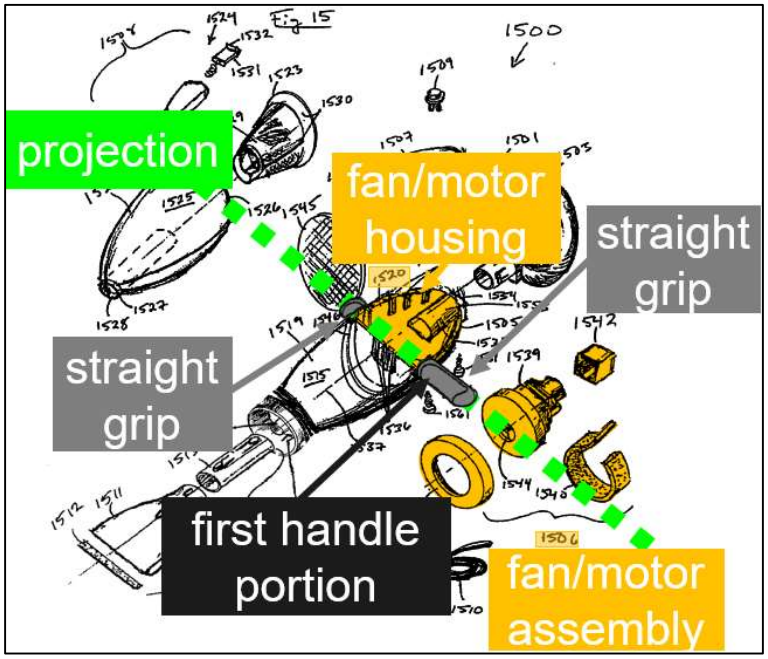


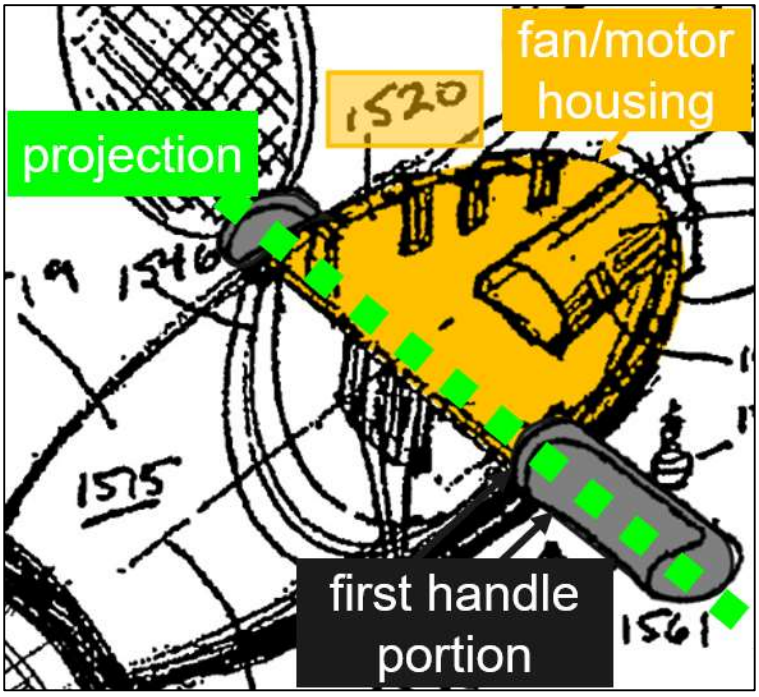


Ex1005, Figs. 15, 5 (modified).



Ex1005, Fig. 5; Ground 1, [1h1]/[14h1].





Ex1005, Figs. 15, 3 (modified).

m. [1h3]/[14h3]

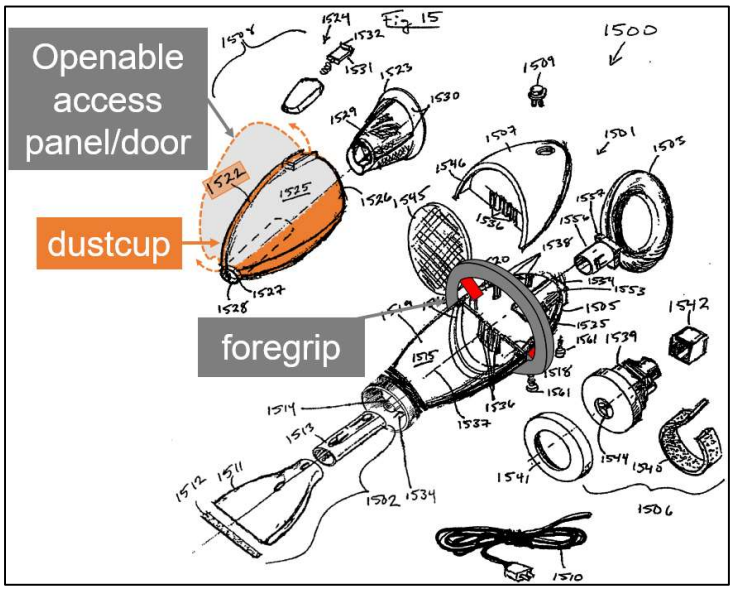
Reference Number	Claim Limitation
[1h3]	"wherein the pre-motor filter housing is openable without moving the handle with respect to the cyclone chamber, and"
[14h3]	"the pre-motor filter housing is openable without moving the handle with respect to the cyclone chamber;"

163. In my opinion, Butler teaches a handle wherein the pre-motor filter housing is openable without moving the handle with respect to the cyclone chamber.

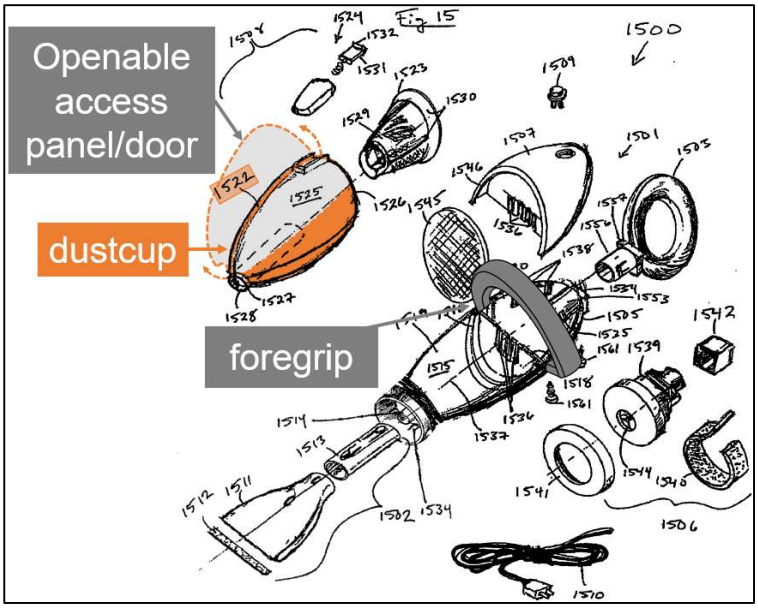
164. In my opinion, Butler teaches an openable pre-motor filter housing ("**dustcup 1522**"/"**dirt receptacle 214**" having an "**access panel or**

door"), Ground 1, [1d2]/[14d2], and a cyclone chamber ("**dustcup 1522**"/"**dirt receptacle 214**"'s "cyclon[e/ic]" "separation chamber"), Ground 1, [1c]/[14c]. Butler further teaches that, in each of Figure 15's handle configurations described in Ground 1, [1h1]/[14h1], the handle is at a position of the suction motor. Ground 1, [1h1] /[14h1].

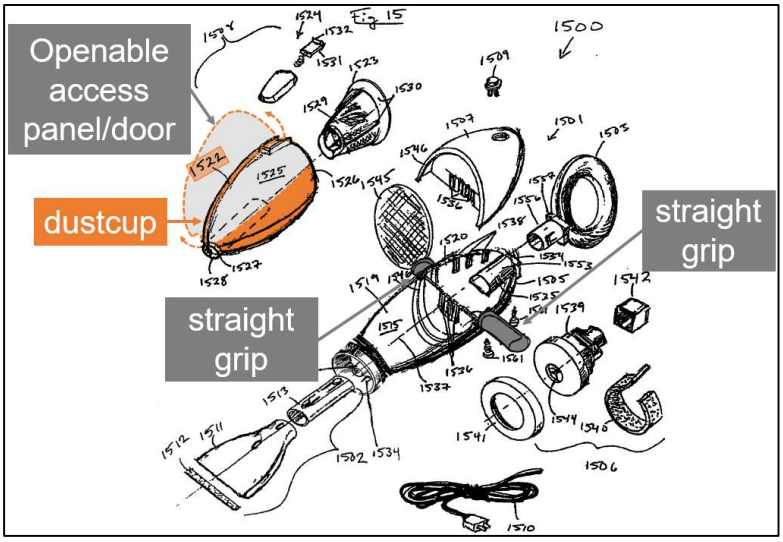
165. Therefore, in my opinion, a POSA would have recognized that, in each of Figure 15's handle configurations described in Ground 1, [1h1] /[14h1], Butler's pre-motor filter housing is openable without moving the handle with respect to the cyclone chamber at least because Butler's handle is at a position of the suction motor, not the pre-motor filter housing, as shown in the modified figures below:



Ex1005, Figs. 15, 5 (modified).



Ex1005, Figs. 15, 2A (modified).



Ex1005, Figs. 15, 3 (modified); *see also id*. Fig. 2A, 2C, 3, 16.

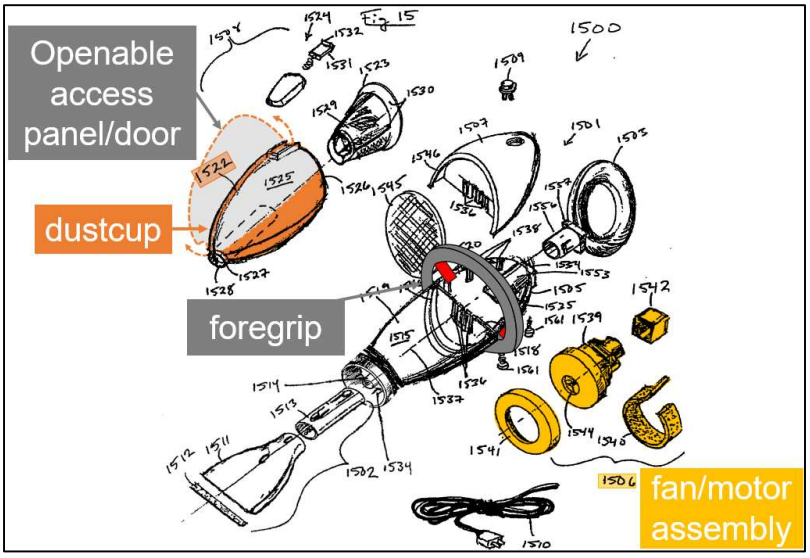
n. [1h4]/[14h4]

Reference Number	Claim Limitation
[1h4]	"wherein the pre-motor filter housing cover is openable while the cyclone bin assembly is in fluid flow communication with the suction motor."
[14h4]	"wherein the pre-motor filter housing cover is openable while the cyclone chamber is in fluid flow communication with the suction motor, and"

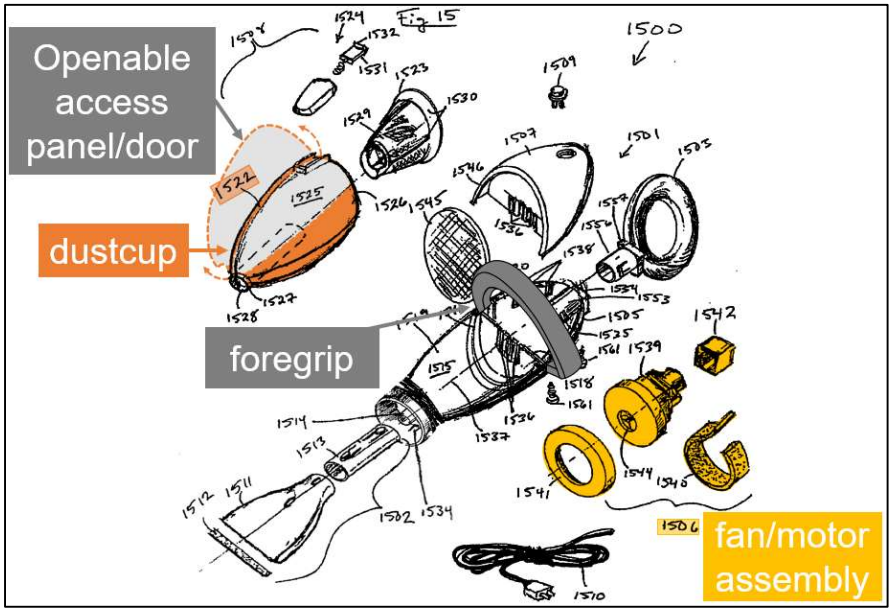
166. In my opinion, Butler teaches the pre-motor filter housing cover is openable while the cyclone bin assembly is in fluid flow communication with the suction motor. (Limitation [1h4]).

167. In my opinion, Butler teaches the pre-motor filter housing cover is openable while the cyclone chamber is in fluid flow communication with the suction motor. (Limitation [14h4]).

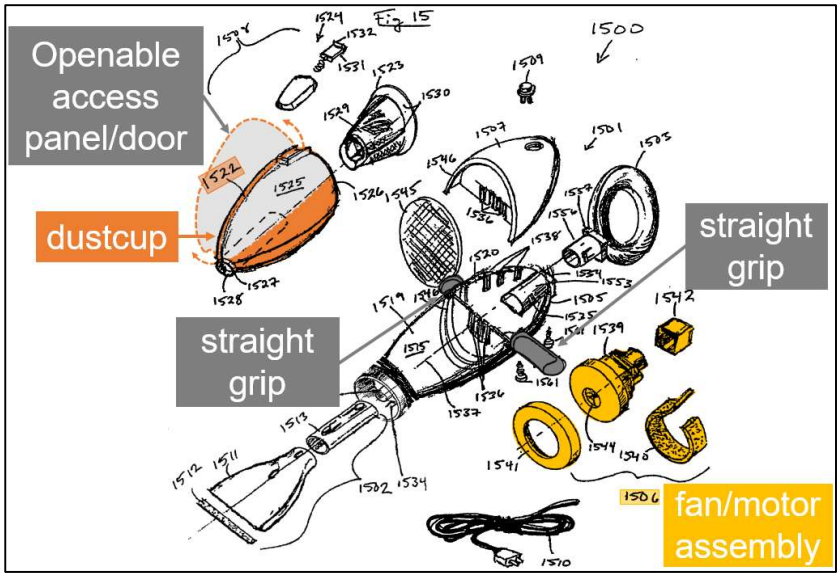
168. In my opinion, a POSA would have recognized that Butler's pre-motor filter housing cover ("**dustcup 1522**"/"**dirt receptacle 214**"'s "**access panel or door**") is openable while the cyclone bin assembly ("**dustcup assembly 1508**"/"**dirt receptacle 214**") is in fluid flow communication with the suction motor ("**fan/motor assembly**"), including because Butler's "**access panel or door**" is opened without blocking an airway, removing the cyclone bin assembly, or removing the suction motor, as shown in the modified figures below:



Ex1005, Figs. 15, 5 (modified).



Ex1005, Fig. 15, 2A (modified).



Ex1005, Figs. 15, 3 (modified).

169. Therefore, in my opinion, because the cyclone chamber is contained within the cyclone bin assembly, Ground 1, [1c]/[14c], a POSA would have understood that the cyclone chamber is in fluid flow communication with the suction motor for the same reasons.

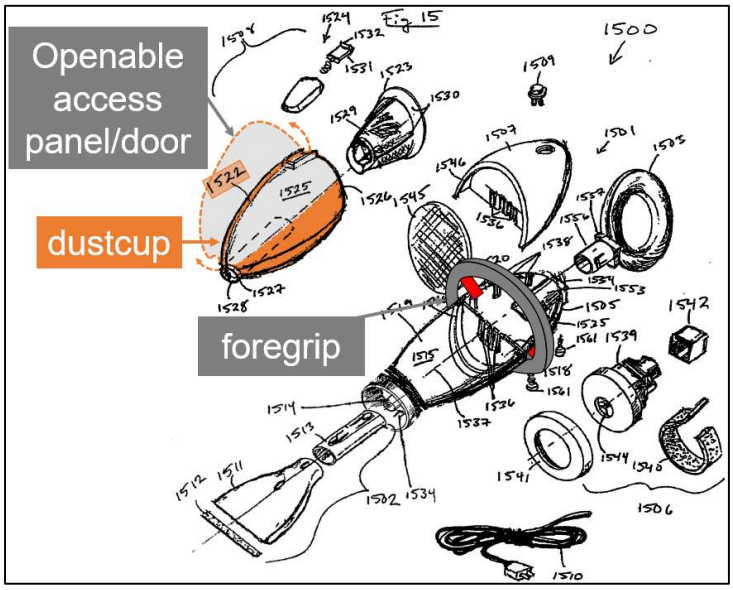
o. [14h5]

Reference Number	Claim Limitation
[14h5]	"wherein the first and second locations are provided other than on the openable pre-motor filter housing cover."

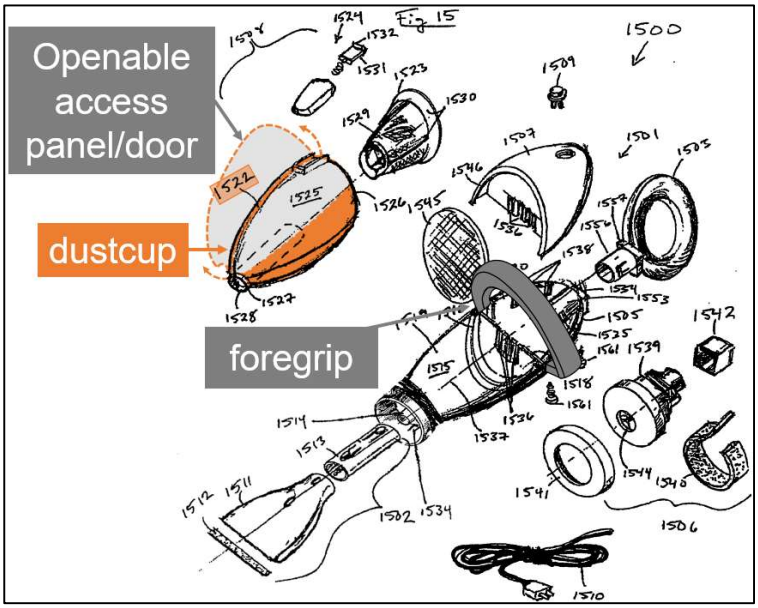
170. In my opinion, Butler teaches first and second locations provided other than on the openable pre-motor filter housing cover.

171. In my opinion, Butler's handle connects to the vacuum at a first and second location, Ground 1, [1h2]/[14h2]. In my opinion, the first and second

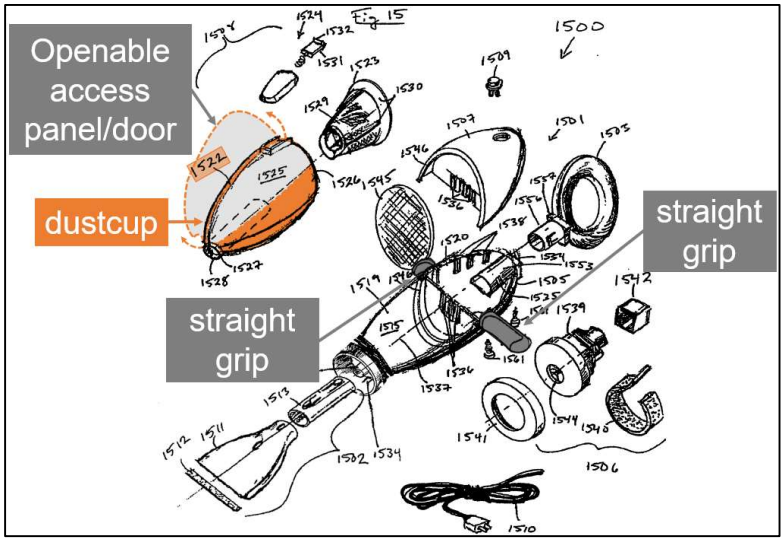
locations are provided other than on the openable pre-motor filter housing cover ("**dustcup 1522**"/"**dirt receptacle 214**"'s "**access panel or door**," Ground 1, [1h2]/[14h2]), as shown in the modified figures below:



Ex1005, Figs. 15, 5 (modified).



Ex1005, Figs. 15, 2A (modified).



Ex1005, Figs. 15, 3 (modified).

3. Butler Renders Claims [2]/[15] Obvious

172. In my opinion, Butler renders claims 2 and 15 obvious.

a. [2a]/[15a]

Reference Number	Claim Limitation
[2a]	"The hand vacuum cleaner of claim 1 wherein the suction motor comprises a fan and a motor and"
[15a]	"The hand vacuum cleaner of claim 14 wherein the suction motor comprises a fan and a motor and"

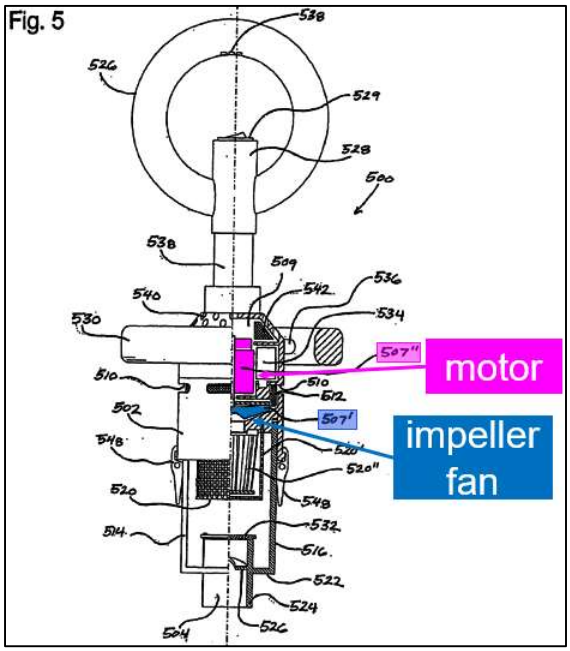
173. In my opinion, Butler renders the hand vacuum cleaner of claim 1 obvious and further teaches that the suction motor comprises a fan and a motor. (Limitation [2a]).

174. In my opinion, Butler renders the hand vacuum cleaner of claim 14 obvious

and further teaches that the suction motor comprises a fan and a motor. (Limitation [15a]).

175. In my opinion, Butler renders obvious claims 1 and 14, as I explained above. Ground 1, [1]/[14].

176. In my opinion, a POSA would have understood that Butler teaches a suction motor ("**fan/motor 507**"), which comprises a fan ("**impeller fan 507'**") and a motor ("**motor 507''**"), as shown in the annotated figure below:



Ex1005, Fig. 5, 20:12-14; *see also id.*, Abstract ("A vacuum fan and a motor are located within the housing and the motor is adapted to drive the vacuum fan to draw a working air flow into the air inlet."), Fig. 15.

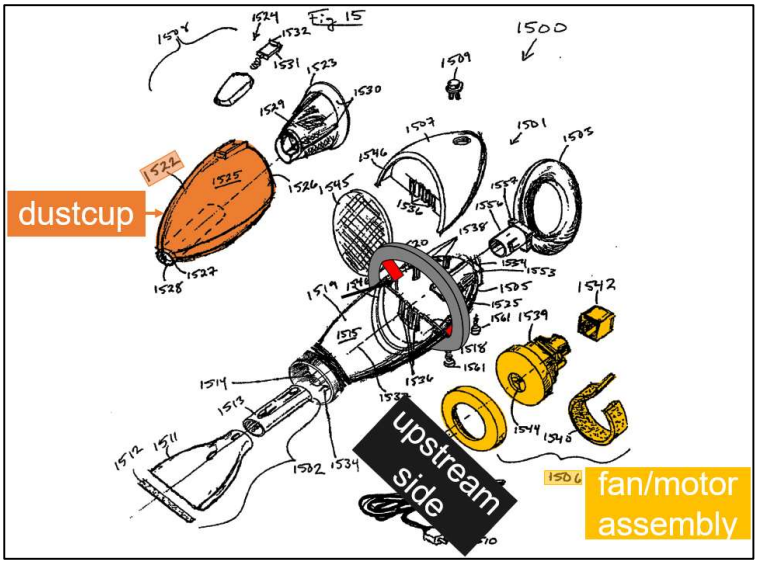
b. [2b]/[15b]

Reference Number	Claim Limitation
[2b]	an upstream side of the fan is positioned proximate the cyclone inlet.
[15b]	an upstream side of the fan is positioned proximate the cyclone air inlet.

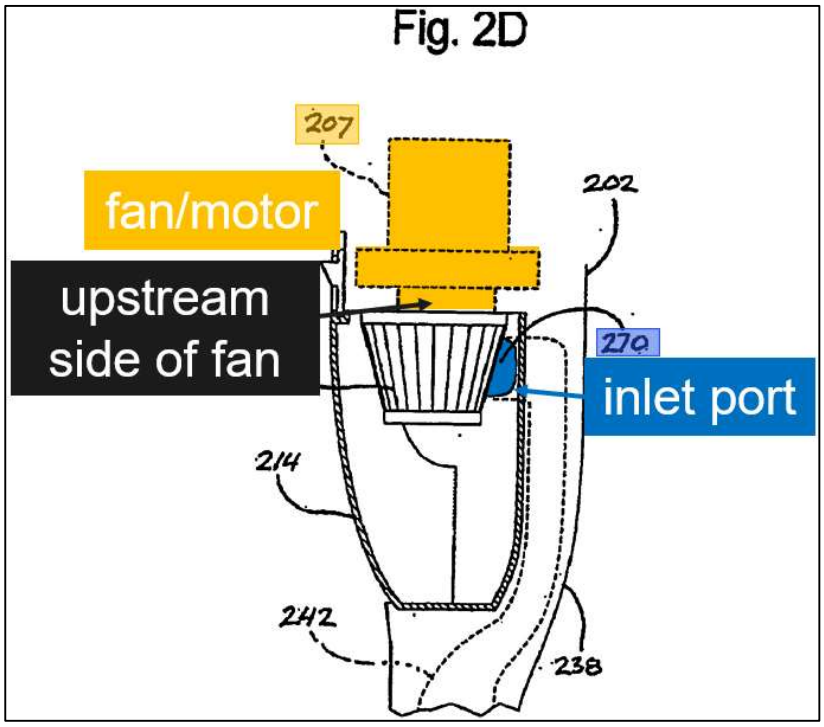
177. In my opinion, Butler teaches that an upstream side of the fan is positioned proximate the cyclone inlet. (Limitation [2b]).

178. In my opinion, Butler teaches that an upstream side of the fan is positioned proximate the cyclone air inlet. (Limitation [15b]).

179. In my opinion, Butler teaches that an upstream side of the fan is positioned proximate the cyclone inlet because the side of the "**fan/motor assembly**" (which contains the "fan") nearer the "**dustcup 1522**" is an **upstream side** of the fan, positioned proximate Butler's cyclone air inlet (Ground 1, [1c]/[14c]), as shown in the annotated figures below:



Ex1005, Figs. 15, 5 (modified), 35:14-19; *see also id.*, Fig. 2D (showing upstream side of **fan/motor 207** proximate **inlet port 270**):



Ex1005, Fig. 2D, 17:26-27, 18:7-10.

4. Butler Renders Claims [3]/[16] Obvious

Reference Number	Claim Limitation
[3]	"The hand vacuum cleaner of claim 1 wherein the downstream side of the pre-motor filter is spaced further from the cyclone chamber than the upstream side of the pre-motor filter."
[16]	"The hand vacuum cleaner of claim 14 wherein the downstream side of the pre-motor filter is spaced further from the cyclone chamber than the upstream side of the pre-motor filter."

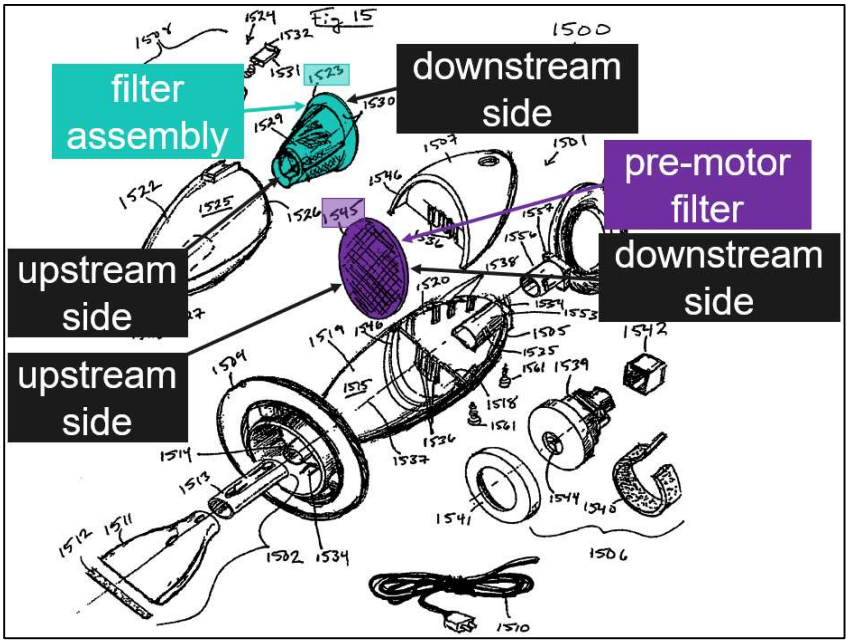
180. In my opinion, Butler renders the hand vacuum cleaner of claim 1 obvious and further teaches that the downstream side of the pre-motor filter is spaced further from the cyclone chamber than the upstream side of the pre-motor filter. (Claim 3).

181. In my opinion, Butler renders obvious the hand vacuum cleaner of claim 14 and further teaches that the downstream side of the pre-motor filter is spaced further from the cyclone chamber than the upstream side of the pre-motor filter. (Claim 16).

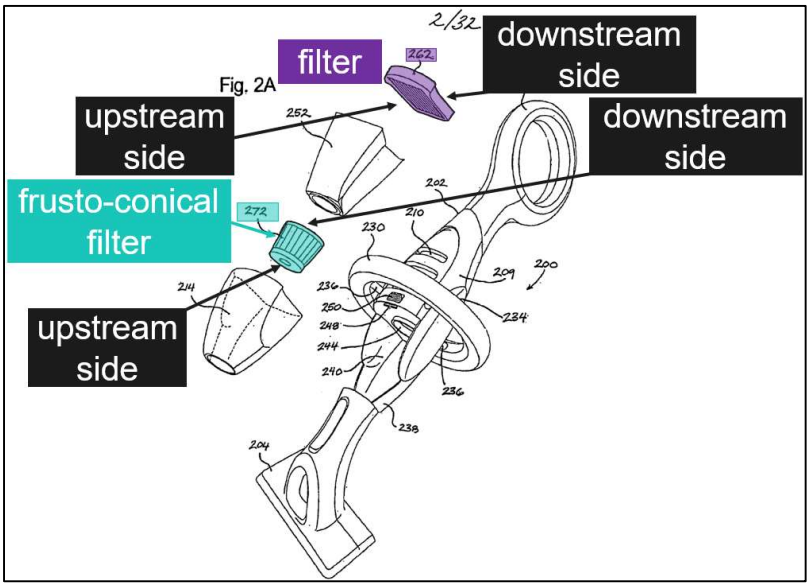
182. In my opinion, Butler renders obvious claims 1 and 14 as I explained above. Ground 1, [1]/[14].

183. In my opinion, a POSA would have understood the **downstream side** of each of Butler's pre-motor filters (**pre-motor filter 1545**/**filter 262**/**filter 272**/**filter assembly 1523**) to be spaced further from the cyclone chamber than the pre-motor filter's **upstream side**, as shown in the annotated

figures below:



Ex1005, Fig. 15, 35:14-19.



Ex1005, Fig. 2A, 17:17-18 ("a **filter 262** is positioned in the top of the dirt receptacle to filter air passing therethrough"), 18:10-12 ("**filter 272** is located over the fan/motor inlet opening 244"); *see also id.* Figs. 2C-2D.

5. Butler Renders Claims [4]/[17] Obvious

Reference Number	Claim Limitation
[4]	"The hand vacuum cleaner of claim 3 further comprising a downstream header on the downstream side of the pre-motor filter and the downstream header is opened when the openable cover is opened."
[17]	"The hand vacuum cleaner of claim 14 further comprising a downstream header on the downstream side of the pre-motor filter and the downstream header is opened when the openable cover is opened."

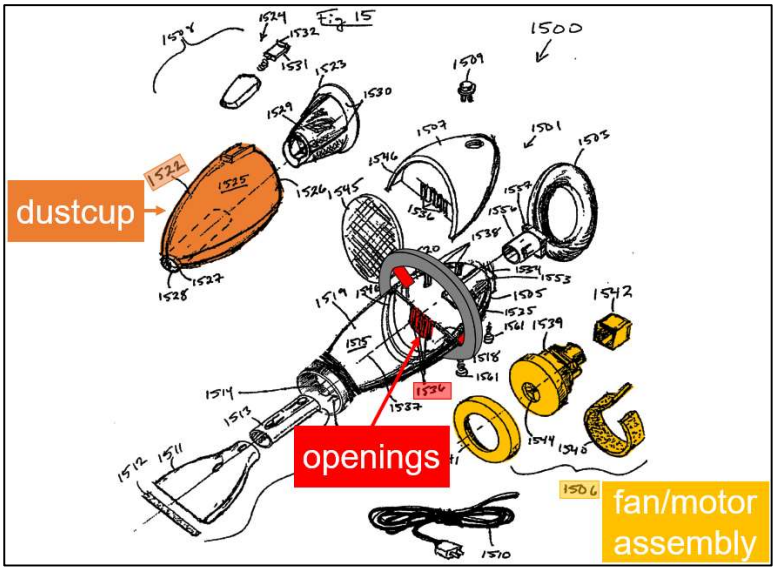
184. In my opinion, Butler renders the hand vacuum cleaner of claim 3 obvious and further teaches the hand vacuum cleaner further comprising a downstream header on the downstream side of the pre-motor filter and the downstream header is opened when the openable cover is opened. (Claim 4).

185. In my opinion, Butler renders the hand vacuum cleaner of claim 14 obvious and further teaches the hand vacuum cleaner further comprising a downstream header on the downstream side of the pre-motor filter and the downstream header is opened when the openable cover is opened. (Claim 17).

186. In my opinion, Butler renders obvious claims 3 and 14 as I explained above. Ground 1, [3]/[14].

187. While the specification of the '472Patent does not define a header, in my opinion, headers were well known and a POSA would have understood that a bounded airflow path that channels air is a header.

188. Butler teaches a downstream header: "**openings 1536** or vents … allow air to pass from the **dustcup 1522** to the **fan/motor assembly 1506**":

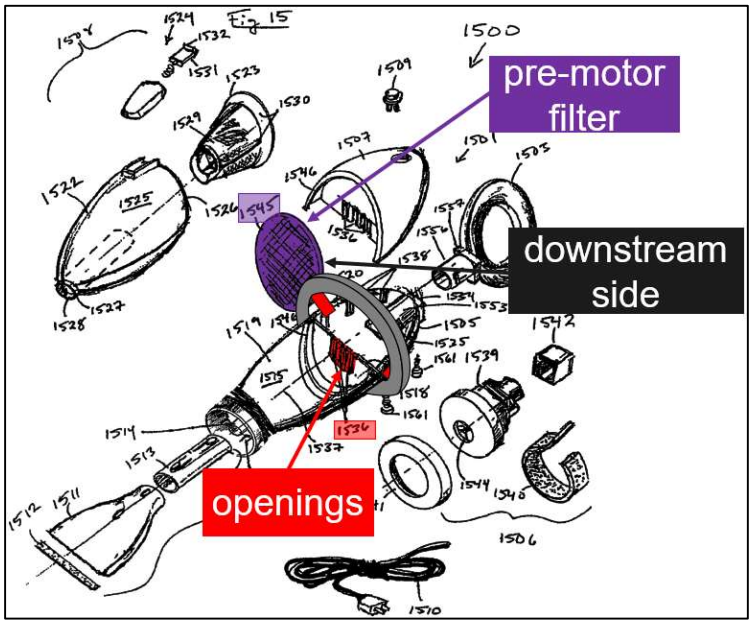


Ex1005, 35:14-20, Figs. 15, 5 (modified); *see also id.*, Figs. 2A, 2C.

189. In my opinion, a POSA would have understood that the bounded airflow path through "**openings 1536**" is a downstream header because it channels and routes air downstream of Butler's pre-motor filter.

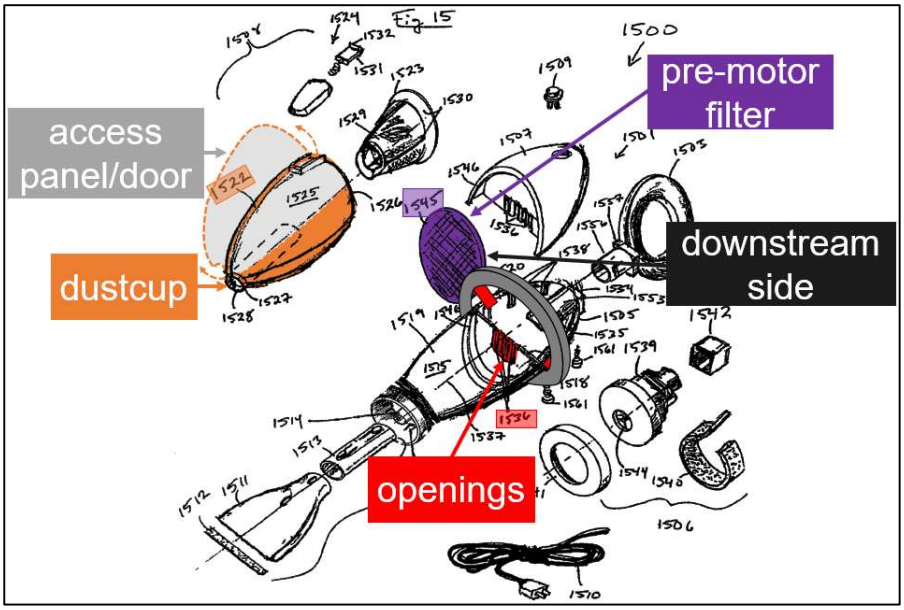
190. Further, in my opinion, a POSA would have understood that Butler's

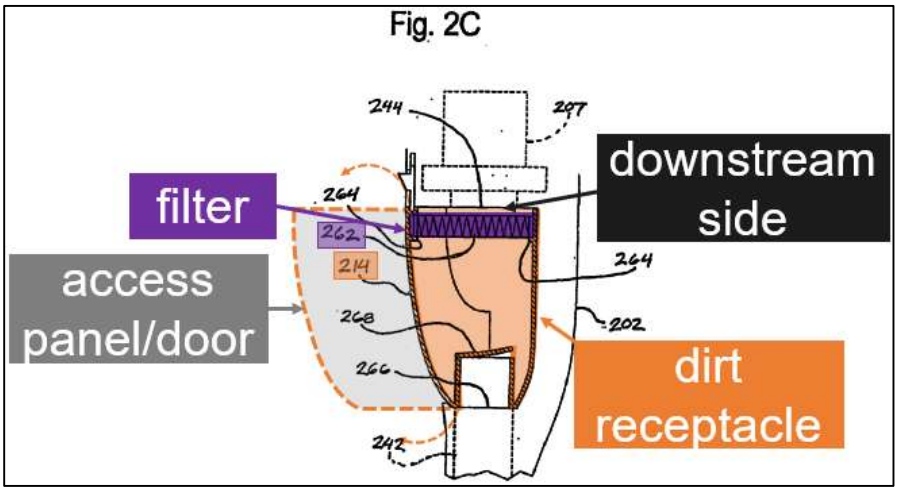
downstream header is on the downstream side of the pre-motor filter (Butler's "**pre-motor filter** … cover[s] the vent **opening 1536**") as shown in the annotated figure below:



Ex1005, Figs. 15, 5 (modified), 35:20-22 ("**pre-motor filter** … [is] in front of the **opening 1536**").

191. In my opinion, Butler teaches and renders obvious that the downstream header ("**openings 1536**") is opened when the openable cover (**dustcup 1522**/**dirt receptacle 214**'s **access panel**) is opened because Butler teaches and renders obvious an openable cover that extends beyond the downstream end of Butler's pre-motor filter (**pre-motor filter 1545**/**filter 262**), the location where Butler's downstream header is positioned, as shown in the annotated figures below:





Ex1005, Figs. 15, 5 (modified), 2C (modified); Ground 1, [1d2]/[14d2].

192. Therefore, it is my opinion that a POSA would have understood that when the openable cover is opened, the downstream header is opened.

6. Butler Renders Claims [8]/[21] Obvious

193. In my opinion, Butler renders claims 8 and 21 obvious.

a. [8a]/[21a]

Reference Number	Claim Limitation
[8a]	"The hand vacuum cleaner of claim 1 wherein each of the upstream and downstream sides of the pre-motor filter has a front end positioned proximate the front end and extending rearwardly,"
[21a]	"The hand vacuum cleaner of claim 14 wherein each of the upstream and downstream sides of the pre-motor filter has a front end positioned proximate the front end and extending rearwardly,"

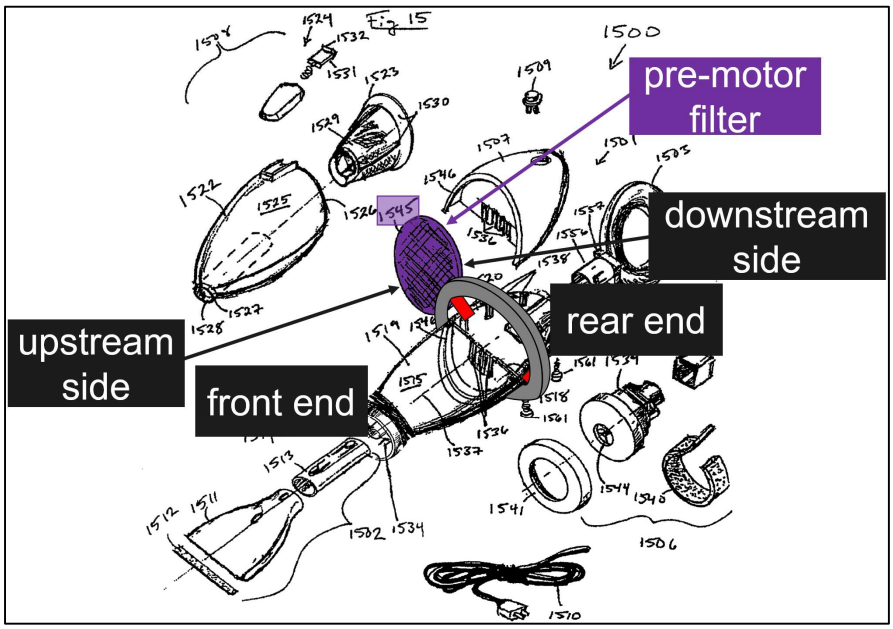
194. In my opinion, Butler renders obvious the hand vacuum cleaner of claim 1 and further teaches that each of the upstream and downstream sides of the pre-motor filter has a front end positioned proximate the front end and extending rearwardly. (Limitation [8a]).

195. In my opinion, Butler renders obvious the hand vacuum cleaner of claim 14 and further teaches that each of the upstream and downstream sides of the pre-motor filter has a front end positioned proximate the front end and extending rearwardly. (Limitation [21a]).

196. In my opinion, Butler renders obvious claims 1 and 14 as I explained above. Ground 1, [1]/[14].

197. In my opinion, Butler teaches that both the **upstream side** and the **downstream side** of Butler's pre-motor filter have a **front end** positioned proximate the **front end** and extending rearwardly because Butler's "**pre-motor filter 1545**" is three dimensional and has a thickness, resulting in

both its **upstream side** and its **downstream side** (Ground 1, [1d1]/[14d1]) have a **front end**, as shown in the annotated figure below:



Ex1005, Figs. 15, 5 (modified).

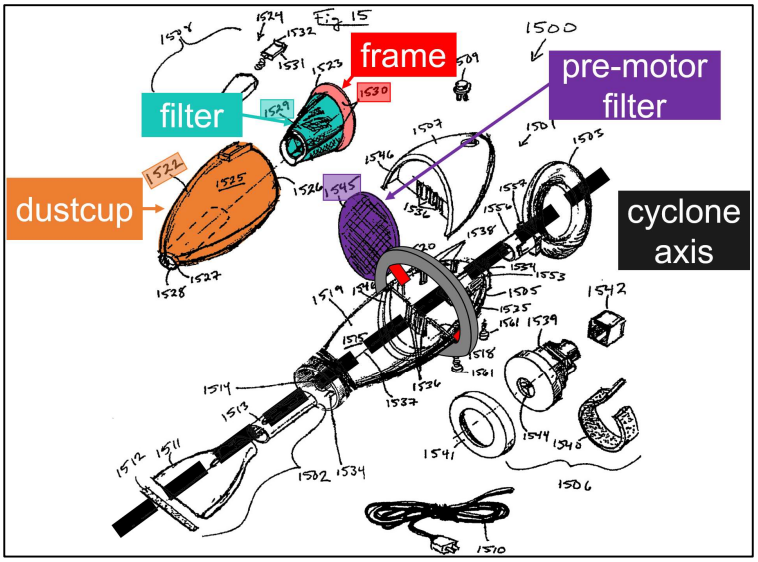
198. Therefore, in my opinion, a POSA would have understood that the **front ends** of the **upstream** and **downstream sides** of Butler's "**pre-motor filter 1545**" are positioned proximate the **front end** of the hand vacuum (at least because they are positioned on the end of the side that is closest to the hand vacuum's **front end**) and they extend rearwardly (towards the hand vacuum's **rear end**), as shown above.

b. [8b]/[21b]

Reference Number	Claim Limitation
[8b]	"the pre-motor filter is positioned axially outwardly from the second end of the cyclone chamber and downstream of the cyclone chamber,"
[21b]	"the pre-motor filter is positioned axially outwardly from the second end of the cyclone chamber and downstream of the cyclone chamber,"

199. In my opinion, Butler teaches that its pre-motor filter is positioned axially outwardly from the second end of the cyclone chamber and downstream of the cyclone chamber.

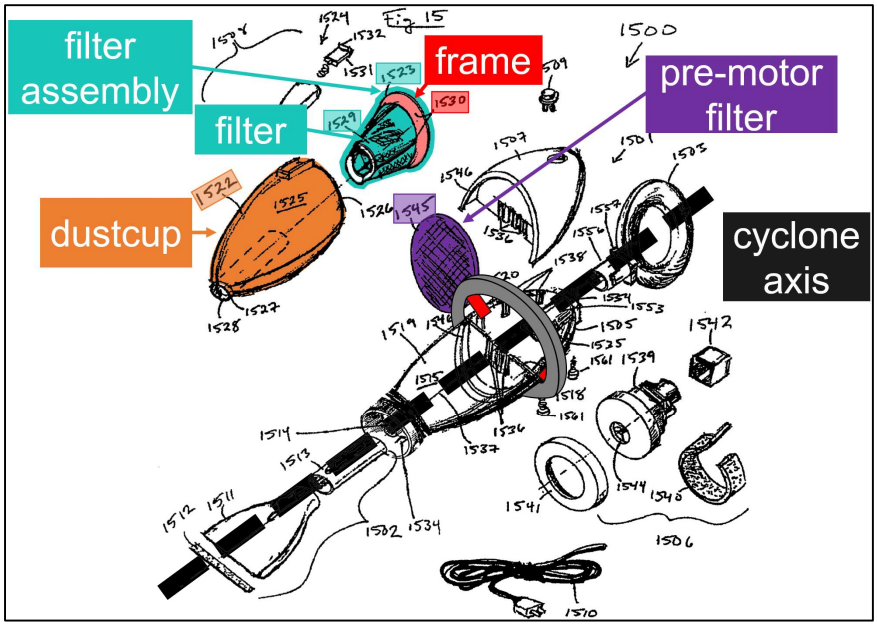
200. In my opinion, Butler's "**pre-motor filter 1545**" in Figure 15 is a pre-motor filter that is positioned axially outwardly from the second end of the cyclone chamber (the airflow interface at **filter 1529**) because the **pre-motor filter 1545** is separated from **filter 1529** (which is the second end of the cyclone chamber because air flowing through it ceases to be cyclonic, Ground 1, [1c]/[14c]) along the **cyclone axis** by the width of **frame 1530**. *See* Ex1005, Fig. 15. This results in a **pre-motor filter 1545** positioned axially outwardly, along the **cyclone axis**, from **filter 1529**, as shown in the modified figure below:



Ex1005, Figs. 15, 5 (modified).

201. In my opinion, a POSA also would have understood that Butler's "**pre-motor filter 1545**" is positioned downstream of Butler's cyclone chamber (**dustcup 1522**), as shown in the annotated figure above.

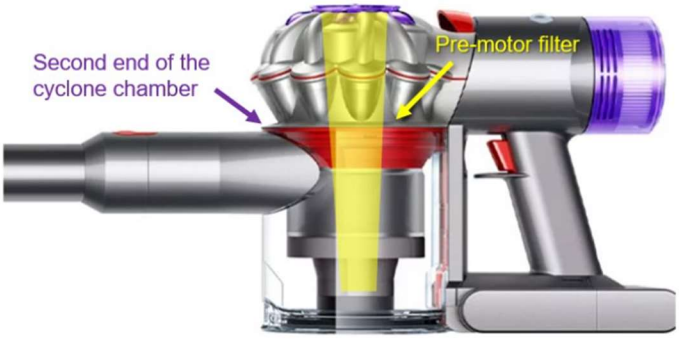
202. Further, in my opinion, a POSA would have understood that Butler's "**filter assembly 1523**" is a pre-motor filter that is positioned axially outwardly from the second end of the cyclone chamber (the airflow interface at **filter 1529**) because "**frame 1530**" has a width such that **filter assembly 1523** is displaced, along the **cyclone axis**, from the second end of the cyclone chamber by the width of "**frame 1530**," as shown in the modified figure below:



Ex1005, Figs. 15, 5 (modified).

203. In my opinion, a POSA also would have understood that Butler's "**filter assembly 1523**" is positioned downstream of Butler's cyclone chamber (cyclonic separation chamber of **dustcup 1522**), as shown above.

204. In my opinion, a POSA would have understood Butler's disclosure to meet the above limitation at least to the same extent as what PO has accused of infringement with respect to identical limitations in claim 9:

9. The hand vacuum cleaner of claim 1 wherein the pre-motor filter is positioned axially outwardly from the second end of the cyclone chamber and downstream of the cyclone chamber, the pre-motor filter overlies at least a portion of the second end of the cyclone chamber.	Each of the Dyson Accused Products includes a pre-motor filter that is positioned axially outwardly from the second end of the cyclone chamber and downstream of the cyclone chamber, wherein the pre-motor filter overlies at least a portion of the second end of the cyclone chamber. For example, the below images show a pre-motor filter that is positioned axially outwardly from the second end of the cyclone chamber and downstream of the cyclone chamber, wherein the pre-motor filter overlies at least a portion of the second end of the cyclone chamber.  https://www.dyson.com/vacuum-cleaners/cordless/v8/absolute-hepa-silver (annotated)

Ex1015, 25 (annotations PO's).

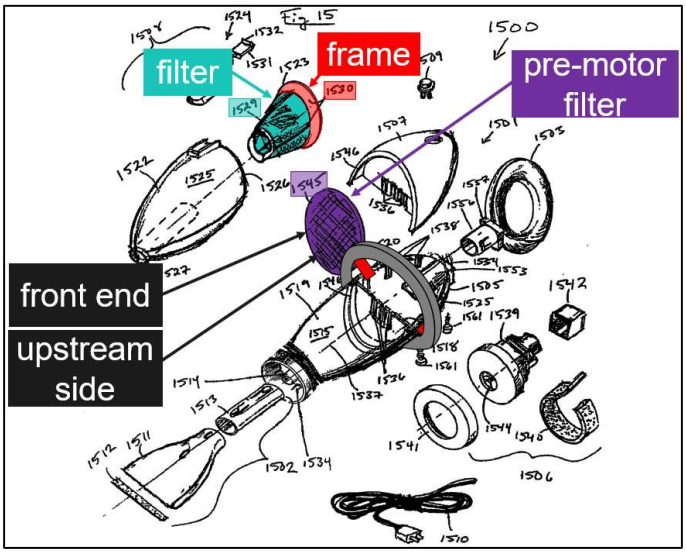
c. [8c]/[21c]

Reference Number	Claim Limitation
[8c]	"the cyclone air outlet is positioned at a location spaced from the front end of the pre-motor filter."
[21c]	"the cyclone air outlet is positioned at a location spaced from the front end of the pre-motor filter."

205. In my opinion, Butler teaches that the cyclone air outlet is positioned at a location spaced from the front end of the pre-motor filter.

206. In my opinion, a POSA would have understood that Butler teaches that the cyclone air outlet (airflow interface at **filter 1529**) is positioned at a location spaced from the **front end** of the pre-motor filter (**pre-motor**

filter 1545), because **pre-motor filter 1545** is separated (spaced) from **filter 1529** by the width of **frame 1530**, as shown in the modified figure below:



Ex1005, 36:5, Figs. 15, 5 (modified).

207. In my opinion, a POSA would have understood that the **front end** of Butler's "**pre-motor filter 1545**" is at its **upstream side**. Ground 1, [1d1]/[14d1].

7. Butler Renders Claims [9] Obvious

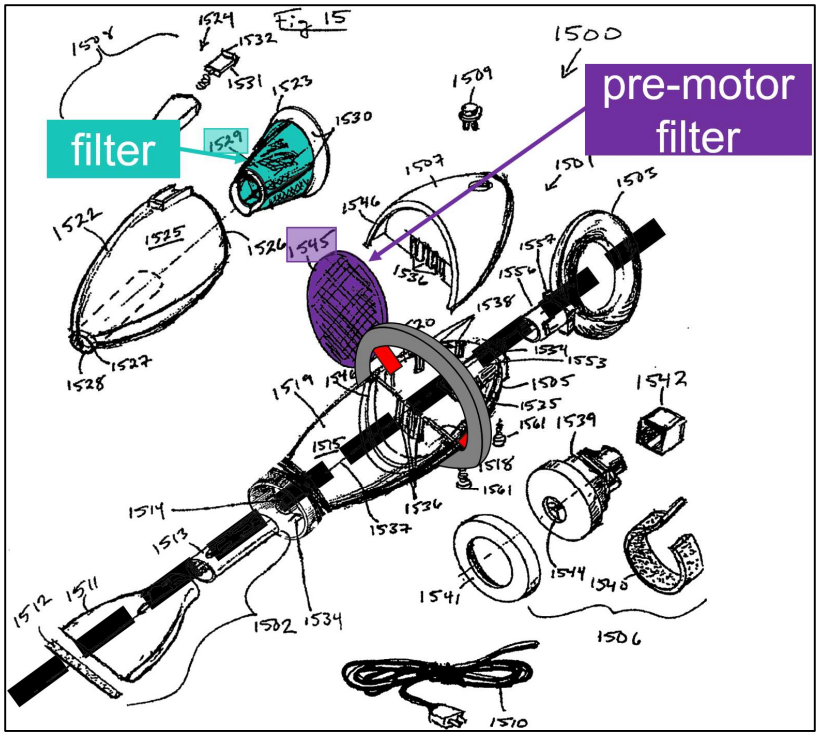
Reference Number	Claim Limitation
[9]	"The hand vacuum cleaner of claim 1 wherein the pre-motor filter is positioned axially outwardly from the second end of the cyclone chamber and downstream of the cyclone chamber, the pre-motor filter overlies at least a portion of the second end of the cyclone chamber."

208. In my opinion, Butler renders the hand vacuum cleaner of claim 1 obvious and further teaches that the pre-motor filter is positioned axially outwardly from the second end of the cyclone chamber and downstream of the cyclone chamber, the pre-motor filter overlies at least a portion of the second end of the cyclone chamber.

209. In my opinion, a POSA would have understood that Butler's pre-motor filters are positioned axially outwardly from the second end of the cyclone chamber and downstream of the cyclone chamber. *See* Ground 1, Limitations [8b]/[14b].

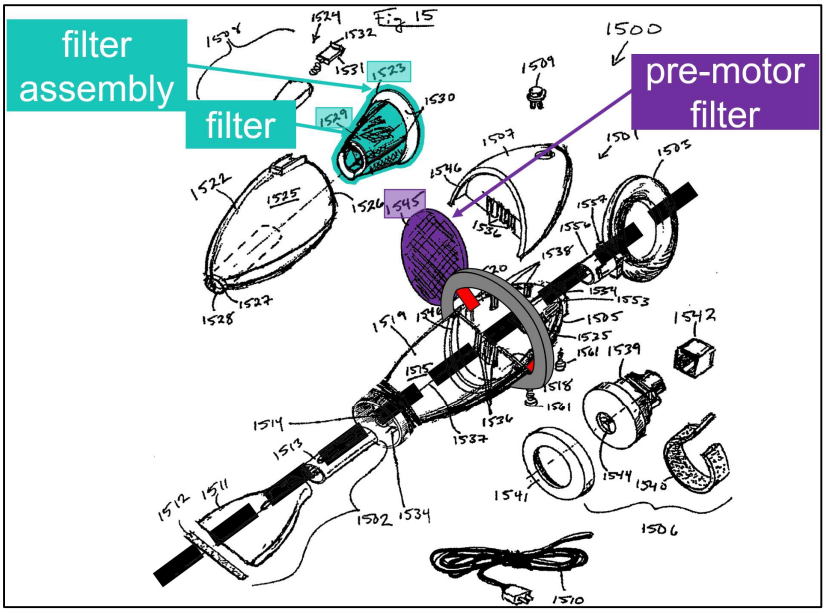
210. In my opinion, Butler renders obvious claim 1. Ground 1, [1].

211. Also, in my opinion, a POSA would have understood that Butler teaches that the pre-motor filter overlies at least a portion of the second end of the cyclone chamber. A POSA would have understood that Butler's "**pre-motor filter 1545**" overlies a portion of the second end of the cyclone chamber (the airflow interface at **filter 1529**) because it is proximate to, larger than, and radially outward of the airflow interface at **filter 1529**, as shown in the modified figure below:



Ex1005, Figs. 15, 5 (modified).

212. Furthermore, in my opinion, Butler's "**filter assembly 1523**" overlies a portion of the second end of the cyclone chamber (the airflow interface at **filter 1529**) because **filter 1529** of **filter assembly 1523** is frusto-conical in shape, with the larger end of **filter 1529** proximate to, larger than, and radially outward of the airflow interface at **filter 1529**, as shown in the modified figure below:



Ex1005, Figs. 15, 5 (modified); *see id.*, 36:5-7; *see also* Ground 1, [1c]/[14c].

8. **Butler Renders Claims [10]/[22] Obvious**

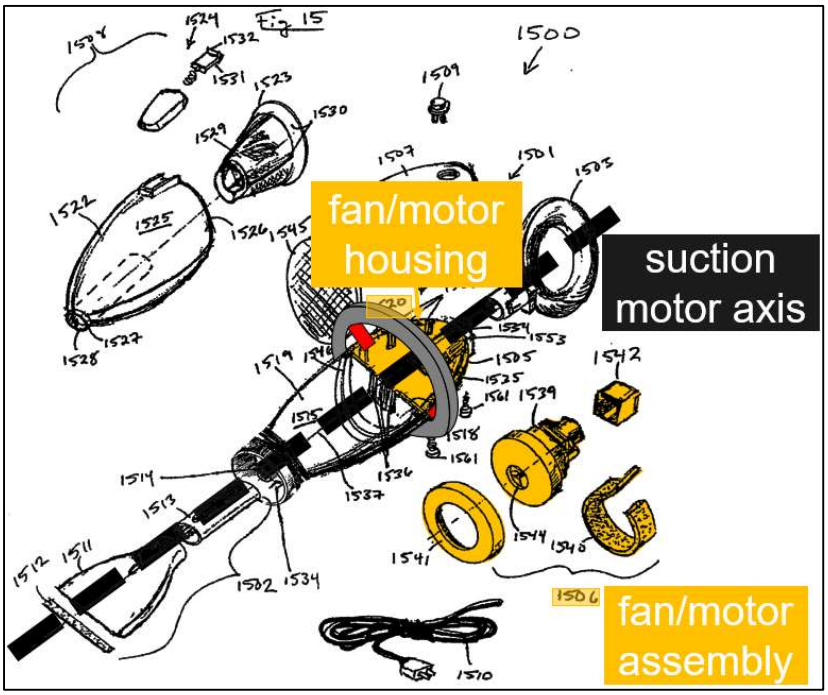
Reference Number	Claim Limitation
[10]	"The hand vacuum cleaner of claim 1 wherein the suction motor has a suction motor axis and when the hand vacuum cleaner is carried by the handle, the suction motor axis extends generally horizontally."
[22]	"The hand vacuum cleaner of claim 14 wherein the suction motor has a suction motor axis and when the hand vacuum cleaner is carried by the handle, the suction motor axis extends generally horizontally."

213. In my opinion, Butler renders the hand vacuum cleaner of claim 1 obvious and further teaches that the suction motor has a suction motor axis and when the hand vacuum cleaner is carried by the handle, the suction motor axis extends generally horizontally. (Claim 10).

214. In my opinion, Butler renders the hand vacuum cleaner of claim 14 obvious and further teaches that the suction motor has a suction motor axis and when the hand vacuum cleaner is carried by the handle, the suction motor axis extends generally horizontally. (Claim 22).

215. In my opinion, Butler renders obvious claims 1 and 14. Ground 1, [1]/[14].

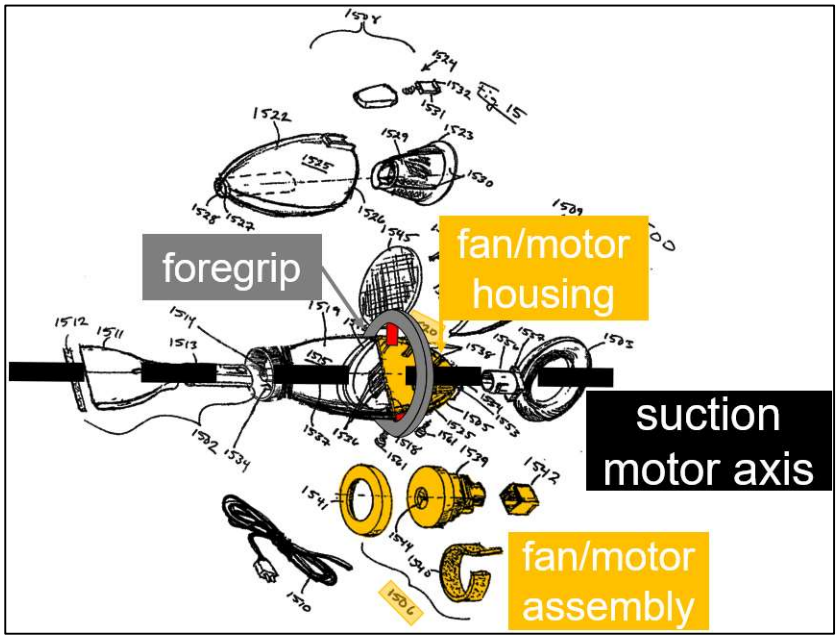
216. In my opinion Butler's suction motor (the **fan/motor assembly** housed in the **fan/motor housing**, Ground 1, [1e]/[14e]) has a **suction motor axis**, as shown in the modified figure below:



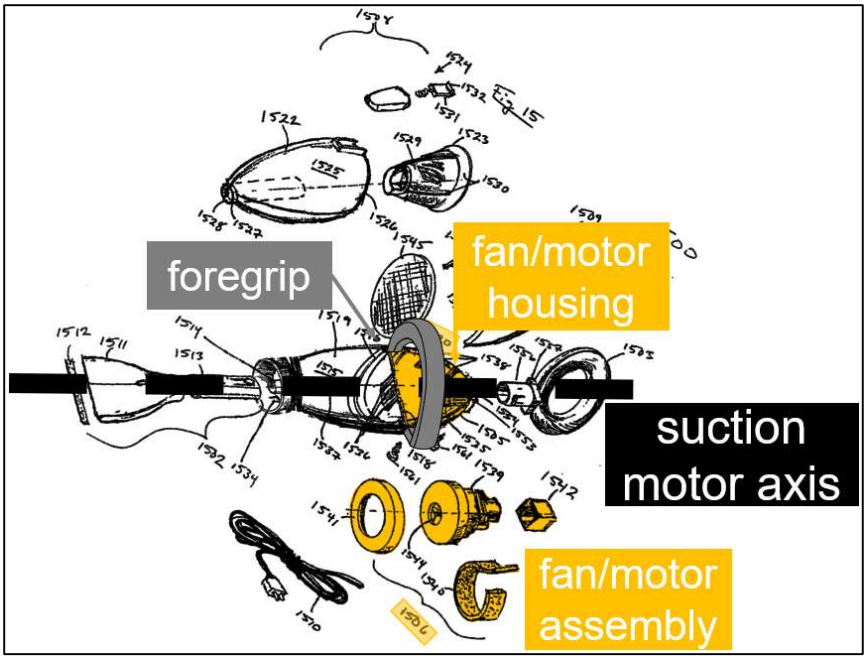
Ex1005, Figs. 15, 5 (modified), 35:14-15.

217. Furthermore, a POSA would have understood that, for each of the handle configurations described in Ground 1, [1h1]/[14h1], the **suction motor**

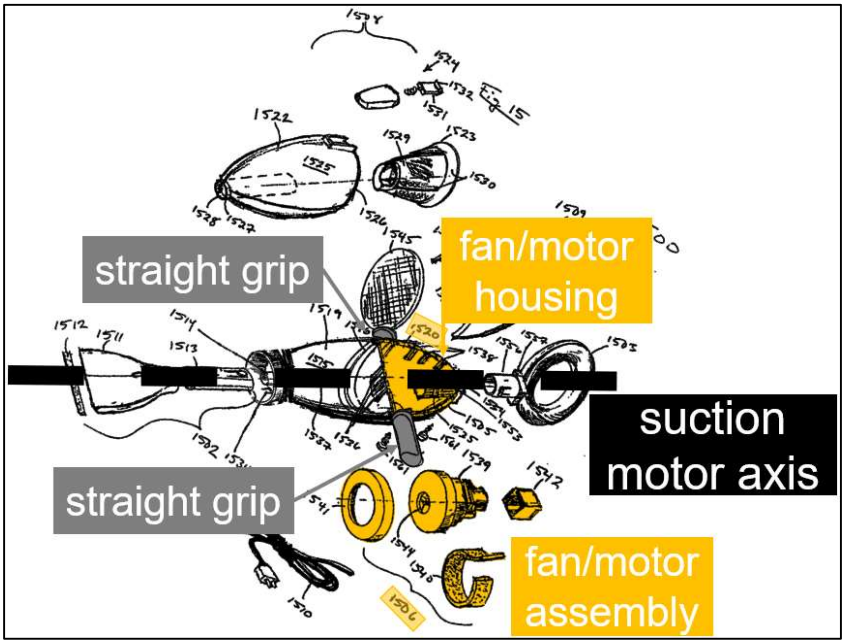
axis extends generally horizontally when the hand vacuum is carried by the handle, particularly when Butler's vacuum is oriented for "vertical cleaning" and "cleaning vertical surfaces" (Ex1005, 13:31-14:3, 29:1-5), as shown in the modified figures below:



Ex1005, Figs. 15, 5 (modified).



Ex1005, Figs. 15, 2A (modified), Fig. 2A.



Ex1005, Figs. 15, 3 (modified), Fig. 3.

9. **Butler Renders Claims [11]/[12]/[23]/[24] Obvious**

Reference Number	Claim Limitation
[11]	"The hand vacuum cleaner of claim 10 wherein when the hand vacuum cleaner is carried by the handle, the cyclone axis extends generally horizontally."
[12]	"The hand vacuum cleaner of claim 1 wherein when the hand vacuum cleaner is carried by the handle, the cyclone axis extends generally horizontally."
[23]	"The hand vacuum cleaner of claim 22 wherein when the hand vacuum cleaner is carried by the handle, the cyclone axis extends generally horizontally."
[24]	"The hand vacuum cleaner of claim 14 wherein when the hand vacuum cleaner is carried by the handle, the cyclone axis extends generally horizontally."

218. In my opinion, Butler renders the hand vacuum cleaner of claim 10 obvious and further teaches that when the hand vacuum cleaner is carried by the handle, the cyclone axis extends generally horizontally. (Claim 11).

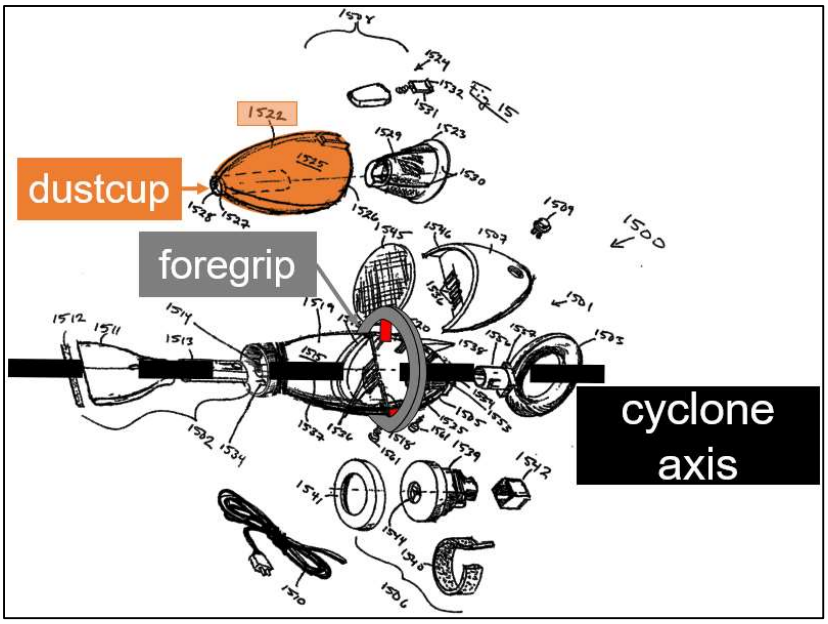
219. In my opinion, Butler renders the hand vacuum cleaner of claim 1 obvious and further teaches that when the hand vacuum cleaner is carried by the handle, the cyclone axis extends generally horizontally. (Claim 12).

220. In my opinion, Butler renders the hand vacuum cleaner of claim 22 obvious and further teaches that when the hand vacuum cleaner is carried by the handle, the cyclone axis extends generally horizontally. (Claim 23).

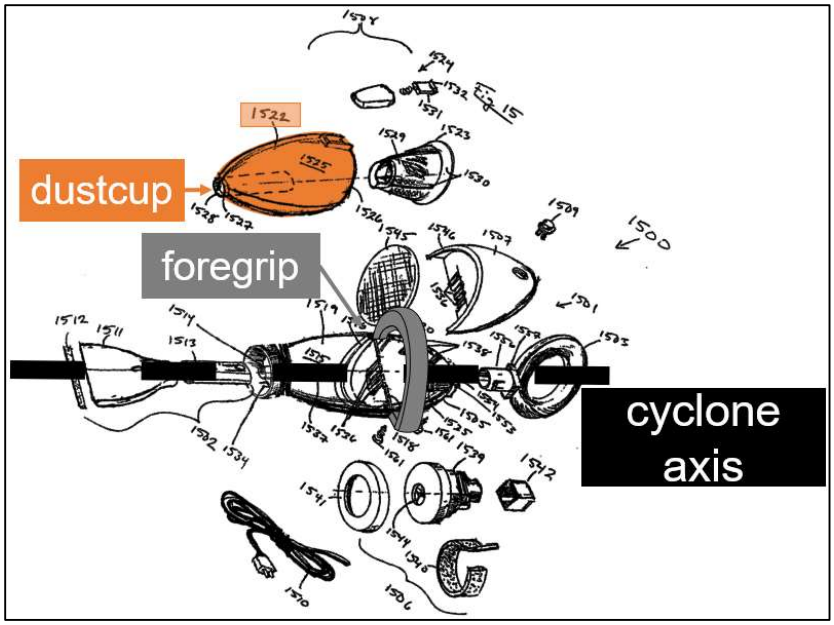
221. In my opinion, Butler renders the hand vacuum cleaner of claim 14 obvious and further teaches that when the hand vacuum cleaner is carried by the handle, the cyclone axis extends generally horizontally. (Claim 24).

222. In my opinion, Butler renders obvious claims 1, 10, 14 and 22. Ground 1, [1]/[14], [10]/[22].

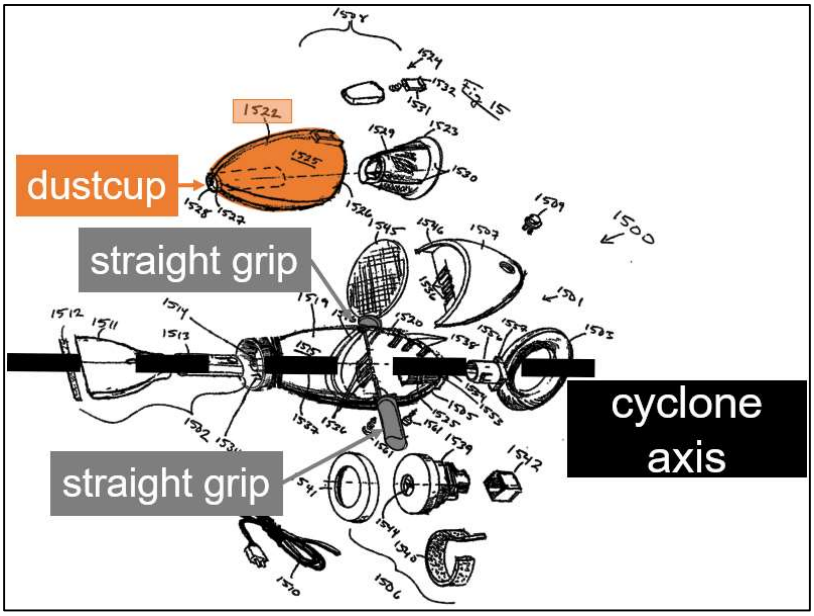
223. In my opinion, Butler teaches a **cyclone axis**. Ground 1, [1c]/[14c]. In my opinion, a POSA would have understood that in each of the handle configurations described in Ground 1, [1h1]/[14h1], Butler's **cyclone axis** (Ground 1, [1c]/[14c]) extends generally horizontally when the vacuum cleaner is carried by the handle, particularly when Butler's vacuum is oriented for "vertical cleaning" and "cleaning vertical surfaces" (Ex1005, 13:31-14:3, 29:1-5), as shown in the modified figures below:



Ex1005, Figs. 15, 5 (modified), Fig. 5.



Ex1005, Figs. 15, 2A (modified), Fig. 2A.



Ex1005, Figs. 15, 3 (modified), Fig. 3.

10. **Butler Renders Claims [13]/[25] Obvious**

Reference Number	Claim Limitation
[13]	"The hand vacuum cleaner of claim 1 wherein the pre-motor filter comprises a physical filter media."
[25]	"The hand vacuum cleaner of claim 14 wherein the pre-motor filter comprises a physical filter media."

224. In my opinion, Butler renders obvious the hand vacuum cleaner of claim 1 and further teaches that the pre-motor filter comprises a physical filter media. (Claim 13).

225. In my opinion, Butler renders obvious the hand vacuum cleaner of claim 14 and further teaches that the pre-motor filter comprises a physical filter media. (Claim 25).

226. In my opinion, Butler renders obvious claims 1 and 14. Ground 1, [1]/[14].

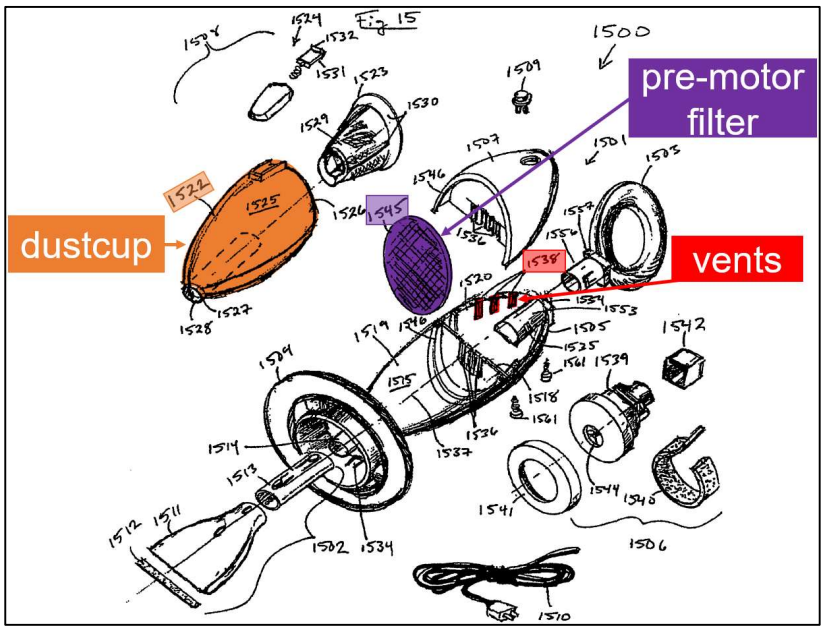
227. In my opinion, Butler teaches several pre-motor filters, Ground 1, [1d1]. Butler further teaches that "any [] filters described herein or otherwise used in embodiments of the invention … may take any shape or form," including "a foam sheet or block, a pleated sheet rigidly held in a frame, a rigid panel, a flexible sheet, and so on." Ex1005, 7:28-8:2. In my opinioin, a POSA would have understood that each of these "form[s]" are physical filter media.

B. Ground 2: The Butler and Oh Combination Renders Claims 1-2, 5, 7, 9-15, 17-18, 20, and 22-25 Obvious

1. A POSA Would Have Been Motivated to Combine Butler and Oh

228. In my opinion, a POSA would have been motivated to combine the teachings of Butler and Oh.

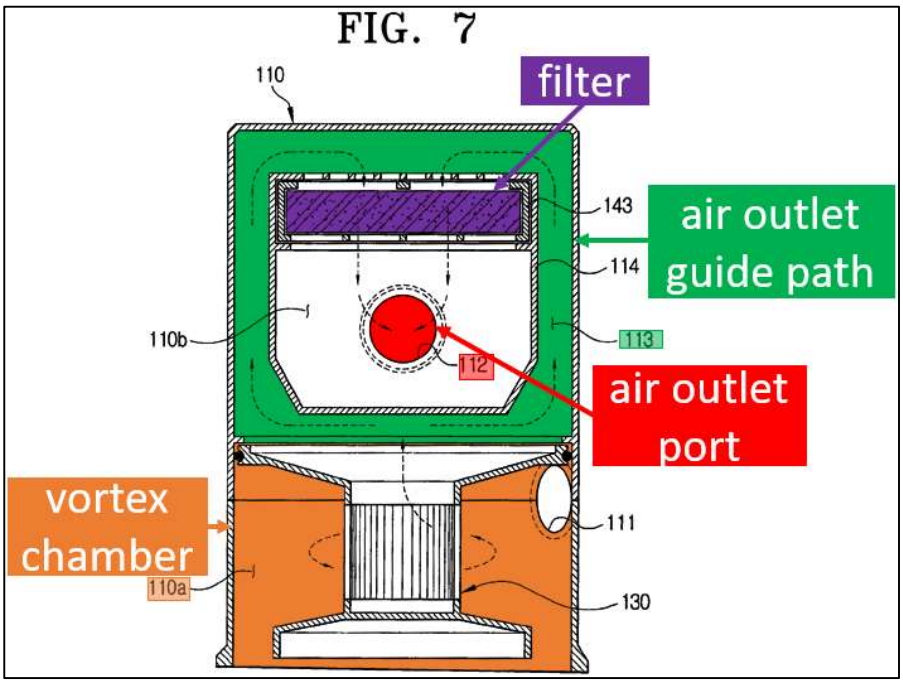
229. As described above, Butler teaches a hand vacuum with a cyclone chamber (**dustcup 1522**), a **pre-motor filter 1545**, a cyclone air outlet (**vents 1538**), and an airflow path that guides air from the **cyclone chamber**, through the **pre-motor filter**, and out the **vents**, as shown in the annotated figure below:



Ex1005, Fig. 15, 36:2-4, 35:20-21, 35:16-20.

230. Likewise, Oh teaches a vacuum cleaner with a cyclone chamber (**vortex chamber 110a**), a **pre-motor filter**, an air outlet (**air outlet port 112**), and

an **air outlet guide path 113** that guides air from the **vortex chamber 110a**, to the **filter**, and to the **air outlet port 112**:



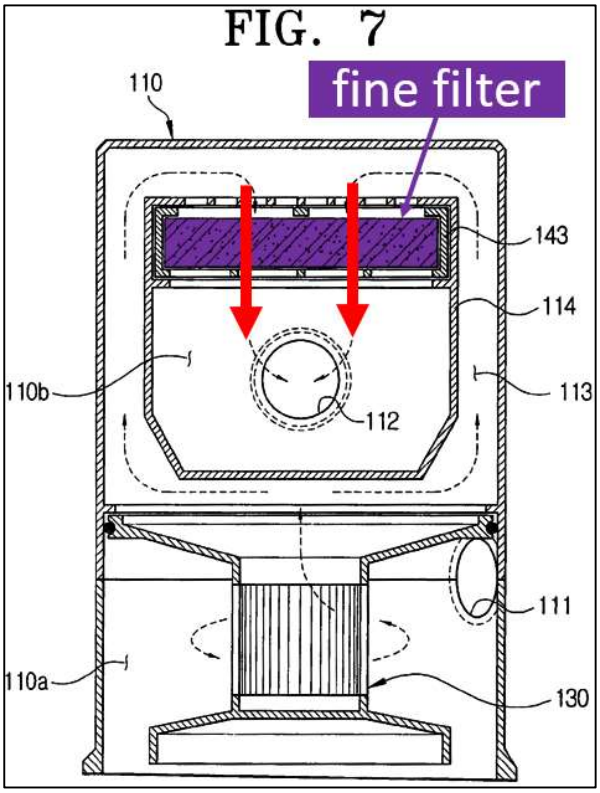
Ex1006, Fig. 7, 6:32-7:7.

231. Oh explains that "clean air … is [] exhausted through the air outlet port 112, the air outlet path 220 of the main body 200 and the motor drive chamber 310 to the outside." Ex1006, 5:5-11.

232. In my opinion, a POSA would have understood from this disclosure, because Oh's "**filter**" is upstream from its "motor drive chamber" in the airflow path, Oh's **filter** is a pre-motor filter, and Oh therefore teaches an airflow path from a cyclone chamber (**vortex chamber**) to the pre-motor filter (**filter**) and out an air outlet (**air outlet port**), as shown in the

annotated figure above.

233. Oh also teaches that its airflow path and filter position is beneficial for not spilling dirt. Ex1006, 7:21-24. Oh additionally teaches that its pre-motor **fine filter 144** is oriented "such that **air** passes from an upper portion of the **fine filter 144** towards a lower portion of the **fine filter**," as shown in the annotated figure below:

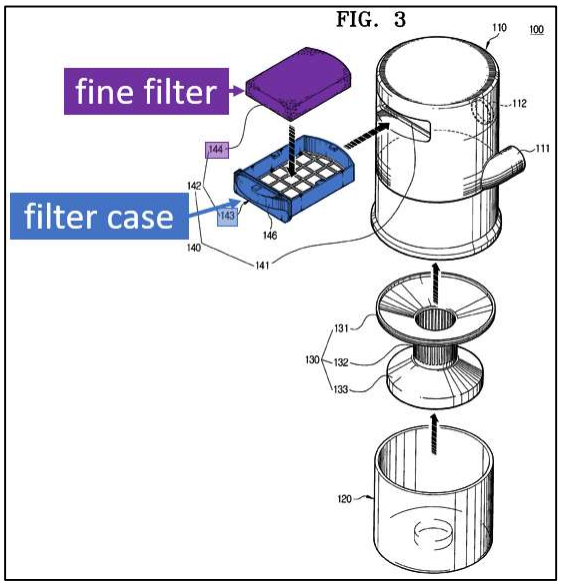


Ex1006, 7:17-19, Fig. 7.

234. Further, in my opinion, Oh teaches that this top-to-bottom airflow path is advantageous over an airflow path where "air is passed from the lower portion of the [pre-motor] filter [] towards the upper portion" because in a

bottom-to-top airflow path "the dust collect[s] on a lower surface of the [pre-motor] filter," and "when disassembling the filter [] to remove the collected fine dust, the dust may be dropped on a floor, thereby contaminating the floor." *Id.*, 7:19-24. Oh's orientation—where air flows from the pre-motor filter's top portion to its bottom portion—beneficially avoids this potential dust spillage by collecting dust on the upper portion of the filter. *Id.*, 7:17-24.

235. Oh further teaches that its filter is removeable using a "filter assembly [with] a **filter case 143** and a **fine filter 144**" and a "filter assembly 142 [] detachably disposed, in the manner of a drawer," as shown in the annotated figure below:



Ex1006, 6:7-9, Fig. 3.

236. Finally, Oh teaches that using a drawer allows for easy and hygienic filter cleaning, by, for example, using a "handle 146 … provided at a front face of the filter case 143" to assist in hygienically "disassembling the filter 140 to remove the collected fine dust." Ex1006, 6:11-12, 7:19-24.

237. Therefore, in my opinion, a POSA would have been motivated to modify Butler's pre-motor filter to incorporate Oh's pre-motor filter teachings in three ways to achieve these benefits.

238. ***First***, in my opinion, a POSA would have been motivated to house Butler's pre-motor filter in a slidably removable housing, such as Oh's "detachably disposed," "drawer"-style "**filter case 143**." Ex1006, 6:7-9, Fig. 3. In my opinion, a POSA would have been motivated by Butler's express teachings that it is beneficial to provide access to its filters to "service" them (e.g., cleaning or replacement), Ex1005, 7:27-28, 8:15-17, to find ways to improve such access, and a POSA would have understood that Oh's detachably disposed, drawer-style **filter case** provides such improved access for hygienic servicing, as Oh teaches. Ex1006, 6:11-12, 7:19-24. Further, in my opinion, by using Oh's drawer-style **filter case** teachings, a user desiring to access only the pre-motor filter could beneficially remove only the pre-motor filter, rather than opening the entire **dustcup 1522**'s "access panel or door," which would reduce accidental spillage of dust

collected in the entire dustcup. In my opinion, a POSA would have understood having a conspicuous and easy to use on-product access point would substantially decrease the cost of compliance with performing the recommended routine maintenance of the filter thereby increasing user satisfaction with the long term performance with the vacuum through user adherence to maintenance.

239. In my opinion, this modification would have involved combining known prior art elements (pre-motor filters and removable filter housings) according to known methods (locating the pre-motor filter in the removable filter housing) to yield predictable results (housing and protecting the pre-motor filter and increasing its accessibility for hygienic servicing). Further, in my opinion, this would have involved a simple substitution of one known element (a pre-motor filter in a housing accessed by opening a panel or door) for another (a pre-motor filter in drawer-style housing accessed by sliding out the housing) to yield these predictable results of increased support and accessibility. In my opinion, a POSA would have understood that Butler's access panel or door was ready for improvement to yield the predictable results of simply accessing the pre-motor filter without having to access the entire dirt collection chamber (which may result in unwanted dirt spillage). In my opinion, this

modification would have been at least obvious to try, as there were a finite number of identified, predictable solutions for accessing Butler's pre-motor filter, including by opening an access panel or door (as Butler teaches) or by sliding a drawer-style filter case (as Oh teaches).

240. In my opinion, a POSA would have had a reasonable expectation of success for multiple reasons. First, Oh's filter case can "hav[e] a shape corresponding to the size and structure of … [the] fine filter disposed in the filter case," Ex1006, 3:31-32, which would have given a POSA a reasonable expectation of successfully modifying Butler to locate the pre-motor filter in such a filter case. Similarly, Butler teaches that it's pre-motor filter "may take any shape or form," that "[o]ther [filter] variations will be apparent to those of ordinary skill in the art," and that Butler's "pre-motor filter 1545 may be … attached in any known way." Ex1005, 7:28-30, 17:19-25, 35:20-22; *see also id.*, 21:24-25. Therefore, in my opinion, a POSA would have understood that a drawer-style filter housing, such as Oh teaches, was a known way for attaching the pre-motor filter.

241. ***Second***, a POSA would have been motivated to orient the airflow through Butler's pre-motor filter to flow from its upper portion towards its lower portion, as Oh teaches, to improve hygienic filter removal and cleaning. Ex1006, 7:17-24, Fig. 7. In my opinion, a POSA would have been

motivated by Butler's express teachings that it is beneficial to "service" the pre-motor filter, Ex1005, 7:27-28, 8:15-17, and by a desire to improve the filter-servicing process, and a POSA would have understood that Oh's pre-motor filter airflow orientation was a known way of doing so, including based on Oh's express teachings that top-to-bottom airflow results in dust collection at the top of the filter, reducing the likelihood of dirt spilling when removing the filter. Ex1006, 7:21-24. In my opinion, a POSA therefore would have understood that incorporating Oh's airflow orientation uses known methods/techniques (top-to-bottom filter airflow) to modify a known device ready for improvement (a pre-motor filter having collected dust stored on the bottom side) to yield predictable results (filtering air and collecting the filtered dust on the filter's top side to reduce spillage). In my opinion, a POSA would have been motivated to make this simple substitution of one known element (a bottom-to-top airflow pre-motor filter) for another (a top-to-bottom airflow pre-motor filter) to obtain these predictable results. In my opinion, a POSA would also have found this modification at least obvious to try, as there were a finite number of ways to route airflow through a pre-motor filter, including bottom-to-top (as Butler teaches) and top-to-bottom (as Oh teaches).

242. ***Third*****,** for these same reasons, a POSA would have also been motivated to

replace Butler's bottom-to-top pre-motor filter with Oh's top-to-bottom pre-motor filter and filter housing to achieve the same benefits.

243. A POSA would have reasonably expected these modifications to be successful because they would simply involve re-routing the airflow path through Butler's pre-motor filter, which Butler teaches can be "attached in any known way," Ex1005, 35:20-22, to flow from top-to-bottom, rather than from bottom-to-top, or replacing one pre-motor filter (Butler's) with another (Oh's).

2. The Combined Teachings of Butler and Oh Render Obvious Claims [1]/[14]

244. In my opinion, the combined teachings of Butler and Oh render claims 1 and 14 obvious.

a. [1pre]/[14pre]

Reference Number	Claim Limitation
[1pre]	"A hand vacuum cleaner having a front end, a rear end, and comprising:"
[14pre]	"A hand vacuum cleaner having a front end, a rear end and comprising:"

245. In my opinion, the combination of Butler and Oh teaches a hand vacuum cleaner having a front end and a rear end for the same reasons Butler does. *See* Ground 1, Limitations [1pre]/[14pre]; Ground 2, §1.

b. [1a]/[14a]

Reference Number	Claim Limitation
[1a]	"a main housing;"
[14a]	"a main housing;"

246. In my opinion, the combination of Butler and Oh teaches a main housing for the same reasons Butler does. *See* Ground 1, Limitations [1a]/[14a]; Ground 2, §1.

c. [1b]/[14b]

Reference Number	Claim Limitation
[1b]	"a dirty fluid inlet;"
[14b]	"a dirty fluid inlet;"

247. In my opinion, the combination of Butler and Oh teaches a dirty fluid inlet for the same reasons Butler does. *See* Ground 1, Limitations [1b]/[14b]; Ground 2, §1.

d. [1c]/[14c]

Reference Number	Claim Limitation
[1c]	"a cyclone bin assembly comprising a cyclone chamber downstream of the dirty fluid inlet, the cyclone chamber comprising a first end, a second end, a cyclone axis, a cyclone air inlet and a cyclone air outlet wherein the cyclone air outlet is located at the second end;"
[14c]	"a cyclone bin assembly comprising a cyclone chamber downstream of the dirty fluid inlet, the cyclone chamber comprising a first end, a second end, a cyclone air inlet, a cyclone axis, and a cyclone air outlet that is located at the second end;"

248. In my opinion, Butler teaches a cyclone bin assembly comprising a cyclone chamber downstream of the dirty fluid inlet, the cyclone chamber comprising a first end, a second end, a cyclone axis, a cyclone air inlet and a cyclone air outlet wherein the cyclone air outlet is located at the second end for the same reasons Butler does. *See* Ground 1, Limitation [1c]; Ground 2, §1.

249. In my opinion, the combination of Butler and Oh teaches a cyclone bin assembly comprising a cyclone chamber downstream of the dirty fluid inlet, the cyclone chamber comprising a first end, a second end, a cyclone axis, a cyclone air inlet and a cyclone air outlet wherein the cyclone air outlet is located at the second end for the same reasons Butler does. *See* Ground 1, Limitation [14c]; Ground 2, §1.

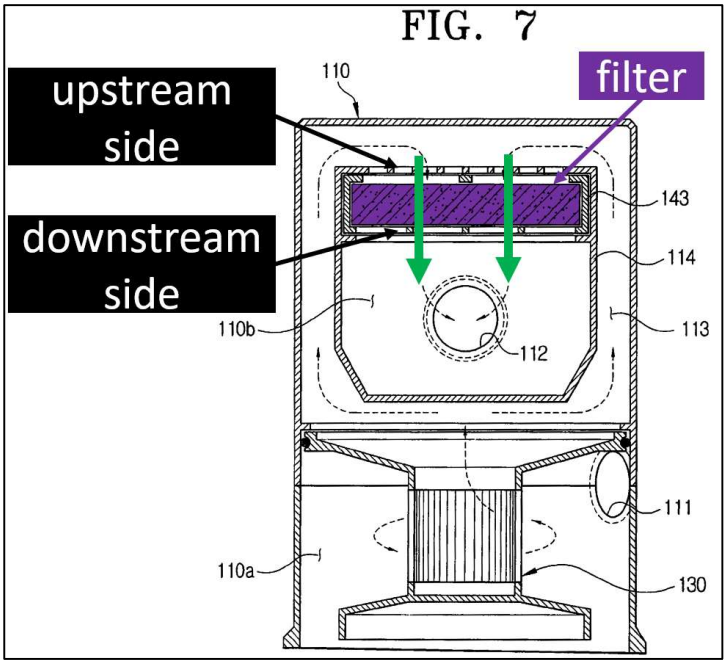
e. [1d1]/[14d1]

Reference Number	Claim Limitation
[1d1]	"a pre-motor filter comprising an upstream side and a downstream side,"
[14d1]	"a pre-motor filter comprising an upstream side and a downstream side,"

250. In my opinion, Butler teaches a pre-motor filter comprising an upstream side and a downstream side, Oh teaches a pre-motor filter comprising an

upstream side and a downstream side, and the combination of Butler and Oh teaches a pre-motor filter comprising an upstream side and a downstream side.

251. In my opinion, Butler and Oh each teach a pre-motor filter comprising an **upstream side** and a **downstream side** and the combination of Butler and Oh teaches a pre-motor filter comprising an **upstream side** and a **downstream side**. Ground 1, [1d1]/[14d1]; Ground 2, §1.



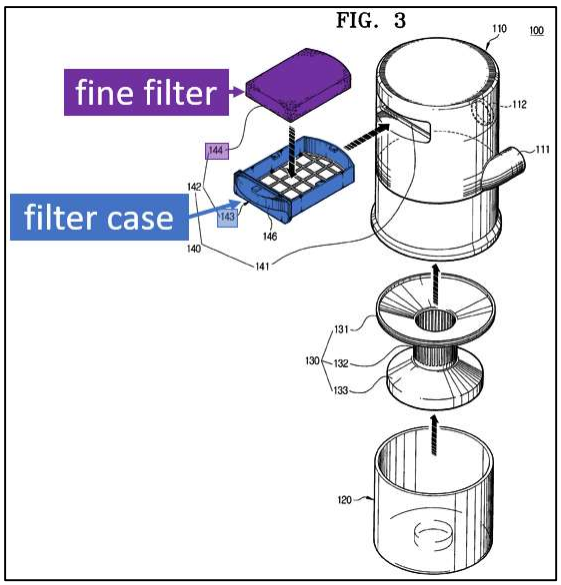
See Ex1006, Fig. 7, 6:31-7:7 ("air flows along the air outlet guide path 113 … and then flows from the upper portion towards the lower portion of the filter 140"); *see also id.*, 6:3-9.

f. [1d2]/[14d2]

Reference Number	Claim Limitation
[1d2]	"the pre-motor filter is positioned in a pre-motor filter housing having an openable cover,"
[14d2]	"the pre-motor filter is positioned in a pre-motor filter housing having an openable cover;"

252. In my opinion, Butler and the combination of Butler and Oh teach the pre-motor filter is positioned in a pre-motor filter housing having an openable cover.

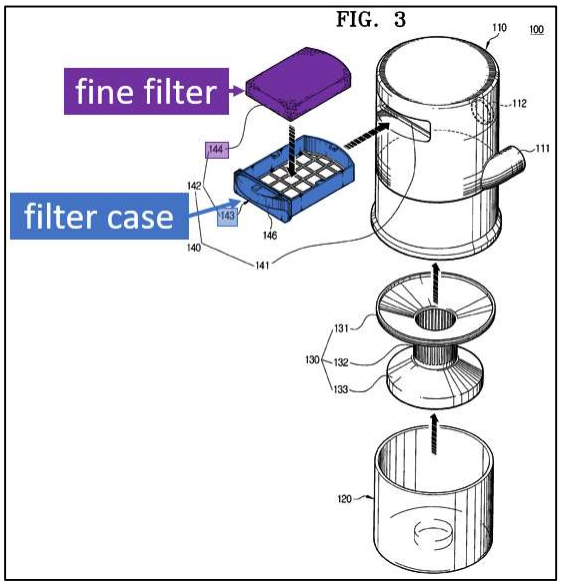
253. Oh teaches a "filter assembly [with] a **filter case 143** and a **fine filter 144**" and a "filter assembly 142 [] detachably disposed, in the manner of a drawer":



Ex1006, Fig. 3, 6:7-9.

254. In my opinion, a POSA would have understood that Oh's "**filter case 143**" is a pre-motor filter housing because the "**filter case**" houses the "**filter 144**." When these slidably removable filter-housing teachings are integrated into Butler (Ground 2, §1), the pre-motor filter (Butler's **pre-motor filter 1545** or Oh's **filter 144**) is positioned in a pre-motor filter housing (**filter case 143**). Ex1005, Fig. 15; Ex1006, Figs. 3, 7.

255. In my opinion, a POSA further would have understood that the pre-motor filter housing has an openable cover because Oh teaches that its filter assembly 142 (which comprises the pre-motor filter housing, "**filter case 143**") is "detachably disposed in the manner of a drawer," which a POSA would understand is openable, as shown in the annotated figure below:

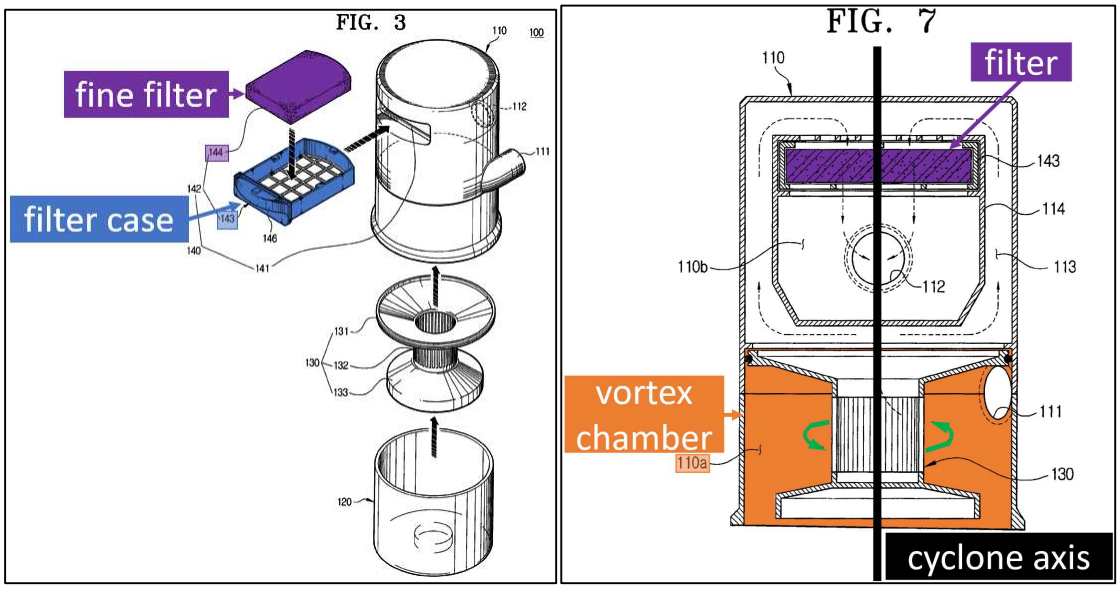


Ex1006, Fig. 3, 6:7-9

g. [1d3]

Reference Number	Claim Limitation
[1d3]	"the cyclone axis extends through the pre-motor filter housing."

256. In my opinion, Butler and the combination of Butler and Oh teaches these limitations. In my opinion, Butler teaches a **cyclone axis**. Ground 1, [1c]/[14c]. In my opinion, a POSA would have understood that, when Butler is modified to incorporate Oh's pre-motor filter housing teachings, the cyclone axis extends through the pre-motor filter housing (**filter case 143**), which, as Oh teaches, encases the pre-motor filter and is intersected by Oh's cyclone axis, as shown in the modified figure below:



Ex1006, Fig. 3, 7, Abstract, 6:7-9; *see also* Ex1005, Fig. 15.

h. [1e]/[14e]

Reference Number	Claim Limitation
[1e]	"a suction motor positioned in the main housing and located downstream of the pre-motor filter and rearward of the cyclone bin assembly;"
[14e]	"a suction motor positioned in the main housing and located downstream of the pre-motor filter and rearward of the cyclone bin assembly;"

257. In my opinion, the combination of Butler and Oh teaches a suction motor positioned in the main housing and located downstream of the pre-motor filter and rearward of the cyclone bin assembly for the same reasons Butler does. *See* Ground 1, Limitations [1e]/[14e]; Ground 2, §1.

i. [1f]/[14f]

Reference Number	Claim Limitation
[1f]	"an air flow path extending from the pre-motor filter to the suction motor;"
[14f]	"an air flow path extending from the pre-motor filter to the suction motor;"

258. In my opinion, the combination of Butler and Oh teaches an air flow path extending from the pre-motor filter to the suction motor for the same reasons Butler does. *See* Ground 1, Limitations [1f]/[14f]; Ground 2, §1.

j. [1g]/[14g]

Reference Number	Claim Limitation
[1g]	"a clean air outlet downstream of the suction motor; and,"
[14g]	"a clean air outlet downstream of the suction motor; and,"

259. In my opinion, the combination of Butler and Oh teaches a clean air outlet downstream of the suction motor for the same reasons Butler does. *See* Ground 1, Limitations [1g]/[14g]; Ground 2, §1.

k. [1h1]/[14h1]

Reference Number	Claim Limitation
[1h1]	"a handle connected to the hand vacuum cleaner at first and second locations, wherein the first location is at a position of the suction motor in the main housing and a first handle portion is connected at the first location,"
[14h1]	"a handle connected to the hand vacuum cleaner at first and second locations wherein the first location is at a position of the suction motor in the main housing, the handle has a first handle portion provided at the first location,"

260. In my opinion, the combination of Butler and Oh teaches a handle connected to the hand vacuum cleaner at first and second locations, wherein the first location is at a position of the suction motor in the main housing and a first handle portion is connected at the first location for the same reasons Butler does. *See* Ground 1, Limitation [1h1]; Ground 2, §1.

261. In my opinion, the combination of Butler and Oh teaches a handle

connected to the hand vacuum cleaner at first and second locations wherein the first location is at a position of the suction motor in the main housing, the handle has a first handle portion provided at the first location for the same reasons Butler does. *See* Ground 1, Limitation [14h1]; Ground 2, §1.

l. [1h2]/[14h2]

Reference Number	Claim Limitation
[1h2]	"wherein a projection of the first handle portion extends through the suction motor,"
[14h2]	"a projection of the first handle portion extends through the suction motor, and"

262. In my opinion, the combination of Butler and Oh teaches a handle wherein a projection of the first handle portion extends through the suction motor for the same reasons Butler does. *See* Ground 1, Limitation [1h2]; Ground 2, §1.

263. In my opinion, the combination of Butler and Oh teaches a handle wherein a projection of the first handle portion extends through the suction motor for the same reasons Butler does. *See* Ground 1, Limitation [14h2]; Ground 2, §1.

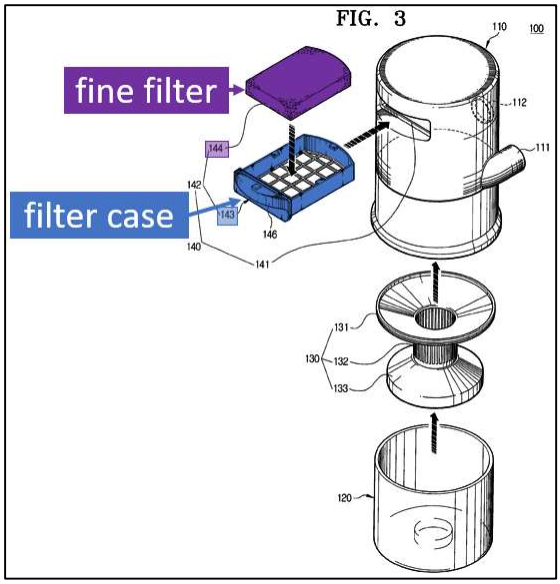
m. [1h3]/[14h3]

Reference Number	Claim Limitation
[1h3]	"wherein the pre-motor filter housing is openable without moving the handle with respect to the cyclone chamber, and"
[14h3]	"the pre-motor filter housing is openable without moving the handle with respect to the cyclone chamber;"

264. In my opinion, Butler and the combination of Butler and Oh teaches a handle wherein the pre-motor filter housing is openable without moving the handle with respect to the cyclone chamber.

265. Butler teaches a handle that is at a position of "the **fan/motor chamber []** in which the **fan/motor []** is located," not the pre-motor filter housing. Ex1005, 20:12-13; Ground 1, [1h1]/[14h1].

266. Oh teaches a "**filter case 143**" that is an openable pre-motor filter housing cover that is "detachably disposed, in the manner of a drawer," as shown in the annotated figure below:



Ex1006, Fig. 3, 6:7-9; Ground 2, [1d2]/[14d2].

267. In my opinion, a POSA would have understood that when Butler is modified to incorporate a slidably removable pre-motor filter housing cover as taught by Oh, the pre-motor filter housing is openable without moving the handle with respect to the cyclone chamber: it can slide out of the vacuum without affecting the handle (**foregrip/straight grip**) or the cyclone chamber (**dustcup 1522**), at least because Butler's handle is positioned at the suction motor, not the pre-motor filter (and therefore not the pre-motor filter housing in the Butler-Oh combination). See Ex1005, Figs. 15, 5; Ex1006, Figs. 3, 7; Ground 1, [1h3]/[14h3].

n. [1h4]/[14h4]

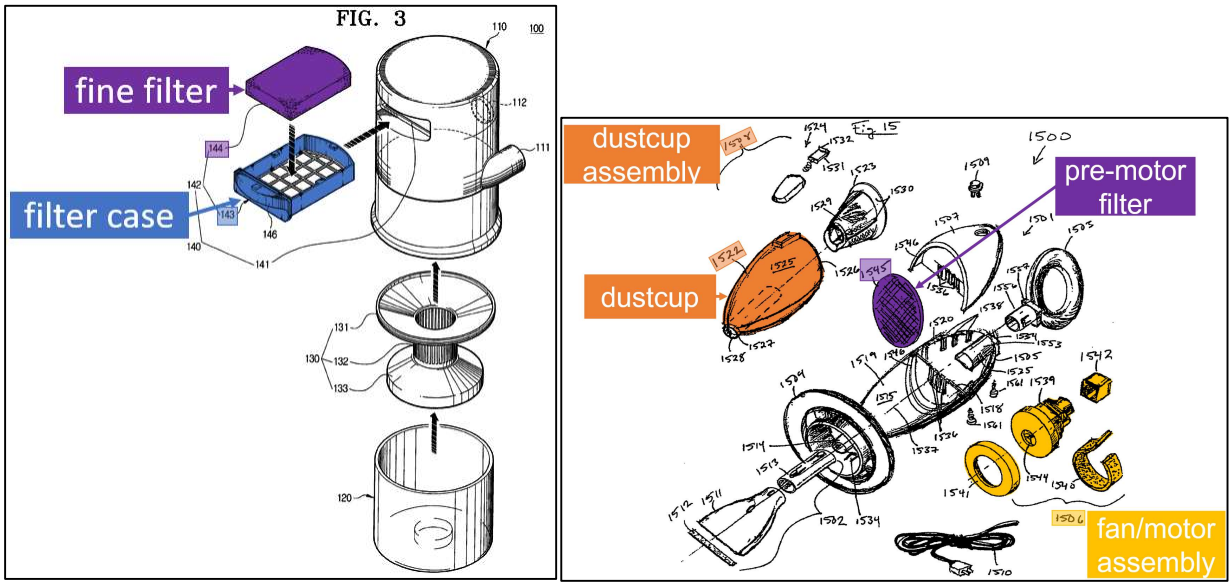
Reference Number	Claim Limitation
[1h4]	"wherein the pre-motor filter housing cover is openable while the cyclone bin assembly is in fluid flow communication with the suction motor."
[14h4]	"wherein the pre-motor filter housing cover is openable while the cyclone chamber is in fluid flow communication with the suction motor, and"

268. In my opinion, Butler and the combination of Butler and Oh teaches that the pre-motor filter housing cover is openable while the cyclone bin assembly is in fluid flow communication with the suction motor. (Limitation [1h4]).

269. In my opinion, Butler and the combination of Butler and Oh teaches that the pre-motor filter housing cover is openable while the cyclone chamber is in fluid flow communication with the suction motor. (Limitation [14h4]).

270. In my opinion, the pre-motor filter housing (**filter case 143**) is openable in the combined teachings of Butler and Oh while the cyclone bin assembly (**dustcup assembly 1508**/**dirt receptacle 214**) is in fluid flow communication with the suction motor (**fan/motor assembly 1506**) because, in Oh, **filter case 143** can slide in and out of the vacuum cleaner without blocking an airway, removing the cyclone bin assembly, or

removing the suction motor, and a POSA would have understood that this also applies when Butler is modified in view of Oh, as shown in the annotated figures below:



Ex1006, Fig. 3, 6:7-9; Ex1005, Fig. 15.

271. In my opinion, because the cyclone chamber is contained within the cyclone bin assembly, Ground 1, [1c]/[14c], a POSA would have understood that the cyclone chamber in the Butler and Oh combination is in fluid flow communication with the suction motor for the same reasons.

o. [14h5]

Reference Number	Claim Limitation
[14h5]	"wherein the first and second locations are provided other than on the openable pre-motor filter housing cover."

272. In my opinion, Butler and the combination of Butler and Oh teaches that the first and second locations are provided other than on the openable pre-motor filter housing cover.

273. In my opinion, a POSA would have understood that incorporating Oh's teachings of a pre-motor filter housing would not modify the relative positions of Butler's handle (**foregrip/straight grip**), which is at a position of the suction motor (**fan/motor assembly 1506**) because the portion of Oh incorporated does not involve a handle. Ground 1, [14h5]; Ground 2, §1. Therefore, a POSA would have understood that the first and second locations are provided other than on the openable pre-motor filter housing cover in the Butler and Oh combination.

3. The Combined Teachings of Butler and Oh Render Obvious Claims [2]/[15]

Reference Number	Claim Limitation
[2]	"The hand vacuum cleaner of claim 1 wherein the suction motor comprises a fan and a motor and an upstream side of the fan is positioned proximate the cyclone inlet."
[15]	"The hand vacuum cleaner of claim 14 wherein the suction motor comprises a fan and a motor and an upstream side of the fan is positioned proximate the cyclone air inlet."

274. In my opinion, the combination of Butler and Oh renders obvious the hand vacuum cleaner of claim 1 wherein the suction motor comprises a fan and a motor and an upstream side of the fan is positioned proximate the cyclone

inlet. (Claim 2).

275. In my opinion, the combination of Butler and Oh renders obvious the hand vacuum cleaner of claim 14 wherein the suction motor comprises a fan and a motor and an upstream side of the fan is positioned proximate the cyclone air inlet. (Claim 15).

276. In my opinion, Butler and the combination of Butler and Oh renders obvious claims 1 and 14. Ground 2, [1]/[14].

277. In my opinion, Butler and the combination of Butler and Oh teaches a hand vacuum wherein the suction motor comprises a fan and a motor and an upstream side of the fan is positioned proximate the cyclone inlet for the same reasons Butler does. Ground 1, [2]/[15]; Ground 2, §1.

4. The Combined Teachings of Butler and Oh Render Obvious Claims [5]/[18]

Reference Number	Claim Limitation
[5]	"The hand vacuum cleaner of claim 1 wherein the upstream side of the pre-motor filter is spaced further from the cyclone chamber than the downstream side of the pre-motor filter."
[18]	"The hand vacuum cleaner of claim 14 wherein the upstream side of the pre-motor filter is spaced further from the cyclone chamber than the downstream side of the pre-motor filter."

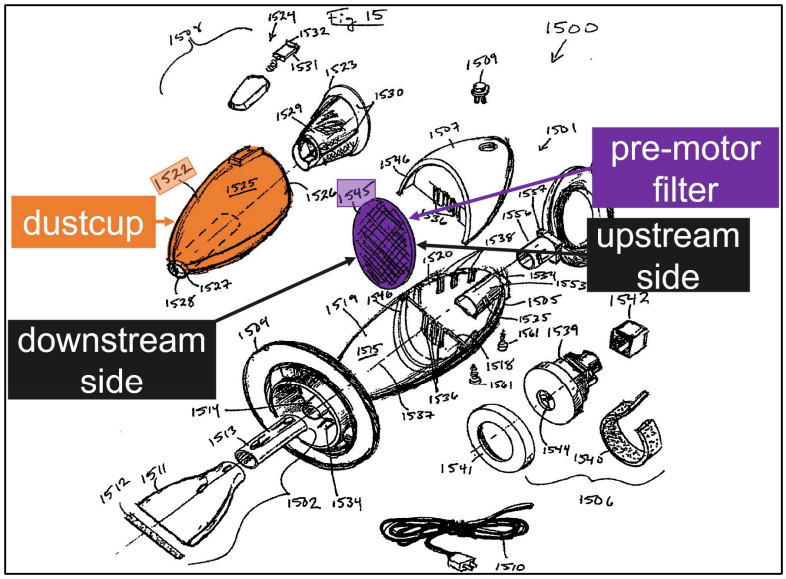
278. In my opinion, the combination of Butler and Oh renders obvious the hand vacuum cleaner of claim 1 and further teaches that the upstream side of the pre-motor filter is spaced further from the cyclone chamber than the

downstream side of the pre-motor filter. (Claim 5).

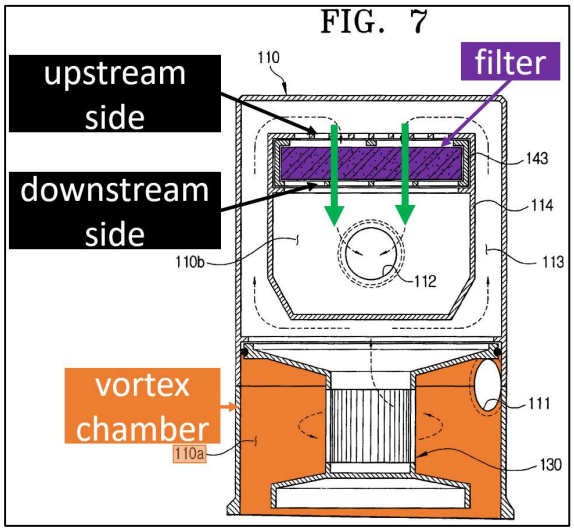
279. In my opinion, the combination of Butler and Oh renders obvious the hand vacuum cleaner of claim 14 and further teaches that the upstream side of the pre-motor filter is spaced further from the cyclone chamber than the downstream side of the pre-motor filter. (Claim 18).

280. In my opinion, Butler and the combination of Butler and Oh renders obvious claims 1 and 14. Ground 2, [1]/[14].

281. In my opinion, the Butler and Oh combination has a pre-motor filter with an upstream side and a downstream side. Ground 2, [1d1]/[14d1]. In my opinion, the Butler and Oh combination modifies Butler's pre-motor filter to incorporate Oh's top-to-bottom pre-motor filter airflow orientation. Ground 2, §1. Therefore, a POSA would have understood that, in the Butler and Oh combination, the **upstream side** of the pre-motor filter is spaced further from the cyclone chamber (**dustcup 1522**'s cyclonic separation chamber) than its **downstream side**, as shown in the modified figures below.



Ex1005, Fig. 15.



See Ex1006, Fig. 7.

5. **The Combined Teachings of Butler and Oh Render Obvious Claims [7]/[20]**

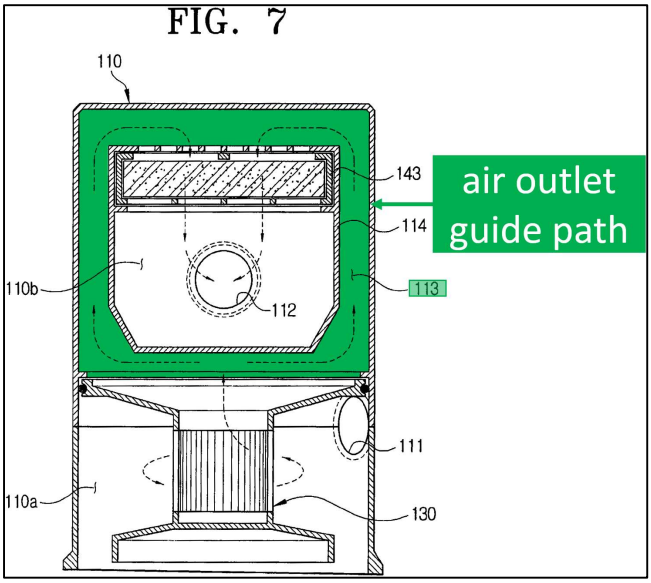
Reference Number	Claim Limitation
[7]	"The hand vacuum cleaner of claim 5 further comprising an upstream header on the upstream side of the pre-motor filter and the upstream header is opened when the openable cover is opened."
[20]	"The hand vacuum cleaner of claim 18 further comprising an upstream header on the upstream side of the pre-motor filter and the upstream header is opened when the openable cover is opened."

282. In my opinion, the combination of Butler and Oh renders obvious the hand vacuum cleaner of claim 5 and further teaches that it comprises an upstream header on the upstream side of the pre-motor filter and the upstream header is opened when the openable cover is opened. (Claim 7).

283. In my opinion, the combination of Butler and Oh renders obvious the hand vacuum cleaner of claim 18 and further teaches that it comprises an upstream header on the upstream side of the pre-motor filter and the upstream header is opened when the openable cover is opened. (Claim 20).

284. In my opinion, Butler and the combination of Butler and Oh renders obvious claims 5 and 18. Ground 2, [5]/[18].

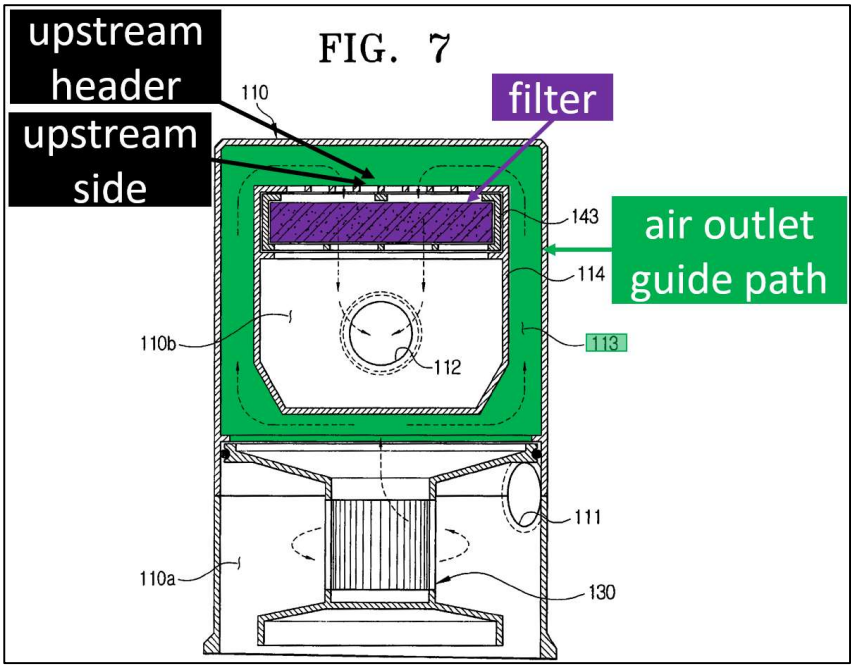
285. Oh teaches an **air outlet guide path 113**, as shown in the annotated figure below:



Ex1006, 7:1-7, Fig. 7.

286. In my opinion, a POSA would have understood that Oh's **air outlet guide path 113** is a bounded airflow path that comprises an upstream header.

287. Further, in my opinion, a POSA would have understood that the **upstream header** is on the **upstream side** of the **pre-motor filter**, as shown in the annotated figure below:



Ex1006, Fig. 7.

288. In my opinion, a POSA would have been motivated to modify Butler to incorporate Oh's pre-motor filter airflow orientation and Oh's slidably removable pre-motor filter housing for the reasons previously explained. Ground 2, §1. When combined, a POSA would have understood that the **upstream header** on the **upstream side** of the pre-motor filter is opened when the openable cover (**filter case 143**) is opened or removed. *See* Ex1005, Fig. 15; Ex1006, Figs. 3, 7

6. The Combined Teachings of Butler and Oh Render Obvious Claims [9]

Reference Number	Claim Limitation
[9]	"The hand vacuum cleaner of claim 5 further comprising an upstream header on the upstream side of the pre-motor filter and the upstream header is opened when the openable cover is opened."

289. In my opinion, Butler and the combination of Butler and Oh renders obvious claim 5. Ground 2, [5].

290. In my opinion, Butler and the combination of Butler and Oh teaches a hand vacuum cleaner further comprising an upstream header on the upstream side of the pre-motor filter and the upstream header is opened when the openable cover is opened for the same reasons Butler does. Ground 1, [9]; Ground 2, §1.

7. The Combined Teachings of Butler and Oh Render Obvious Claims [10]/[22]

Reference Number	Claim Limitation
[10]	The hand vacuum cleaner of claim 1 wherein the suction motor has a suction motor axis and when the hand vacuum cleaner is carried by the handle, the suction motor axis extends generally horizontally.
[22]	The hand vacuum cleaner of claim 14 wherein the suction motor has a suction motor axis and when the hand vacuum cleaner is carried by the handle, the suction motor axis extends generally horizontally.

291. In my opinion, Butler and the combination of Butler and Oh renders obvious claims 1 and 14. Ground 2, [1]/[14].

292. In my opinion, Butler and the combination of Butler and Oh teaches a hand

vacuum wherein the suction motor has a suction motor axis and when the hand vacuum cleaner is carried by the handle, the suction motor axis extends generally horizontally for the same reasons as in Butler. Ground 1, [10]/[22]; Ground 2, §1.

8. The Combined Teachings of Butler and Oh Render Obvious Claims [11]/[12]/[23]/[24]

Reference Number	Claim Limitation
[11]	"The hand vacuum cleaner of claim 10 wherein when the hand vacuum cleaner is carried by the handle, the cyclone axis extends generally horizontally."
[12]	"The hand vacuum cleaner of claim 1 wherein when the hand vacuum cleaner is carried by the handle, the cyclone axis extends generally horizontally."
[23]	"The hand vacuum cleaner of claim 22 wherein when the hand vacuum cleaner is carried by the handle, the cyclone axis extends generally horizontally."
[24]	"The hand vacuum cleaner of claim 14 wherein when the hand vacuum cleaner is carried by the handle, the cyclone axis extends generally horizontally."

293. In my opinion, Butler renders the hand vacuum cleaner of claim 10 obvious and further teaches that when the hand vacuum cleaner is carried by the handle, the cyclone axis extends generally horizontally. (Claim 11).

294. In my opinion, Butler renders the hand vacuum cleaner of claim 1 obvious and further teaches that when the hand vacuum cleaner is carried by the handle, the cyclone axis extends generally horizontally. (Claim 12).

295. In my opinion, Butler renders the hand vacuum cleaner of claim 22 obvious

and further teaches that when the hand vacuum cleaner is carried by the handle, the cyclone axis extends generally horizontally. (Claim 23).

296. In my opinion, Butler renders the hand vacuum cleaner of claim 14 obvious and further teaches that when the hand vacuum cleaner is carried by the handle, the cyclone axis extends generally horizontally. (Claim 24).

297. In my opinion, Butler and the combination of Butler and Oh renders obvious claims 1, 10, 14 and 22. Ground 2, [1]/[14], [10]/[22].

298. In my opinion, Butler and the combination of Butler and Oh teaches a hand vacuum wherein when the hand vacuum cleaner is carried by the handle, the cyclone axis extends generally horizontally for the same reasons Butler does. Ground 1, [11]/[12]/[23]/[24]; Ground 2, §1.

9. The Combined Teachings of Butler and Oh Render Obvious Claims [13]/[25]

Reference Number	Claim Limitation
[13]	The hand vacuum cleaner of claim 1 wherein the pre-motor filter comprises a physical filter media.
[25]	The hand vacuum cleaner of claim 14 wherein the pre-motor filter comprises a physical filter media.

299. In my opinion, Butler and the combination of Butler and Oh renders obvious claims 1 and 14. Ground 2, [1]/[14].

300. In my opinion Butler and the combination of Butler and Oh teaches a hand vacuum wherein the pre-motor filter comprises a physical filter media for

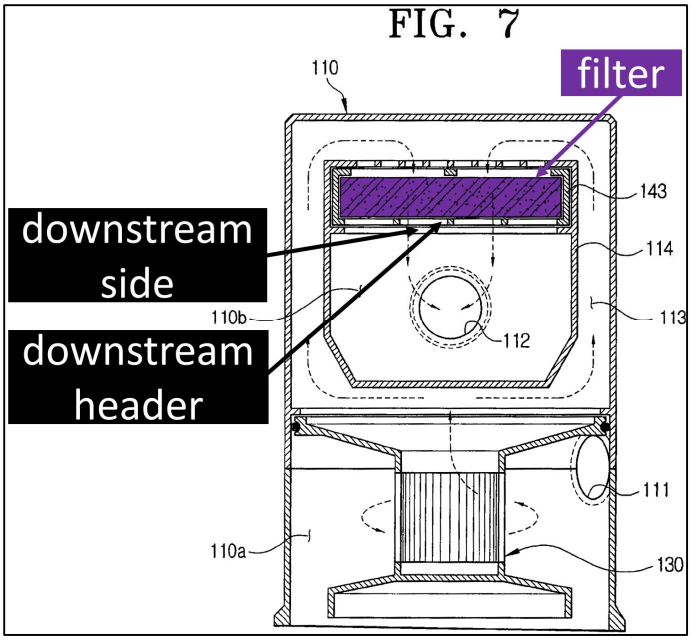
the same reasons Butler does. Ground 1, [13]/[25]; Ground 2, §1.

10. The Combined Teachings of Butler and Oh Render Obvious Claims [17]

Reference Number	Claim Limitation
[17]	"The hand vacuum cleaner of claim 14 further comprising a downstream header on the downstream side of the pre-motor filter and the downstream header is opened when the openable cover is opened."

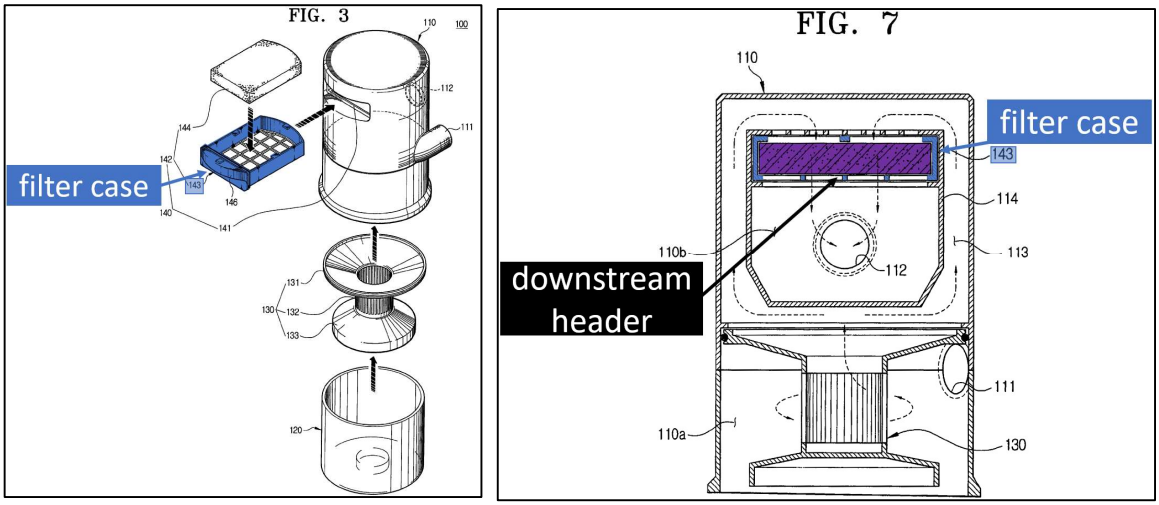
301. In my opinion, Butler and the combination of Butler and Oh renders obvious claim 14. Ground 2, [14]. In my opinion Butler and the combination of Butler and Oh further teaches a hand vacuum comprising a downstream header on the downstream side of the pre-motor filter and the downstream header is opened when the openable cover is opened.

302. In my opinion, a POSA would have understood that the airflow path taught in Oh results in a **downstream header** on the **downstream side** of the pre-motor **filter**, as shown in the annotated figure below:



Ex1006, Fig. 7.

303. Further, a POSA would have understood the combination of Butler and Oh to render obvious a **downstream header** opened when the openable cover (**filter case 143**) is opened because Oh's **downstream header** opens when the openable cover (**filter case 143**) is opened, as shown in the annotated figures below:



Ex1006, Fig. 7.

304. In my opinion, Oh's **downstream header** is part of Oh's pre-motor filter airflow orientation and pre-motor filter housing teachings that a POSA would have been motivated to incorporate into Butler.

C. Ground 3: The Butler, Oh, and Organ Combination Renders Claims 6 and 19 Obvious

1. A POSA Would Have Been Motivated to Combine Butler, Oh, and Organ

305. In my opinion, a POSA would have been motivated to combine Butler, Oh, and Organ.

306. Like Butler and Oh, Organ teaches a vacuum cleaner. Ex1007, Abstract. Organ's cleaner has a duct "which passes through the [pre-motor] filter" and contains a "**bleed valve**":

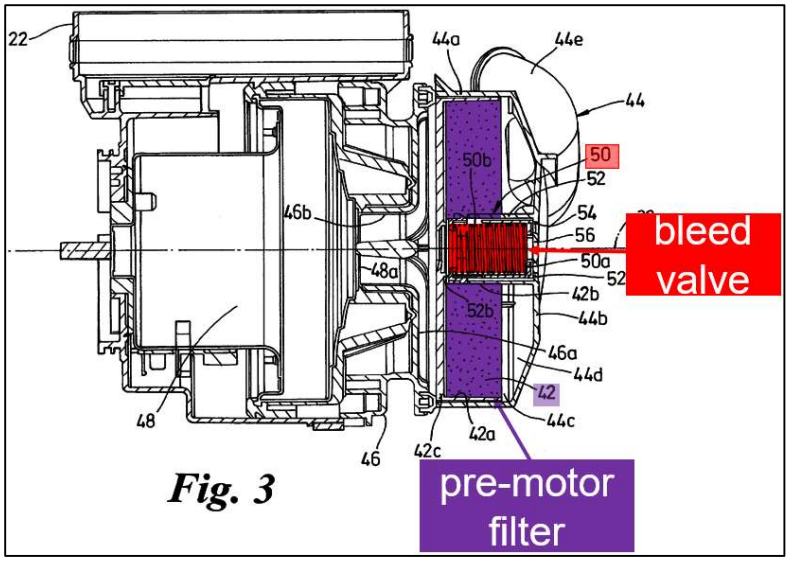


Fig. 3

Ex1007, Abstract, Fig. 3.

307. Organ's **bleed valve** remains closed when the **filter** is operational but opens when the **filter** is blocked. Ex1007, Abstract, 7, 8.

308. In my opinion, a POSA would have been motivated to incorporate Organ's pre-motor filter "**bleed valve**" with the Butler and Oh combination in order to minimize "the risk of overheating of the motor due to blocking of the [pre-motor] filter," which "improve[s] reliability of the appliance," as Organ teaches. Ex1007, 2–3, 7, Fig. 3.

309. Furthermore, in my opinion, a POSA would have understood that this modification would have involved using a known technique (using a bleed valve for a pre-motor filter in a vacuum cleaner) to improve a similar device (a pre-motor filter in another vacuum cleaner) in the same way as Organ teaches to achieve the predicable result of reducing the risk of

overheating the motor by passing air through the bleed valve, thereby increasing reliability. Further, in my opinion, a POSA would have expected this modification to be successful because it is a simple addition of a known component (a bleed valve) that would not have otherwise affected the components of Butler's cleaner when modified in view of Oh.

2. The Combined Teachings of Butler Oh, and Organ Render Obvious Claims [6]/[19]

Reference Number	Claim Limitation
[6]	"The hand vacuum cleaner of claim 5 further comprising a conduit that is in flow communication with the air outlet of the cyclone chamber and extends through the pre-motor filter."
[19]	"The hand vacuum cleaner of claim 18 further comprising a conduit that is in flow communication with the cyclone air outlet and extends through the pre-motor filter."

310. In my opinion, the combination of Butler, Oh, and Organ renders obvious the hand vacuum cleaner of claim 5 and further teaches that it further comprises a conduit that is in flow communication with the air outlet of the cyclone chamber and extends through the pre-motor filter. (Claim 6).

311. In my opinion, the combination of Butler, Oh, and Organ renders obvious the hand vacuum cleaner of claim 18 and further teaches that it further comprises a conduit that is in flow communication with the cyclone air outlet and extends through the pre-motor filter. (Claim 19).

312. In my opinion, Butler and the combination of Butler and Oh renders

obvious claims 5 and 18, Ground 2, [5]/[18], and for the same reasons the combination of Butler, Oh, and Organ renders obvious claims 5 and 18. Ground 2, [5]/[18].

313. Organ teaches a "**bleed valve**," which a POSA would have understood is a conduit, at least because air passes through it. Ex1007, Abstract, Fig. 7. In my opinion, a POSA would have been motivated to incorporate Organ's **bleed valve** teachings into the combination of Butler and Oh and would have had a reasonable expectation of success. Ground 3, §1. A POSA would have understood that, in the combined teachings of Butler, Oh, and Organ, the **bleed valve** extends through the pre-motor filter. *Id.*

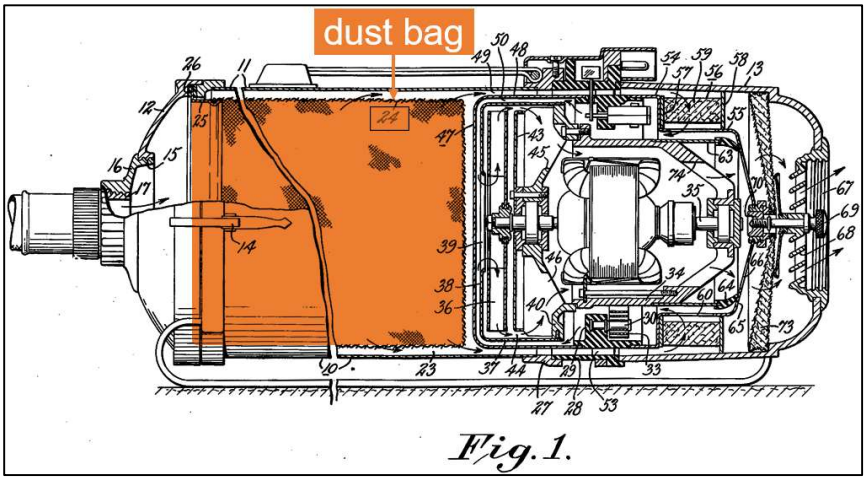
314. In my opinion, a POSA would have understood that the conduit (**bleed valve**) is in flow communication with the cyclone chamber's air outlet (the airflow interface at **filter 1529**), because air leaving **dustcup 1522** through **filter 1529** travels via the **air outlet guide path** to the **filter** and the **bleed valve**. A POSA further would have understood that the **bleed valve** extends through the pre-motor **filter** because Organ teaches that the **bleed valve** "passes through the filter." Ex1007, Abstract.

D. Ground 4: The Eriksson-Jons and Martelliere Combination Renders Claims 1-25 Obvious

1. A POSA Would Have Been Motivated to Combine Eriksson-Jons and Martelliere

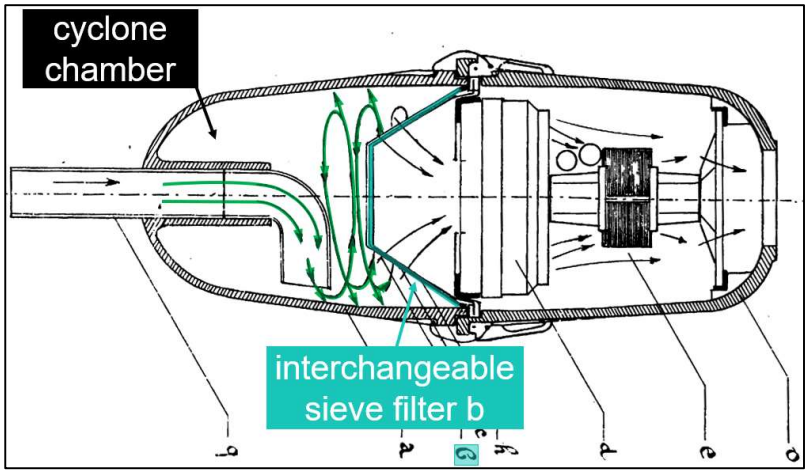
315. In my opinion, a POSA would have been motivated to combine Eriksson-Jons and Martelliere.

316. Eriksson-Jons teaches a compact vacuum with a "**dust bag 24** or other dust separating member" to separate dust from air, as shown in the annotated figure below:



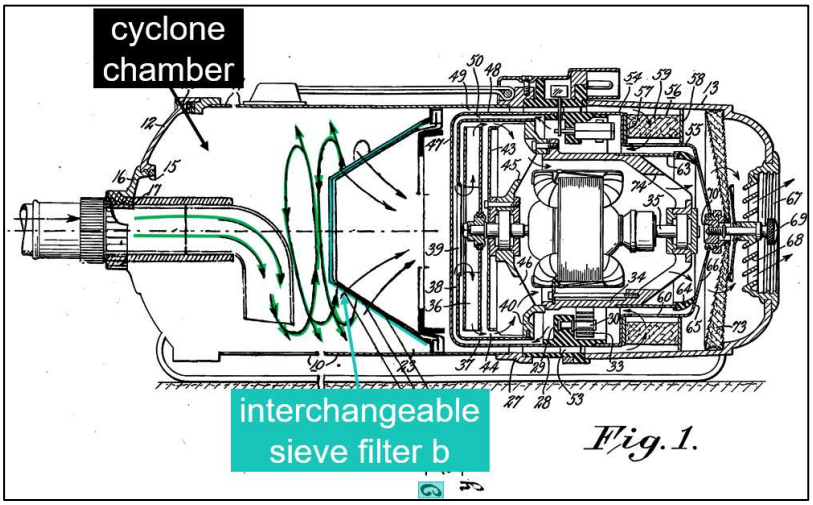
Ex1008, 1(right):19-30, Fig. 1.

317. Martelliere teaches a compact vacuum with a cyclone chamber—which Martellliere describes as using "the 'Whirlwind' principle"—to separate dust from air, which is then further filtered by an "**interchangeable sieve filter b**," as shown in the annotated figure below:



Ex1010, 1, Fig. 1.

318. A POSA would have been motivated to combine Martelliere's cyclonic-separation teachings with Eriksson-Jons, as shown in the modified figure below:



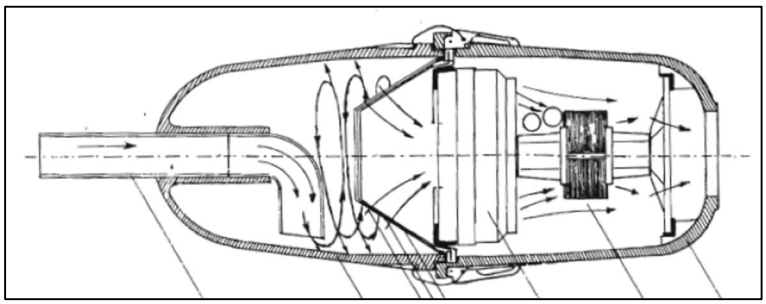
Ex1008, Fig. 1 (modified); Ex1010, Fig. 1.

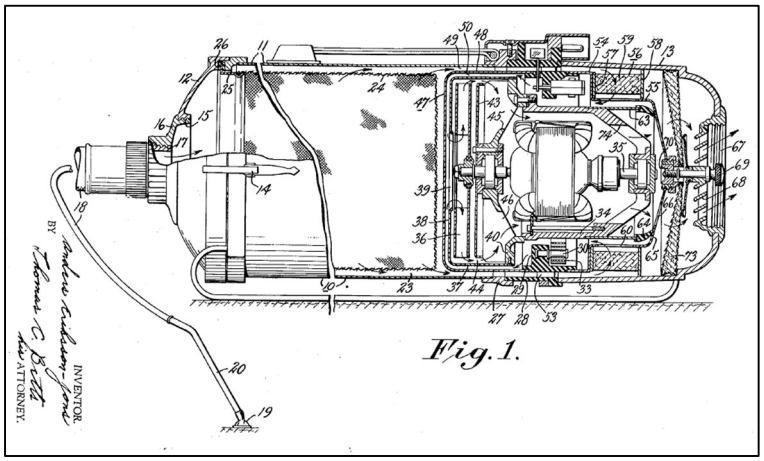
319. In my opinion, a POSA would have recognized Eriksson-Jons' teaching that a "**dust bag 24** ***or other dust separating member***" may be used as an

air-filtration unit (Ex1008, 1(right):21-22) and would have been motivated to incorporate Martelliere's teachings of "the 'Whirlwind' principle" (i.e., cyclonic filtration) and its "**interchangeable sieve filter b**" as one such "other dust separating member" for its many known benefits, including benefits Martelliere explicitly teaches, and would have reasonably expected success. For example, Martelliere teaches that "[b]y application of the 'Whirlwind' principle," i.e., cyclonic filtration, "the materials are deposited in the bottom of the container, after having separated from the air, before it passes through the filter screen," which "prevent[s] clogging" and creates "stable suction," and by using a transparent cyclonic chamber, "the user is able, when stopped, to see where the filling of the container is" and "can therefore better judge when it must be emptied." Ex1010, 1. Furthermore, a POSA would have recognized that Martelliere and Eriksson-Jons are analogous art because both teach vacuum cleaners with similar layouts.

320. A POSA would have been motivated to make this straightforward substitution of one known dust-separating element (a dust bag chamber) for another dust-separating element (a cyclone chamber with a filter) to obtain predictable results (dust separation). Indeed, both Eriksson-Jons and Martelliere teach a dust-separation unit at the front of the vacuum

cleaner with a centrally located air inlet having a similar form factor and orientation. Ex1008, Fig. 1.





Ex1010, Fig. 1; Ex1008, Fig. 1.

321. These similarities would have further motivated a POSA to combine them.

322. In my opinion, it would have been obvious to a POSA to at least try this combination. A POSA would have understood that there were a finite number of identified dust-separation solutions, including dust bags (as Eriksson-Jons teaches) and cyclonic separators with a filter (as Martelliere teaches), and a POSA would have been motivated to use cyclonic

separation with a filter as taught by Martelliere to achieve its known benefits. It further would have been obvious to try this combination because Martelliere explicitly teaches that its cyclonic filtration teachings "remedy [the] disadvantages" of a "dust bag" filter. Ex1010, 1.

323. A POSA further would have had a reasonable expectation of success incorporating Martelliere's cyclonic-separator and filter teachings with Eriksson-Jons because Eriksson-Jons teaches that its dust-separating unit can be a "dust bag 24 ***or other dust separating member***," and a POSA would have understood that such "other dust separating member[s]" include Martelliere's cyclonic chamber and filter unit. Ex1008, 1(right):21-22. In my opinion, a POSA would have had a reasonable expectation of success in making this simple substitution.

2. Eriksson-Jons and Martelliere Render Claims [1]/[14] Obvious

324. In my opinion, the combination of Eriksson-Jons and Martelliere renders claims 1 and 14 obvious.

a. [1pre]/[14pre]

Reference Number	Claim Limitation
[1pre]	"A hand vacuum cleaner having a front end, a rear end, and comprising:"
[14pre]	"A hand vacuum cleaner having a front end, a rear end and comprising:"

325. To the extent the preambles are limiting, in my opinion, the combined teachings of Eriksson-Jons and Martelliere teaches and renders obvious a hand vacuum cleaner having a front end and a rear end.

326. Eriksson-Jons teaches a hand vacuum. Eriksson-Jons is titled "Vacuum Cleaner," and teaches a **handle** by which the entire vacuum may be carried:

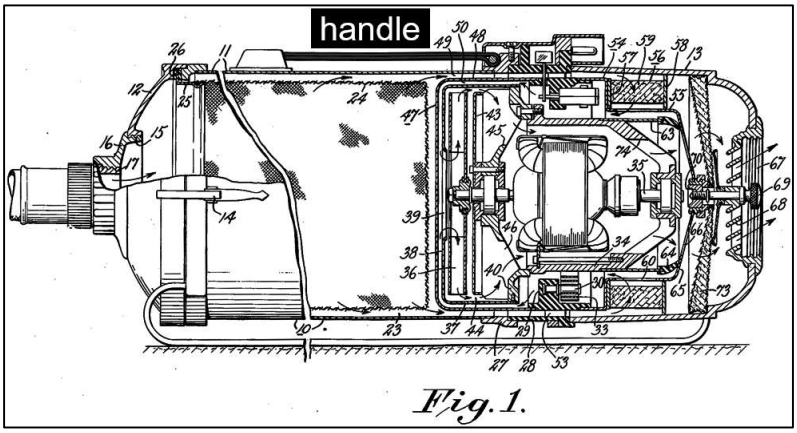


Fig. 1.

Ex1008, Title, Fig. 1.

327. Martelliere likewise teaches a hand vacuum because Martelliere teaches a compact-sized "vacuum cleaner" that is "held vertically or slightly inclined." Ex1010, 1, Fig. 1. Accordingly, a POSA would have recognized that the combination of Eriksson-Jons and Martelliere is a hand vacuum.

328. In my opinion, Eriksson-Jons, Martelliere, and their combination also renders a hand vacuum obvious. While Eriksson-Jons and Martelliere do

not specify particular dimensions, to the extent PO argues they are not hand vacuums, it would have been obvious to a POSA to decrease their size to increase maneuverability and decrease weight, making them a more compact and portable hand vacuum, which could be accomplished with a straightforward use of modern components and materials alone (in comparison with what was commercially available in 1936 and 1955 respectively).

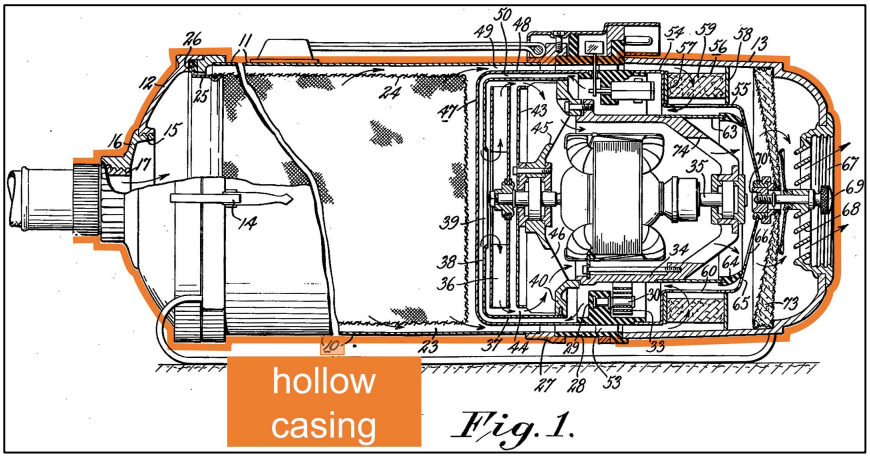
329. In my opinion, a POSA would have also understood that Eriksson-Jons, Martelliere, and the Eriksson-Jons and Martelliere combination, each teach a front end at the air inlet end, and rear end at the air outlet end.

b. [1a]/[14a]

Reference Number	Claim Limitation
[1a]	"a main housing;"
[14a]	"a main housing;"

330. In my opinion, Eriksson-Jons teaches a main housing.

331. For example, Eriksson-Jons teaches that its vacuum cleaner's "**hollow casing [10]**" includes a "central portion 11 and end caps or closure members 12 and 13," as shown in the annotated figure below:



Ex1008, 1(right):5-18, Fig. 1.

332. Eriksson-Jons also teaches that its "**hollow casing 10**" also has "an inlet opening at one end and a closure member …with an outlet opening." Ex1008, Claim 10.

333. In my opinion, a POSA would have understood that Eriksson-Jons's "**hollow casing 10**" is a main housing. For example, as shown above, Eriksson-Jons teaches that "**hollow casing 10**" houses the main components of Eriksson-Jons's vacuum cleaner, including its fan and motor assembly, its dirt collection chamber, and its air filters. *See* Ex1008, Fig. 1.

c. [1b]/[14b]

Reference Number	Claim Limitation
[1b]	"a dirty fluid inlet;"
[14b]	"a dirty fluid inlet;"

334. In my opinion, the combination of Eriksson-Jons and Martelliere teaches

a dirty fluid inlet.

335. Eriksson-Jons teaches an "inlet opening" in which dirty air flows into the cleaner. Ex1008, 2(left):53-59, Claim 1. In my opinion, a POSA would have understood that this is a dirty air inlet. This is because it is an inlet for dirty air.

336. Likewise, Martelliere teaches an inlet tube through which dirty air is "sucked tangentially to the interior wall of the … container." Ex1010, 1, Fig. 1. In my opinion, a POSA would have understood that this is a dirty air inlet because it is an inlet for dirty air.

337. A POSA therefore would have understood that the combination of Eriksson-Jons and Martelliere has a dirty fluid inlet.

d. [1c]/[14c]

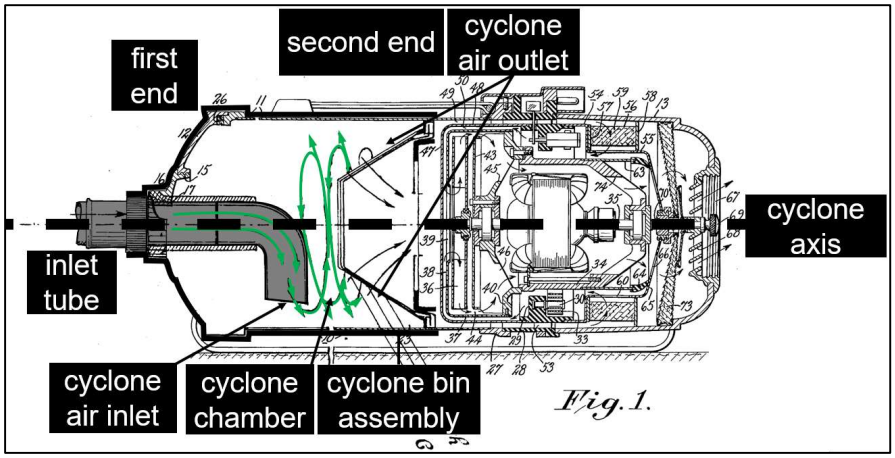
Reference Number	Claim Limitation
[1c]	"a cyclone bin assembly comprising a cyclone chamber downstream of the dirty fluid inlet, the cyclone chamber comprising a first end, a second end, a cyclone axis, a cyclone air inlet and a cyclone air outlet wherein the cyclone air outlet is located at the second end;"
[14c]	"a cyclone bin assembly comprising a cyclone chamber downstream of the dirty fluid inlet, the cyclone chamber comprising a first end, a second end, a cyclone air inlet, a cyclone axis, and a cyclone air outlet that is located at the second end;"

338. In my opinion, the combination of Eriksson-Jons and Martelliere teach a cyclone bin assembly comprising a cyclone chamber downstream of the

dirty fluid inlet, the cyclone chamber comprising a first end, a second end, a cyclone axis, a cyclone air inlet and a cyclone air outlet wherein the cyclone air outlet is located at the second end. (Limitation [1c]).

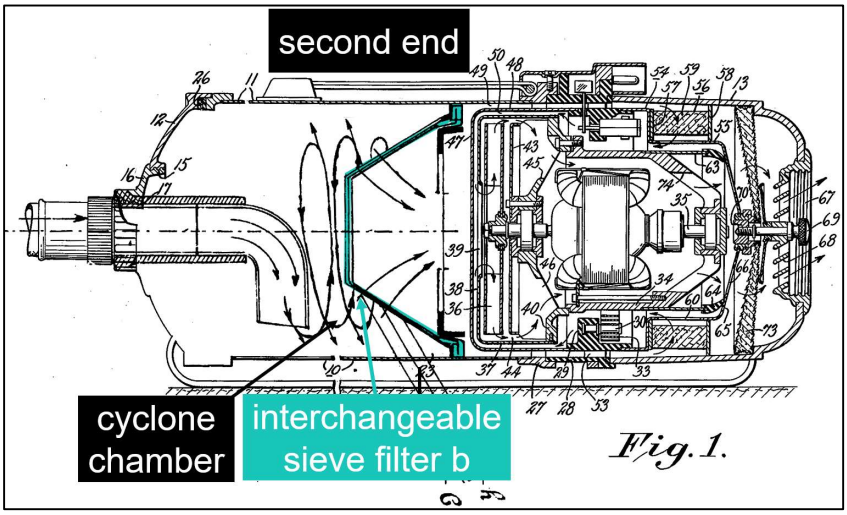
339. In my opinion, the combination of Eriksson-Jons and Martelliere teach a cyclone bin assembly comprising a cyclone chamber downstream of the dirty fluid inlet, the cyclone chamber comprising a first end, a second end, a cyclone air inlet, a cyclone axis, and a cyclone air outlet that is located at the second end. (Limitation [14c]).

340. It is my opinion that the combination of Eriksson-Jons and Martelliere teaches a cyclone bin assembly. Martelliere teaches a cyclone bin assembly comprising a cyclone chamber downstream of a dirty fluid inlet, the cyclone chamber comprising a first end, a second end, a cyclone axis, a cyclone air inlet, and a cyclone air outlet, wherein the cyclone air outlet is located at the second end, which a POSA would have been motivated to incorporate into Eriksson-Jons and which results in a cyclone bin assembly comprising the same features when combined with Eriksson-Jons, as shown in the annotated figure below:



Ex1008, Fig. 1; Ex1010, 1, Fig. 1; *see also* Ground 4, §1.

341. In my opinion, a POSA would have understood that air leaves the **cyclone chamber** at a **second end** through the "**interchangeable sieve filter b**:"



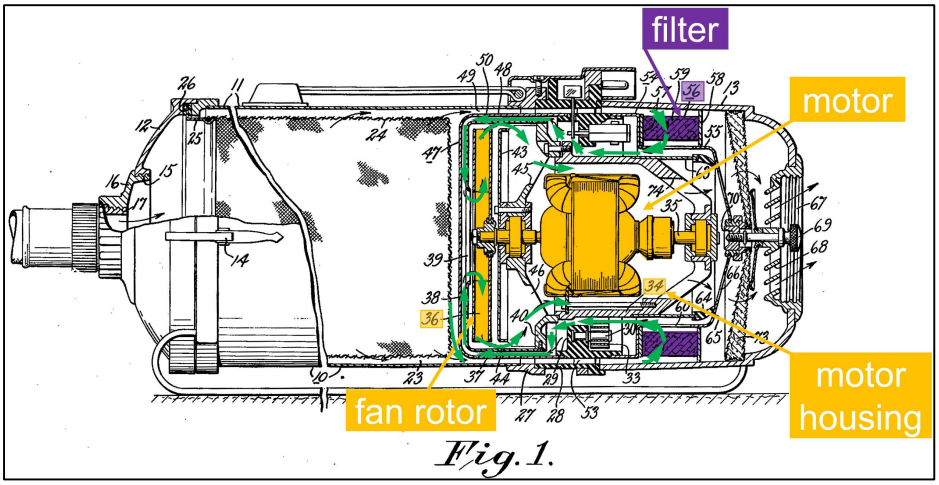
Ex1010, 1 (teaching that "after" dust and dirt have been "separated from the air," the air "passes through the filter screen"), Fig. 1.

e. [1d1]/[14d1]

Reference Number	Claim Limitation
[1d1]	"a pre-motor filter comprising an upstream side and a downstream side,"
[14d1]	"a pre-motor filter comprising an upstream side and a downstream side,"

342. In my opinion, the combination of Eriksson-Jons and Martelliere teaches a pre-motor filter comprising an upstream side and a downstream side.

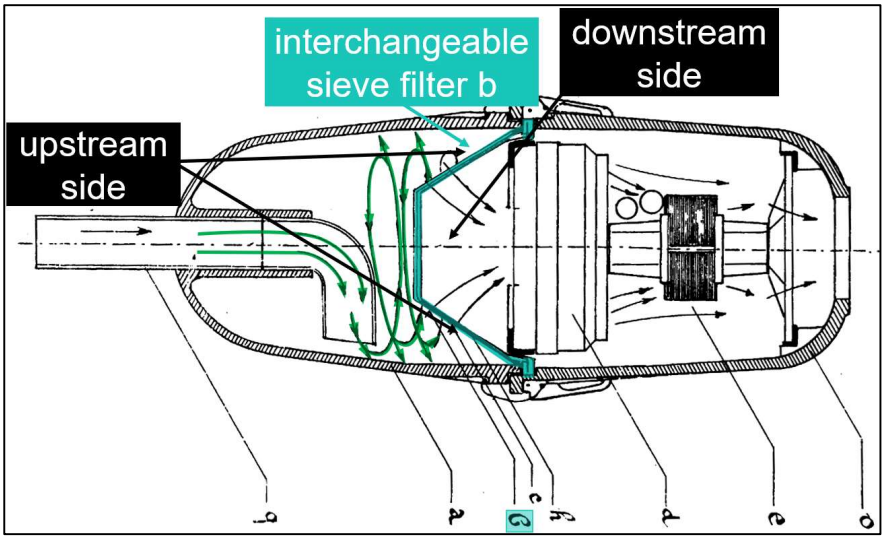
343. In my opinion, Eriksson-Jons teaches a pre-motor filter. Eriksson-Jons teaches a "**filter 56**" upstream of "**fan rotor 36**" and the "**motor**." Ex1008, 2(left):63-2(right):7 ("air [] flows through … **filter 56** … to the inlet 39 of the fan. The **fan rotor 36** acts upon this air … air thus passes within the **motor housing [34]** … and is discharged through … the motor housing."). "**Filter 56**" is therefore a pre-motor filter because air passes through "**filter 56**" before it passes through the "**motor**," as shown in the annotated figure below:



Ex1008, Fig. 1.

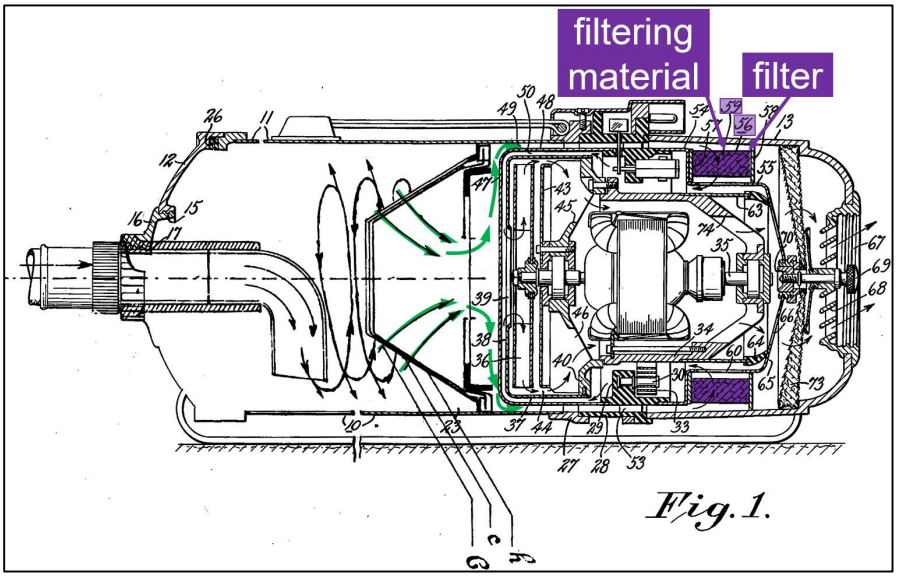
344. A POSA would have understood that "**filter 56**" is three-dimensional and therefore has an **upstream side** and a **downstream side**, as shown in the figure above. Ex1008, 2(left):63-75 ("air then flows through the channel formed by **annular passage 49** … to the outer surface of the **filtering material 59** of **filter 56**. The air passes through **filtering material 59** … passes through openings 60, flows through the channel … by annular passage 50 … to the inlet 39 of the fan.").

345. A POSA would have understood that Martelliere also teaches a pre-motor filter ("**interchangeable sieve filter b**") comprising an **upstream side** and a **downstream side**, as shown in the annotated figure below:



Ex1010, 1, Fig. 1.

346. Therefore, the combined teachings of Eriksson-Jons and Martelliere teach a pre-motor filter comprising an upstream side and a downstream side, as shown in the annotated figure below:



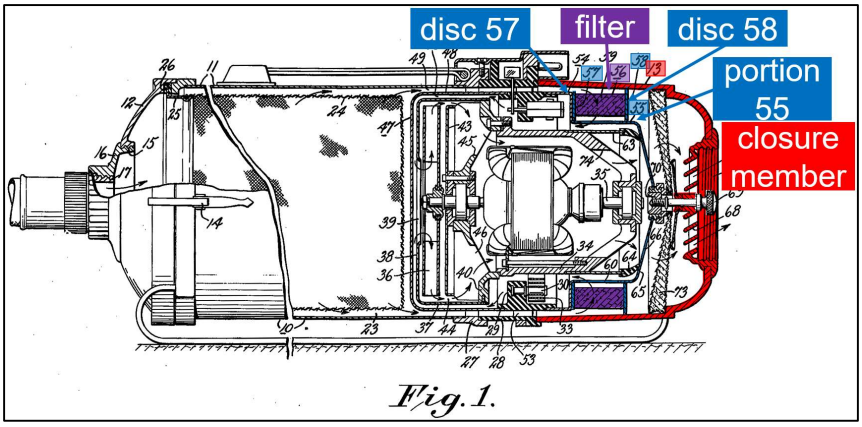
Ex1008, Fig. 1 (modified); Ex1010, Fig. 1

f. [1d2]/[14d2]

Reference Number	Claim Limitation
[1d2]	"the pre-motor filter is positioned in a pre-motor filter housing having an openable cover,"
[14d2]	"the pre-motor filter is positioned in a pre-motor filter housing having an openable cover;"

347. In my opinion the combination of Eriksson-Jons and Martelliere teaches that the pre-motor filter is positioned in a pre-motor filter housing having an openable cover.

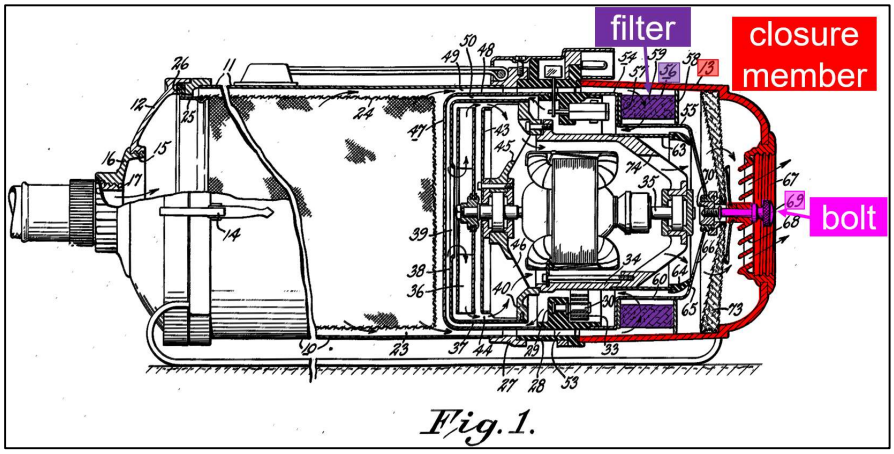
348. Eriksson-Jons teaches that "**filter 56**" is housed by "[t]he inner circumference of **discs 57** and **58**," the "**portion 55 of reduced diameter**," and "**closure member 13**," as shown in the annotated figure below:



Ex1008, Fig. 1, 2(left):38-45 ("The inner circumference of **discs 57** and **58** of the **filter 56** … closely engage the **portion 55 of reduced diameter**. The outer

circumference of **disc 58** … closely engages the inner surface of **closure member 13**.").

349. Further, Eriksson-Jons teaches that, "to remove **filter 56**[,] … unscrew **bolt 69** and remove **closure member 13**," as shown in the annotated figure below:



Ex1008, 2(right):16-19, Fig. 1.

350. Therefore, in my opinion, a POSA would have understood that "**closure member 13**" is an openable cover of the pre-motor filter housing (**discs 57** and **58**, **portion 55**, and **closure member 13**).

g. [1d3]

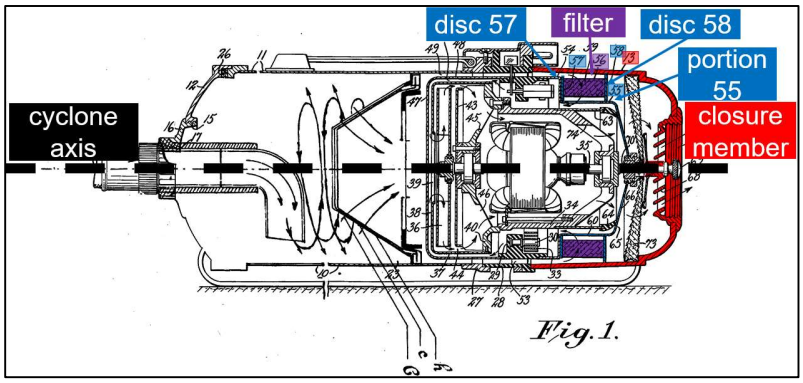
Reference Number	Claim Limitation
[1d3]	"the cyclone axis extends through the pre-motor filter housing."

351. In my opinion, the combination of Eriksson-Jons and Martelliere teaches

that the cyclone axis extends through the pre-motor filter housing.

352. As I explained above, in my opinion, the combination of Eriksson-Jons and Martelliere teaches a cyclone bin assembly with a **cyclone axis**. *See* Ground 4, Limitations [1c]/[14c].

353. Therefore, in my opinion, in the combined teachings of Eriksson-Jons and Martelliere, the **cyclone axis** (Ground 4, [1c]/[14c]) extends through the pre-motor filter housing (**discs 57** and **58**, **portion 55**, and **closure member 13**, Ground 4, [1d2]/[14d2]), and intersects "**closure member 13**," as shown in the modified figure below:



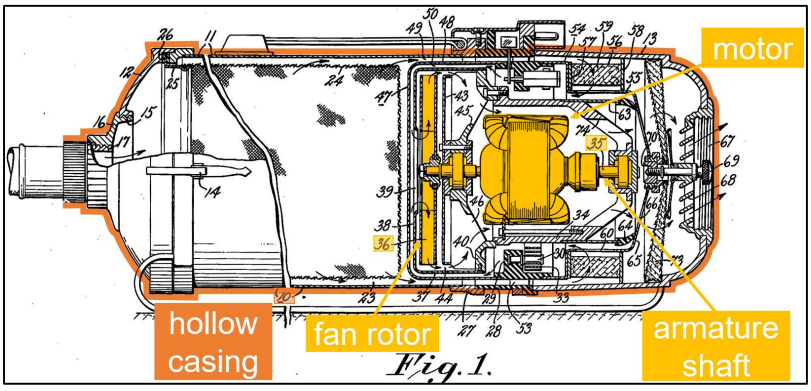
Ex1008, Fig. 1 (modified); Ex1010, Fig. 1.

h. [1e]/[14e]

Reference Number	Claim Limitation
[1e]	"a suction motor positioned in the main housing and located downstream of the pre-motor filter and rearward of the cyclone bin assembly;"
[14e]	"a suction motor positioned in the main housing and located downstream of the pre-motor filter and rearward of the cyclone bin assembly;"

354. In my opinion, the combination of Eriksson-Jons and Martelliere teaches a suction motor positioned in the main housing and located downstream of the pre-motor filter rearward of the cyclone bin assembly.

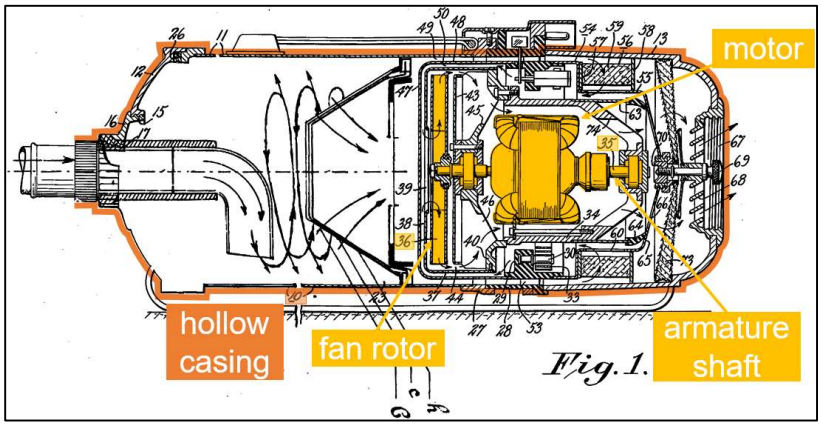
355. Eriksson-Jons teaches a suction motor: a "**motor**" "provided with the usual **armature shaft 35** to one end of which is secured a **fan rotor 36**," as shown in the annotated figure below:



Ex1008, Fig. 1, 1(right):43-45.

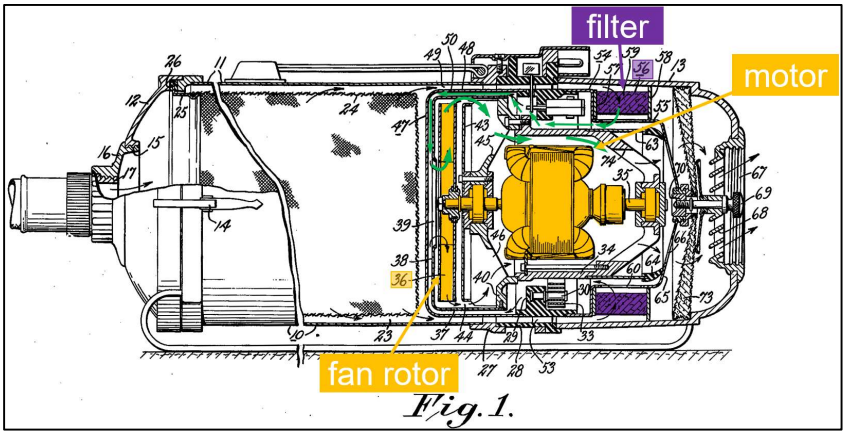
356. In my opinion, a POSA would have understood that, in the Eriksson-Jons

and Martelliere combination, the suction motor is positioned within the main housing (**hollow casing 10**, Ground 4, [1a]/[14a]), as shown in the modified figure below:



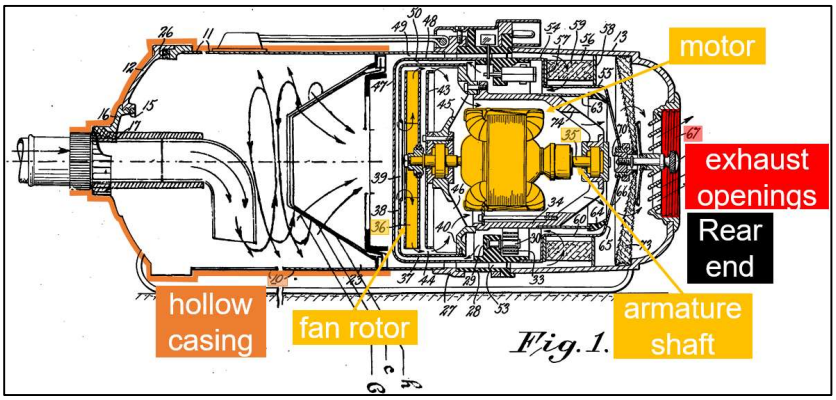
Ex1008, Fig. 1 (modified); Ex1010, Fig. 1; Ground 4, §1.

357. A POSA further would have recognized that Eriksson-Jons's suction motor (**motor**, **armature shaft 35**, and **fan rotor 36**) is located downstream of the pre-motor filter (**filter 56**, Ground 4, [1d1]/[14d1]), as shown in the annotated figure below:



Ex1008, Fig. 1.

358. Further, a POSA would have recognized that, in the Eriksson-Jons and Martelliere combination, the suction motor is located rearward of the cyclone bin assembly (the front half of **hollow casing 10**, the **cyclone chamber**, and the **interchangeable sieve filter b**, Ground 4, [1c]/[14c]), because it is located downstream of it and closer to the vacuum cleaner's **rear end** (the end with "**exhaust openings 67**"), as shown in the modified figure below:



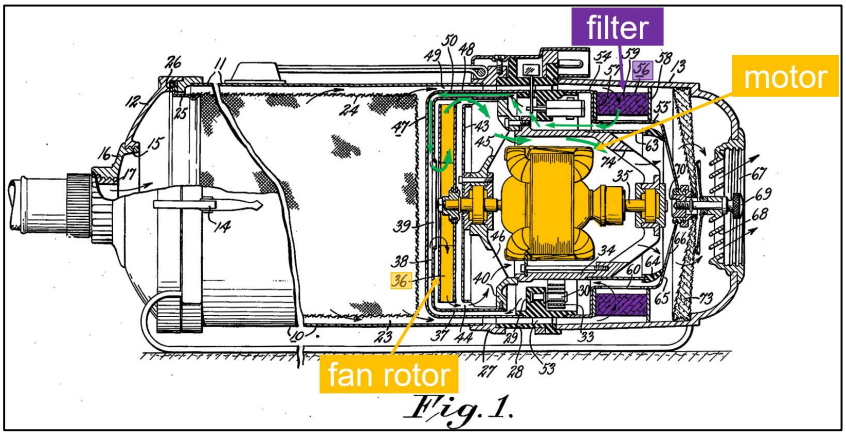
Ex1008, Fig. 1 (modified); Ex1010, Fig. 1; Ground 4, [1pre]/[14pre].

i. [1f]/[14f]

Reference Number	Claim Limitation
[1f]	"an air flow path extending from the pre-motor filter to the suction motor;"
[14f]	"an air flow path extending from the pre-motor filter to the suction motor;"

359. In my opinion, the combination of Eriksson-Jons and Martelliere teaches an air flow path extending from the pre-motor filter to the suction motor.

360. In my opinion, a POSA would have recognized that the **airflow path** in Eriksson-Jons extends from the pre-motor filter (**filter 56**, Ground 4, [1d1]/[14d1]) to the suction motor (**motor**, **armature shaft 35**, and **fan rotor 36**, Ground 4, [1e]/[14e]), as shown in the annotated figure below:



Ex1008, Fig. 1, 2(left):63-2(right):7.

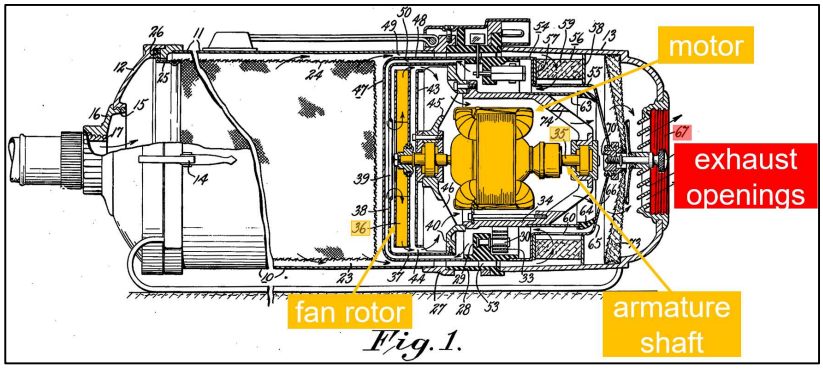
j. [1g]/[14g]

Reference Number	Claim Limitation
[1g]	"a clean air outlet downstream of the suction motor; and,"
[14g]	"a clean air outlet downstream of the suction motor; and,"

361. In my opinion, the combination of Eriksson-Jons and Martelliere teaches a clean air outlet downstream of the suction motor.

362. In Eriksson-Jons, air discharged from the suction motor (**motor**, **armature shaft 35**, and **fan rotor 36**, Ground 4, [1e]/[14e]) passes downstream through a clean air outlet, "**exhaust opening 67**," as shown in the

annotated figure below:



Ex1008, 2(right):1-9, Fig. 1.

363. In my opinion, a POSA would have understood that air discharged from "**exhaust opening 67**" is clean air because the air has passed through "**filter 56**," which cleans the air by separating dust from air. Further, in the Eriksson-Jons and Martelliere combination, a POSA would have recognized that air passes through the **cyclone chamber**, "**interchangeable sieve filter b**," and "**filter 56**," (each of which separates dust from air) before exiting from "**exhaust opening 67**." A POSA therefore would have recognized that "**exhaust opening 67**" is a clean air outlet downstream of the suction motor.

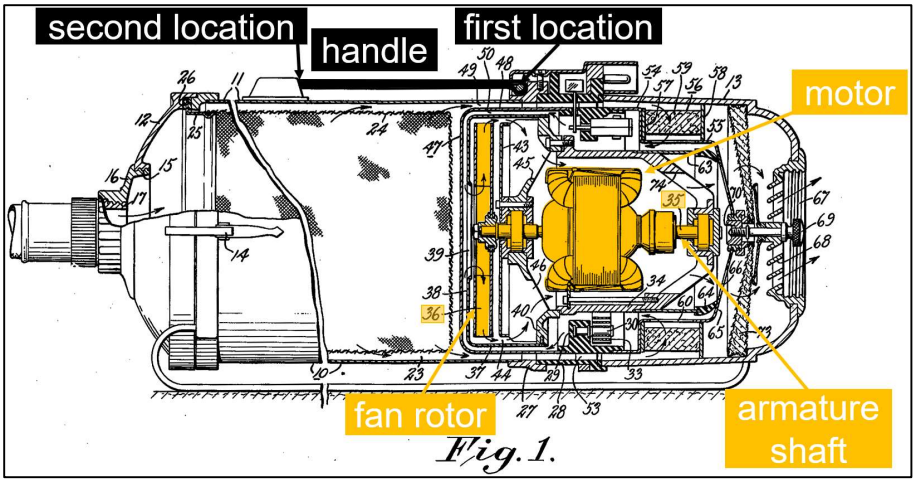
i. **[1h1]/[14h1]**

Reference Number	Claim Limitation
[1h1]	"a handle connected to the hand vacuum cleaner at first and second locations, wherein the first location is at a position of the suction motor in the main housing and a first handle portion is connected at the first location,"
[14h1]	"a handle connected to the hand vacuum cleaner at first and second locations wherein the first location is at a position of the suction motor in the main housing, the handle has a first handle portion provided at the first location,"

364. In my opinion, the combination of Eriksson-Jons and Martelliere teaches a handle connected to the hand vacuum cleaner at first and second locations, wherein the first location is at a position of the suction motor in the main housing and a first handle portion is connected at the first location. (Limitation [1h1]).

365. In my opinion, the combination of Eriksson-Jons and Martelliere teaches a handle connected to the hand vacuum cleaner at first and second locations, wherein the first location is at a position of the suction motor in the main housing, the handle has a first handle portion provided at the first location. (Limitation [14h1]).

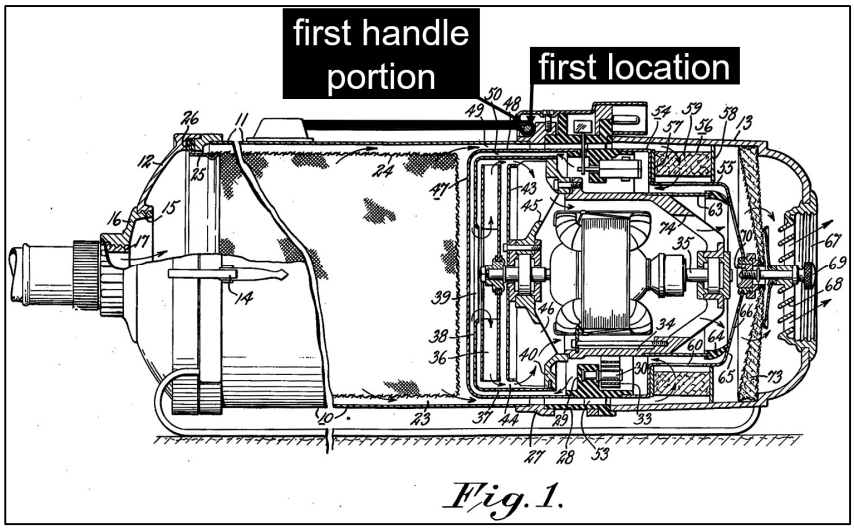
366. Eriksson-Jons teaches that its hand vacuum includes a **handle** connected to the hand vacuum at **first** and **second locations**:



Ex1008, Fig. 1.

367. In my opinion, a POSA would have recognized that the **first location** is at a position of the suction motor (**motor**, **armature shaft 35**, and **fan rotor 36**, Ground 4, [1e]/[14e]) in the main housing (**hollow casing 10**, Ground 4, [1e]/[14e]), as shown above.

368. A POSA further would have recognized that a **first handle portion** is connected at the **first location**, as shown in the annotated figure below:



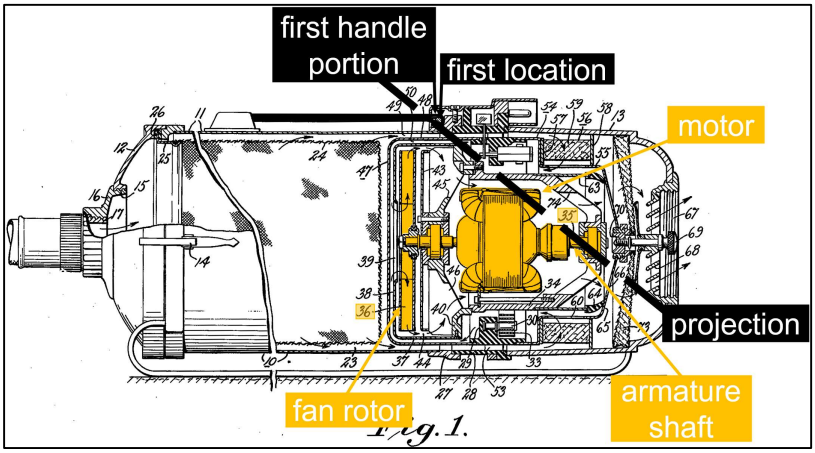
Ex1008, Fig. 1.

ii. **[1h2]/[14h2]**

Reference Number	Claim Limitation
[1h2]	"wherein a projection of the first handle portion extends through the suction motor,"
[14h2]	"a projection of the first handle portion extends through the suction motor, and"

369. In my opinion, the combination of Eriksson-Jons and Martelliere teaches and renders obvious a handle wherein a projection of the first handle portion extends through the suction motor.

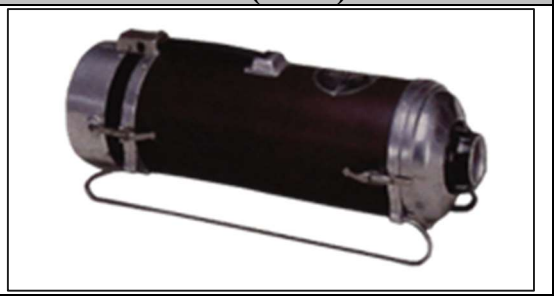
370. In my opinion, a **projection** of Eriksson-Jons's **first handle portion** extends through the suction motor (**motor**, **armature shaft 35**, and **fan rotor 36**, Ground 4, [1e]/[14e]), as shown in the annotated figure below:



Ex1008, Fig. 1.

371. Further, in my opinion, while Eriksson-Jons does not expressly state

whether its handle is rigid or flexible, a POSA would have understood that the handle is flexible. For example, Electrolux (the company assigned Eriksson-Jons, Ex1008, 1) created vacuums similar to Eriksson-Jons with flexible handles both before, during, and after Eriksson-Jons was patented, as shown in the table of Electrolux Vacuum models below:

XI(1927)	XII(1930)
	
XXX(1937)	**LX(1952)**
	

Ex1017.

372. As another example, other companies manufactured similar vacuums with leather handles in the 1930s:

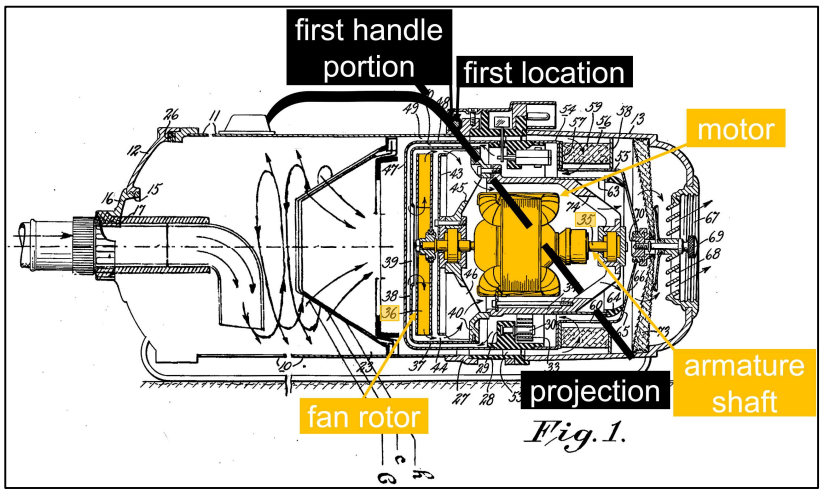
Goblin Clean-Sweep(1930)



Ex1018.

373. Further, in my opinion, it would have been obvious to a POSA to use a flexible handle with Eriksson-Jons to increase finger clearance, useability, mobility, and user comfort, as flexible handles were well known in the art as providing those benefits. Such a modification would have involved a simple substitution of a rigid handle with a flexible handle to predictably result in a user-friendly handle; it would have been at least obvious to try as there were a finite number of handle types (including rigid and flexible handles); and a POSA would have had a reasonable expectation of success doing this because it would have been a simple substitution that would not otherwise affect device operation. In my opinion, a POSA would have understood that, when a flexible handle is used with Eriksson-Jons, a

projection of the **first handle portion** extends through the suction motor, as shown in the modified figure below:



Ex1008, Fig. 1 (modified).

374. Further, it would have been obvious to use a rigid arched handle with Eriksson-Jons. For example, Electrolux (the company assigned Eriksson-Jons, Ex1008, 1) created vacuums similar to Eriksson-Jons with rigid arched handles after Eriksson-Jons was issued but well before the '472's claimed priority date, as shown in the table of Electrolux Vacuum models below:

Hospital-G(1964)	S(1957)
	

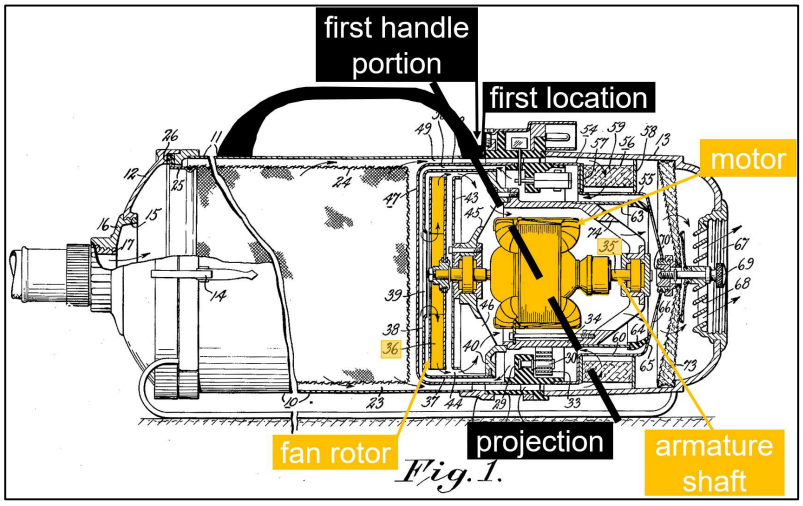
E(1954)	L(1966)
	

R(1960)


Ex1017.

375. In my opinion, it would have been obvious to use a rigid arched handle with Eriksson-Jons to increase finger clearance, useability, mobility, and user comfort, as rigid arched handles were well known in the art and would have involved a simple substitution of one handle for another to predictably result in a user-friendly handle; it would have been at least obvious to try as there are a finite number of handle options; and a POSA would have had a reasonable expectation of success because it would have

been a simple substitution that would not otherwise affect device operation. When a rigid arced handle is used with Eriksson-Jons, a **projection** of the **first handle portion** extends through the suction motor, as shown in the modified figure below:



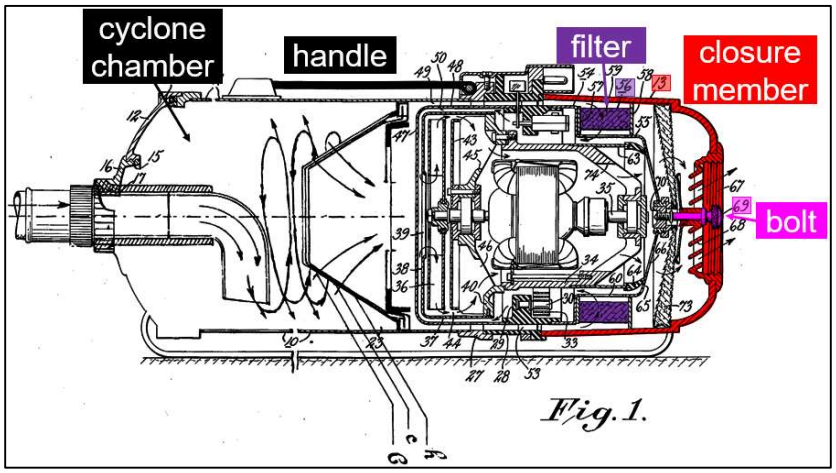
Ex1008, Fig. 1 (modified).

iii. **[1h3]/[14h3]**

Reference Number	Claim Limitation
[1h3]	"wherein the pre-motor filter housing is openable without moving the handle with respect to the cyclone chamber, and"
[14h3]	"the pre-motor filter housing is openable without moving the handle with respect to the cyclone chamber;"

376. In my opinion, the combination of Eriksson-Jons and Martelliere teaches a handle wherein the pre-motor filter housing is openable without moving the handle with respect to the cyclone chamber.

377. In the combined teachings of Eriksson-Jons and Martelliere, a POSA would have recognized that the pre-motor filter housing (**discs 57** and **58**, **portion 55**, and **closure member 13**, Ground 4, [1d2]/[14d2]) is openable without moving the **handle** with respect to the **cyclone chamber**, because a user opens the pre-motor filter housing by unscrewing **bolt 69** and removing **closure member 13**, which does not require moving the **handle** with respect to the **cyclone chamber**, as shown in the modified figure below:



Ex1008, Fig. 1 (modified); Ex1010, Fig. 1.

iv. **[1h4]/[14h4]**

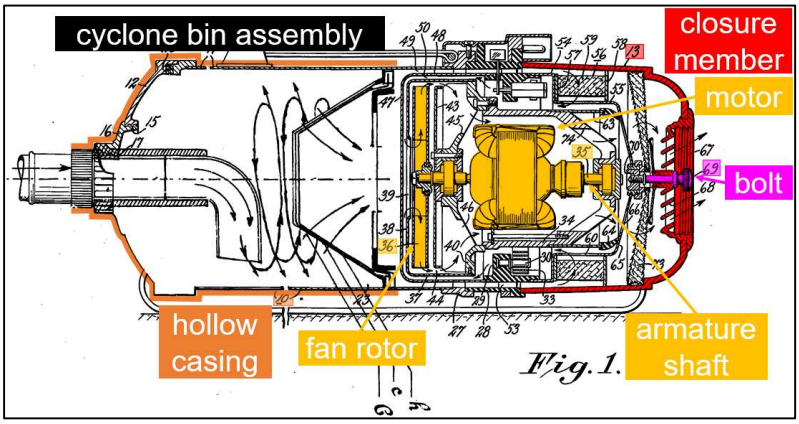
Reference Number	Claim Limitation
[1h4]	"wherein the pre-motor filter housing cover is openable while the cyclone bin assembly is in fluid flow communication with the suction motor."
[14h4]	"wherein the pre-motor filter housing cover is openable while the cyclone chamber is in fluid flow communication with the suction motor, and"

378. In my opinion, the combination of Eriksson-Jons and Martelliere teaches that the pre-motor filter housing cover is openable while the cyclone bin assembly is in fluid flow communication with the suction motor. (Limitation [1h4]).

379. In my opinion, the combination of Eriksson-Jons and Martelliere teaches that the pre-motor filter housing cover is openable while the cyclone chamber is in fluid flow communication with the suction motor. (Limitation [14h4]).

380. In my opinion, in the combined teachings of Eriksson-Jons and Martelliere, a POSA would have recognized that Eriksson-Jons's pre-motor filter housing cover (**closure member 13**, Ground 4, [1d2]/[14d2]) is openable while the cyclone bin assembly (the front half of **hollow casing 10**, the **cyclone chamber**, and the **interchangeable sieve filter b**, Ground 4, [1c]/[14c]) is in fluid flow communication with the suction motor

(motor, armature shaft 35, and fan rotor 36, Ground 4, [1e]/[14e]), because Eriksson-Jons's closure member 13 is opened (by unscrewing bolt 69) without blocking an airway, removing the cyclone bin assembly, or removing the suction motor, as shown in the modified figure below:



Ex1008, Fig. 1 (modified); Ex1010, Fig. 1.

381. In my opinion, because the cyclone chamber is contained within the cyclone bin assembly (Ground 4, [1c]/[14c]), a POSA would have understood that the cyclone chamber is in fluid flow communication with the suction motor for the same reasons.

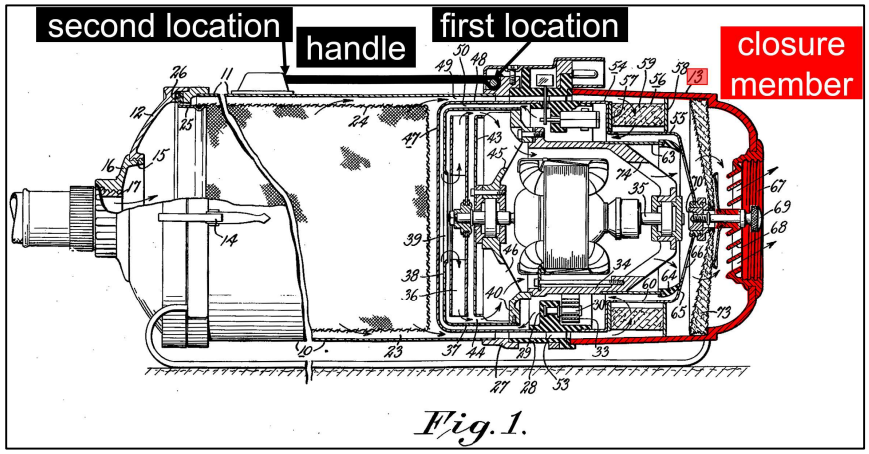
i. **[14h5]**

Reference Number	Claim Limitation
[14h5]	"wherein the first and second locations are provided other than on the openable pre-motor filter housing cover."

382. In my opinion, the combination of Eriksson-Jons and Martelliere teaches

that the first and second locations are provided other than on the openable pre-motor filter housing cover.

383. A POSA would have recognized that, in Eriksson-Jons, the **first** and **second locations** (Ground 4, [1h1]/[14h1]) are provided other than on the openable pre-motor filter housing cover (**closure member 13**, Ground 4, [1d2]/[14d2]), as shown in the annotated figure below:



Ex1008, Fig. 1.

3. Eriksson-Jons and Martelliere Render Claims [2]/[15] Obvious

384. In my opinion, the combination of Eriksson-Jons and Martelliere render claims 2 and 15 obvious.

a. [2a]/[15a]

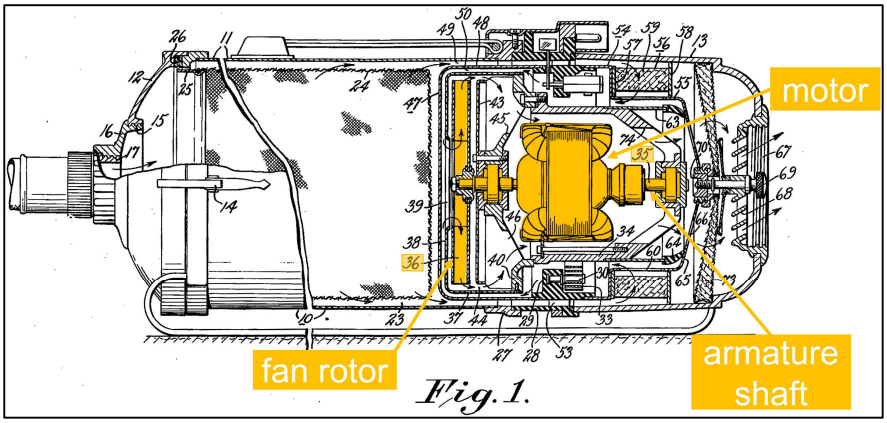
Reference Number	Claim Limitation
[2a]	"The hand vacuum cleaner of claim 1 wherein the suction motor comprises a fan and a motor and"
[15a]	"The hand vacuum cleaner of claim 14 wherein the suction motor comprises a fan and a motor and"

385. In my opinion, the combination of Eriksson-Jons and Martelliere render obvious the hand vacuum cleaner of claim 1 and further teach that the suction motor comprises a fand and a motor. (Limitation [2a]).

386. In my opinion, the combination of Eriksson-Jons and Martelliere render obvious the hand vacuum cleaner of claim 14 and further teach that the suction motor comprises a fan and a motor. (Limitation [15a]).

387. In my opinion, the combination of Eriksson-Jons and Martelliere renders obvious claims 1 and 14. Ground 4, [1]/[14].

388. In my opinion, a POSA would have recognized that, in Eriksson-Jons, the suction motor (**motor**, **armature shaft 35**, and **fan rotor 36**, Ground 4, [1e]/[14e]) comprises a fan (**fan rotor 36**) and a motor (**motor**), as shown in the annotated figure below:



Ex1008, 1(right):43-45, Fig. 1.

b. [2b]/[15b]

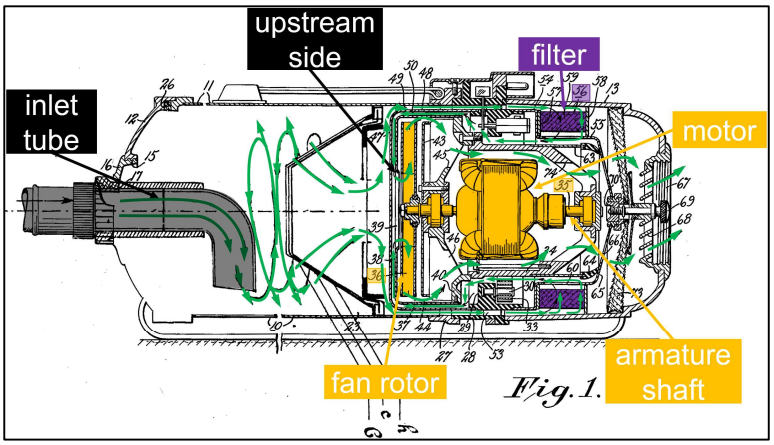
Reference Number	Claim Limitation
[2b]	"an upstream side of the fan is positioned proximate the cyclone inlet."
[15b]	"an upstream side of the fan is positioned proximate the cyclone air inlet."

389. In my opinion, the combination of Eriksson-Jons and Martelliere teaches an upstream side of the fan is positioned proximate the cyclone inlet. (Limitation [2b]).

390. In my opinion, the combination of Eriksson-Jons and Martelliere teaches an upstream side of the fan is positioned proximate the cyclone air inlet. (Limitation [15b]).

391. In my opinion, a POSA would have recognized that, in the combined teachings of Eriksson-Jons and Martelliere, an upstream side of the fan

(**fan rotor 36**, Ground 4, [2a]/[15a]) is positioned proximate the cyclone inlet (**inlet tube**, Ground 4, [1c]/[14c]) because **air flows** from the pre-motor filter (**filter 56**, Ground 4, [1e]/[14e]) to "**fan rotor 36**" such that its **upstream side** faces and is positioned proximate the **inlet tube**, as shown in the modified figure below:



Ex1008, Fig. 1 (modified), 2(left):67-2(right):3; Ex1010, Fig. 1.

4. Eriksson-Jons and Martelliere Render Claims [3]/[16] Obvious

Reference Number	Claim Limitation
[3]	"The hand vacuum cleaner of claim 1 wherein the downstream side of the pre-motor filter is spaced further from the cyclone chamber than the upstream side of the pre-motor filter."
[16]	"The hand vacuum cleaner of claim 14 wherein the downstream side of the pre-motor filter is spaced further from the cyclone chamber than the upstream side of the pre-motor filter."

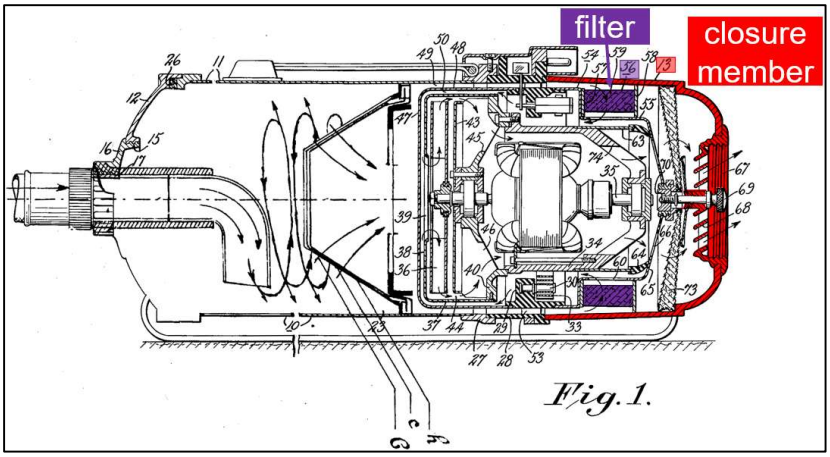
392. In my opinion, the combination of Eriksson-Jons and Martelliere renders

the hand vacuum cleaner of claim 1 obvious and further renders obvious that the downstream side of the pre-motor filter is spaced further from the cyclone chamber than the upstream side of the pre-motor filter. (Claim 3).

393. In my opinion, the combination of Eriksson-Jons and Martelliere renders the hand vacuum cleaner of claim 1 obvious and further renders obvious that the downstream side of the pre-motor filter is spaced further from the cyclone chamber than the upstream side of the pre-motor filter. (Claim 16).

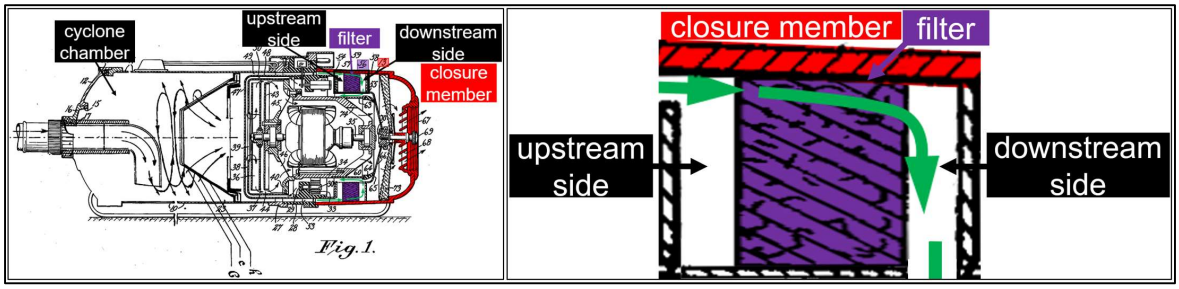
394. In my opinion, the combination of Eriksson-Jons and Martelliere renders obvious claims 1 and 14. Ground 4, [1]/[14].

395. In my opinion, a POSA would have recognized that, in the combined teachings of Eriksson-Jons and Martelliere, the pre-motor filter (**filter 56**, Ground 4, [1d1]/[14d1]) has an upstream side and downstream side. Eriksson-Jons teaches "locat[ing] [a] **filter** in such a position that it is readily accessible upon removal of [an] **end member of the casing[]** while providing means for guiding the air through this **filter**," as shown in the modified figure below:



Ex1008, 1(left):39-43; *see also id.*, claim 4, Fig. 1 (modified); Ex1010, Fig. 1.

396. A POSA further would have understood that, to achieve Eriksson-Jons's goal of a "readily accessible" pre-motor filter, the precise air path to and from Eriksson-Jons's pre-motor filter can be changed, while still achieving pre-motor air filtration, to facilitate the pre-motor filter's removal when **closure member 13** is removed. Therefore, while Eriksson-Jons's figures show only one pre-motor filter airflow orientation, a POSA reading Eriksson-Jons would have found alternative airflow configurations that facilitate "**filter**" removal obvious. One such obvious alternate airflow configuration was to modify Eriksson-Jons's "means for guiding the air" to flow through **filter 56** from front-to-rear as opposed to from outside-to-inside, as shown in the modified figures below:



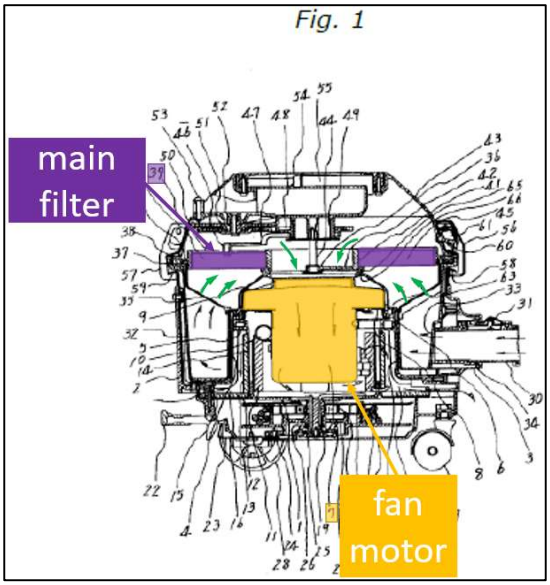
Ex1008, Fig. 1 (modified); Ex1010, Fig. 1.

397. A POSA would have recognized that, in this modified airflow configuration, the **downstream side** of the pre-motor filter is spaced further from the **cyclone chamber** (Ground 4, [1c]/[14c]) than the **upstream side** of the pre-motor filter, as shown above.

398. Further, in my opinion, a POSA would have been motivated to make this modification because it would further Eriksson-Jons's stated goal of improving access to **filter 56** when **closure member 13** is removed, *see* Ex1008, 1(left):39-43, by allowing a user to more-hygienically grasp the **filter 56**'s non-airflow sides during removal. When so modified, **filter 56**'s non-airflow sides face the user when **closure member 13** is removed, rather than the airflow sides, which are likely to be dirtied by collected dust. Further, in my opinion, a POSA would have found this modification at least obvious to try as there were a finite number of identified, predictable solutions for airflow through a pre-motor filter, including from the front-most to the rear-most side, with a reasonable expectation of

success because the physical filter media would filter air in each configuration and because this would only involve minor modifications to the air-guiding means and the pre-motor filter. Also, a POSA would have been motivated to make this modification because modifying filter characteristics, such as surface area, volume, and airflow direction, to achieve optimal airflow efficiency and electrical-usage efficiency was common.

399. Pre-motor filters with this orientation and airflow path were known in the art to be functional, which would have further given a POSA a reasonable expectation of success. For example, Ishii, Japanese Patent No. S5350580, published in 1978, has an airflow path that moves along the outside of a cylindrical vacuum, passes through a "**main filter 39**," and then turns towards the center of the cylindrical vacuum where the "**fan motor 7**" motor is located, as shown in the annotated figure below:



Ex1012, 383, Fig. 1.

5. Eriksson-Jons and Martelliere Render Claims [4]/[17] Obvious

Reference Number	Claim Limitation
[4]	"The hand vacuum cleaner of claim 3 further comprising a downstream header on the downstream side of the pre-motor filter and the downstream header is opened when the openable cover is opened."
[17]	"The hand vacuum cleaner of claim 14 further comprising a downstream header on the downstream side of the pre-motor filter and the downstream header is opened when the openable cover is opened."

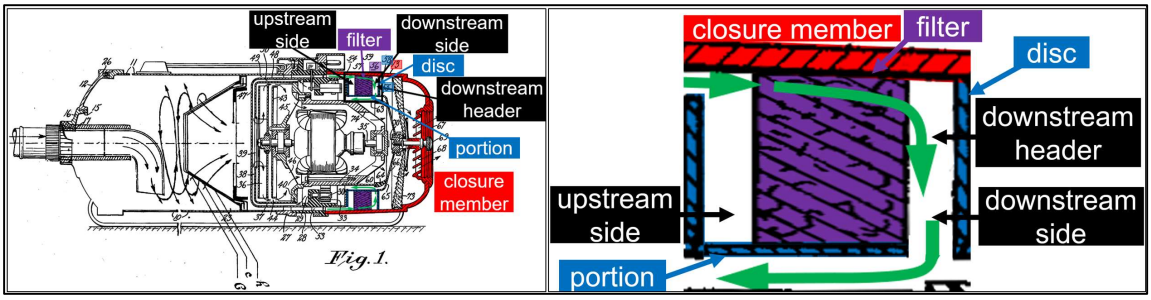
400. In my opinion, the combination of Eriksson-Jons and Martelliere renders the hand vacuum cleaner of claim 3 obvious and further renders obvious a downstream header on the downstream side of the pre-motor filter and the downstream header is opened when the openable cover is opened. (Claim

4).

401. In my opinion, the combination of Eriksson-Jons and Martelliere renders the hand vacuum cleaner of 14 obvious and further renders obvious a downstream header on the downstream side of the pre-motor filter and the downstream header is opened when the openable cover is opened. (Claim 17).

402. In my opinion, the combination of Eriksson-Jons and Martelliere renders obvious claims 3 and 14. Ground 4, [3]/[14].

403. In my opinion, when the air flow through **filter 56** is modified as described for Claims 3/16, the hand vacuum comprises a downstream header on the **downstream side** of the pre-motor filter (**filter 56**, Ground 4, [1d1]/[14d1]) and the downstream header is opened when the openable cover (**closure member 13**, Ground 4, [1d2]/[14d2]) is opened. A POSA would have understood that the bounded airflow path between **filter 56**'s **downstream side** and **disc 58**, where the air flows along that path and then turns to flow through the channel formed alongside the **portion 55** toward the motor, is a downstream header on the **downstream side** of the pre-motor filter, as shown in the modified figures below:



Ex1008, Fig. 1 (modified); Ex1010, Fig. 1.

404. A POSA would have also understood that the **downstream header** is opened when the openable cover (**closure member 13**) is opened, as the channel between **filter 56**'s **downstream side** and **disc 58** opens when **closure member 13** is removed.

6. Eriksson-Jons and Martelliere Render Claims [5]/[18] Obvious

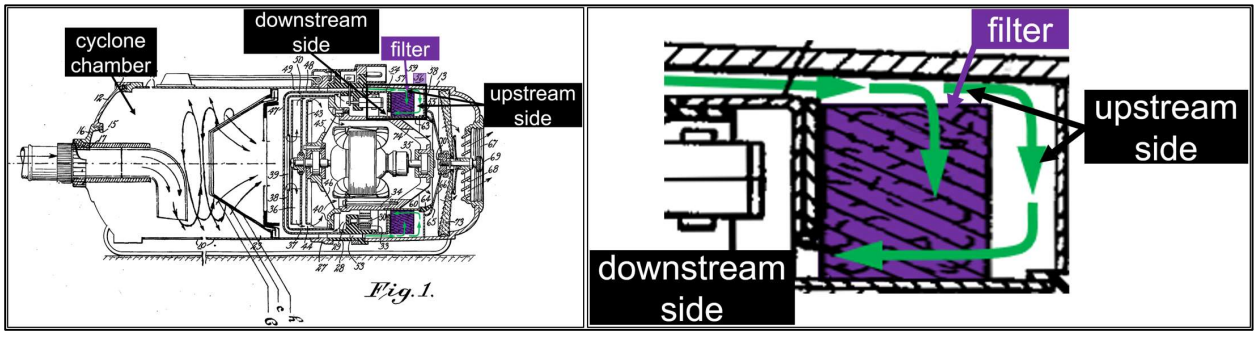
Reference Number	Claim Limitation
[5]	"The hand vacuum cleaner of claim 1 wherein the upstream side of the pre-motor filter is spaced further from the cyclone chamber than the downstream side of the pre-motor filter."
[18]	"The hand vacuum cleaner of claim 14 wherein the upstream side of the pre-motor filter is spaced further from the cyclone chamber than the downstream side of the pre-motor filter."

405. In my opinion, the combination of Eriksson-Jons and Martelliere renders the hand vacuum cleaner of claim 1 obvious and further renders obvious the upstream side of the pre-motor filter is spaced further from the cyclone chamber than the downstream side of the pre-motor filter. (Claim 5).

406. In my opinion, the combination of Eriksson-Jons and Martelliere renders obvious the hand vacuum cleaner of claim 14 wherein the upstream side of the pre-motor filter is spaced further from the cyclone chamber than the downstream side of the pre-motor filter. (Claim 18).

407. In my opinion, the combination of Eriksson-Jons and Martelliere renders obvious claims 1 and 14. Ground 4, [1]/[14].

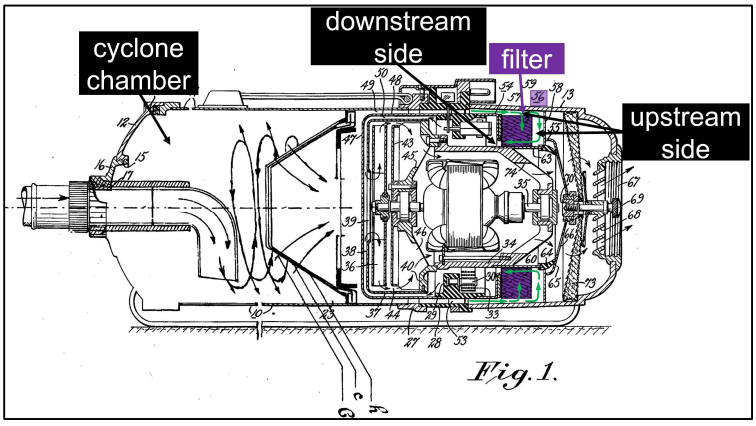
408. As I explained when addressing Claims 3 and 16, the combined teachings of Eriksson-Jons and Martelliere renders obvious alternate airflow configurations that facilitate **filter** removal. Ground 4, [3]/[16]. In my opinion, one such obvious alternate airflow configuration was to modify the "means for guiding the air" to allow air to pass through the pre-motor filter (**filter 56**, Ground 4, [1d1]/[14d1]) from two sides—the out-most side and the rear-most side—as shown in the modified figures below:



Ex1008, Fig. 1 (modified); Ex1010, Fig. 1.

409. A POSA would have recognized that, when so modified, the **upstream**

side of the pre-motor filter (the out-most side and the rear-most side, together) is spaced further from the **cyclone chamber** (Ground 4, [1c]/[14c]) than the **downstream side** of the pre-motor filter (the front-most side), as shown in the modified figure below:

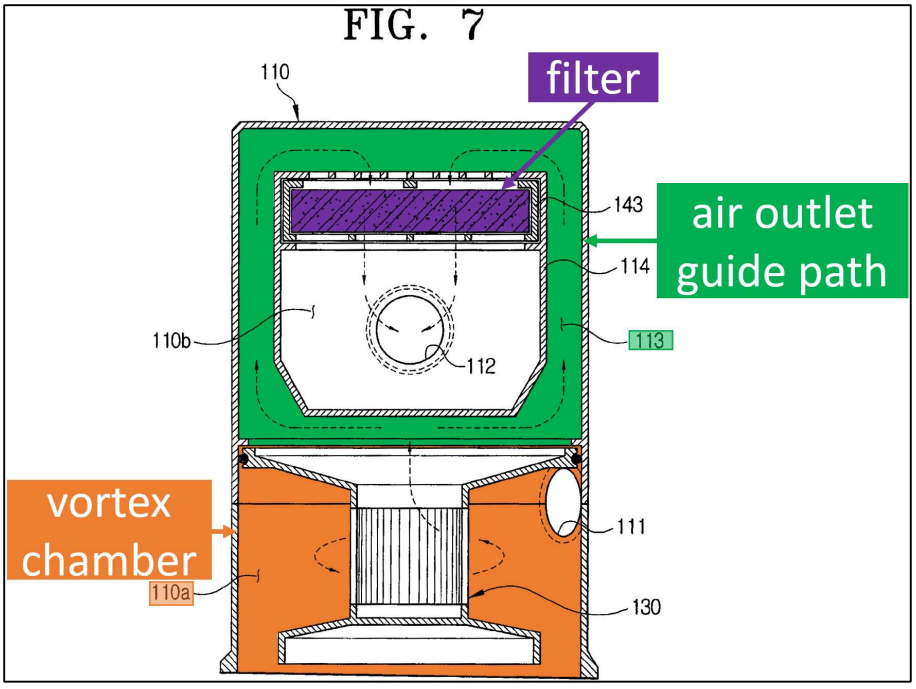


Ex1008, Fig. 1 (modified); Ex1010, Fig. 1.

410. In my opinion, a POSA would have been motivated to make this modification to increase the surface area of **filter 56**'s upstream side, which would beneficially increase the amount of air filtration. Additionally, a POSA would have understood that this modification would further Eriksson-Jons's goal of facilitating removal of **filter 56**, *see* Ex1008, 1(left):39-43, because it would expose two filter sides, either or both of which could be accessed and directly manipulated by a user for removal. A POSA also would have found this modification at least obvious to try as there were a finite number of identified, predictable

solutions for airflow through a pre-motor filter, including from the out-most and rear-most sides to the front-most side, with a reasonable expectation of success because the physical filter media would filter air in each configuration and because this would only involve minor modifications to the air-guiding means and the pre-motor filter. And, a POSA would have been motivated to make this modification because modifying filter characteristics, such as surface area, volume, and airflow direction, to achieve optimal airflow efficiency and electrical-usage efficiency was common.

411. Pre-motor filters with this orientation and airflow path were known in the art to be functional, which would have further given a POSA a reasonable expectation of success. For example, Oh was published in 2004 and has an "**air outlet guide path 113**" that guides air from its **cyclone chamber** ("**vortex chamber 110a**") along its cylindrical walls before turning towards the center of the vacuum and passing through its "**filter**," as shown in the annotated figure below:



Ex1006, Abstract, 6:32-7:6, Fig. 7.

7. Eriksson-Jons and Martelliere Render Claims [6]/[19] Obvious

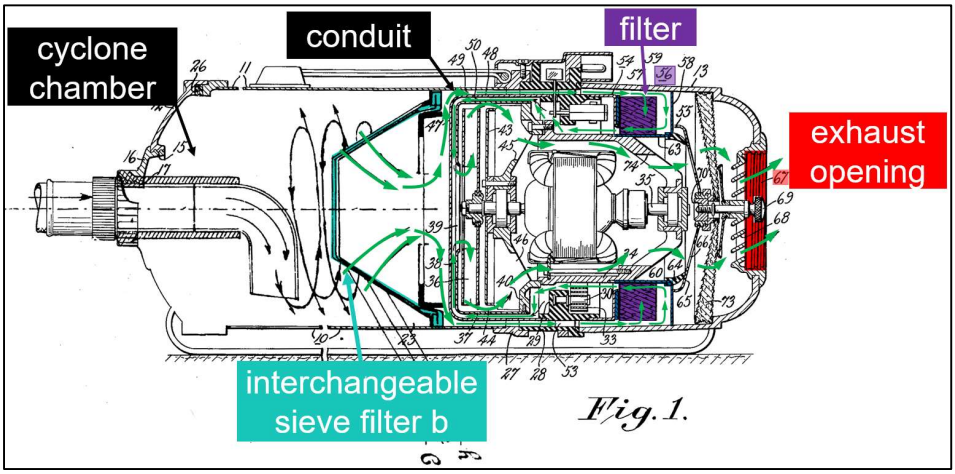
Reference Number	Claim Limitation
[6]	"The hand vacuum cleaner of claim 5 further comprising a conduit that is in flow communication with the air outlet of the cyclone chamber and extends through the pre-motor filter."
[19]	"The hand vacuum cleaner of claim 18 further comprising a conduit that is in flow communication with the cyclone air outlet and extends through the pre-motor filter."

412. In my opinion, the combination of Eriksson-Jons and Martelliere renders the hand vacuum cleaner of claim 5 obvious and further renders obvious a conduit that is in flow communication with the air outlet of the cyclone chamber and extends through the pre-motor filter. (Claim 6).

413. In my opinion, the combination of Eriksson-Jons and Martelliere renders the hand vacuum cleaner of claim 18 obvious and further renders obvious a conduit that is in flow communication with the cyclone air outlet and extends through the pre-motor filter. (Claim 19).

414. In my opinion, the combination of Eriksson-Jons and Martelliere renders obvious claims 5 and 18. Ground 4, [5]/[18].

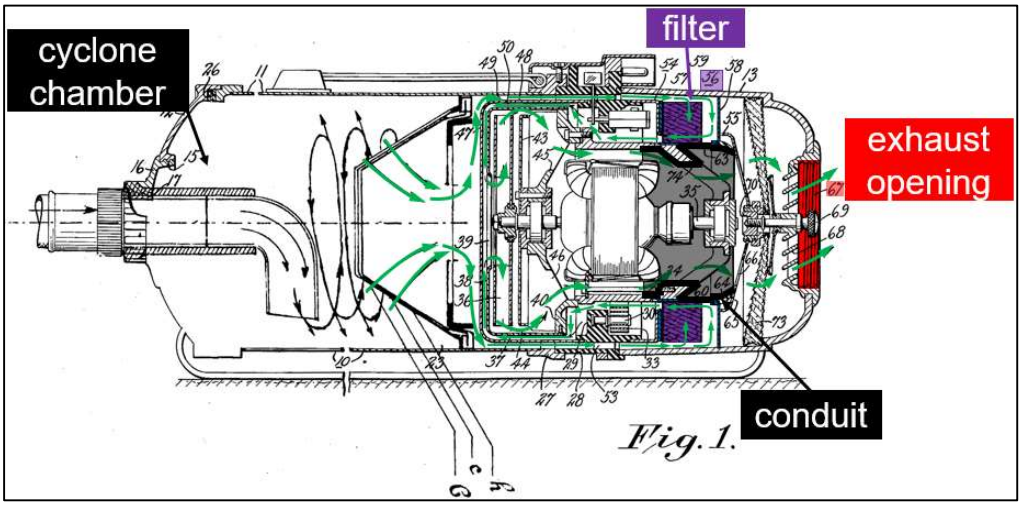
415. A POSA would have recognized that the combined teachings of Eriksson-Jons and Martelliere, when modified as described for Claims 5/18, teach a conduit that is in flow communication with the air outlet of the **cyclone chamber** (the interface of the "**interchangeable sieve filter b**," Ground 4, [1c]/[14c]) and extends through the pre-motor filter (**filter 56**, Ground 4, [1d1]/[14d1]), the conduit being the **airflow path** shown in the modified figure below:



Ex1008, 2(left):53-2(right):9, Fig. 1 (modified); Ex1010, Fig. 1.

416. A POSA further would have understood this airflow path is such a conduit because air flows along it from the air outlet of the **cyclone chamber** through the pre-motor filter and because Eriksson-Jons teaches a continuous flow through the "**filter 56**," through the motor housing, and out the "**exhaust opening 67**." Ex1008, 2(left):63-2(right):9 ("air then flows through the channel formed by annular passage 49 … through **filtering material 59** … passes within the motor housing … to the **exhaust opening 67**"); *see also id.*, 2(left):53-2(right):9 (describing airflow).

417. Further, in my opinion, a POSA would have understood that this **conduit** extends through the open center of **filter 56**, as shown in the modified figure below:



Ex1008, Fig. 1 (modified); Ex1010, Fig. 1.

8. Eriksson-Jons and Martelliere Render Claims [7]/[20] Obvious

Reference Number	Claim Limitation
[7]	"The hand vacuum cleaner of claim 5 further comprising an upstream header on the upstream side of the pre-motor filter and the upstream header is opened when the openable cover is opened."
[20]	"The hand vacuum cleaner of claim 18 further comprising an upstream header on the upstream side of the pre-motor filter and the upstream header is opened when the openable cover is opened."

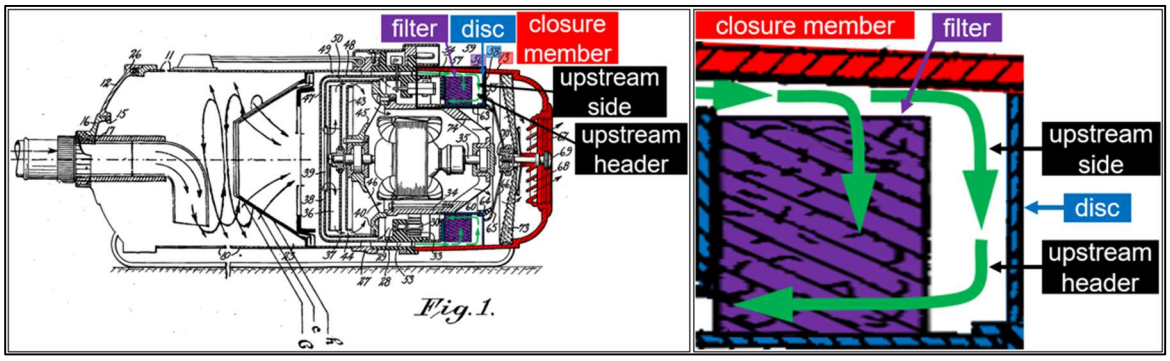
418. In my opinion, the combination of Eriksson-Jons and Martelliere renders the hand vacuum cleaner of claim 5 obvious and further renders obvious an upstream header on the upstream side of the pre-motor filter and the upstream header is opened when the openable cover is opened. (Claim 7).

419. In my opinion, the combination of Eriksson-Jons and Martelliere renders the hand vacuum cleaner of claim 18 obvious and further renders obvious an upstream header on the upstream side of the pre-motor filter and the upstream header is opened when the openable cover is opened. (Claim 20).

420. In my opinion, the combination of Eriksson-Jons and Martelliere renders obvious claims 5 and 18. Ground 4, [5]/[18].

421. In my opinion, a POSA would have understood that the combined teachings of Eriksson-Jons and Martelliere, when modified as described for Claims 5/18, teach an **upstream header** on the **upstream side** of the

pre-motor filter (**filter 56**, Ground 4, [1d1]/[14d1]) and the **upstream header** is opened when the openable cover (**closure member 13**, Ground 4, [1d2]/[14d2]) is opened. A POSA further would have understood that the bounded airflow path between **filter 56**'s **upstream side**, **closure member 13**, and **disc 58**, where the air flows along that path and then turns to flow through the channel formed alongside the portion 55 toward the motor, is an upstream header on the **upstream side** of the pre-motor filter, as shown in the modified figure below:



Ex1008, Fig. 1 (modified); Ex1010, Fig. 1.

422. In my opinion, a POSA would have also understood that the **upstream header** is opened when the openable cover (**closure member 13**) is opened, as the channel between **filter 56**'s **upstream side** and **disc 58** and the channel between **filter 56**'s **upstream side** and **closure member 13** opens when **closure member 13** is removed.

9. Eriksson-Jons and Martelliere Render Claims [8]/[21] Obvious

423. In my opinion, the combination of Eriksson-Jons and Martelliere renders claims 8 and 21 obvious.

a. [8a]/[21a]

Reference Number	Claim Limitation
[8a]	"The hand vacuum cleaner of claim 1 wherein each of the upstream and downstream sides of the pre-motor filter has a front end positioned proximate the front end and extending rearwardly,"
[21a]	"The hand vacuum cleaner of claim 14 wherein each of the upstream and downstream sides of the pre-motor filter has a front end positioned proximate the front end and extending rearwardly,"

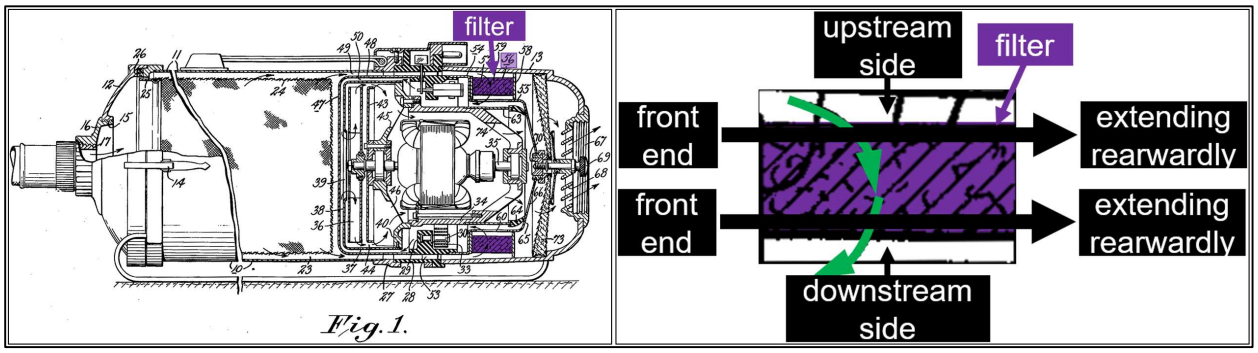
424. In my opinion, the combination of Eriksson-Jons and Martelliere renders the hand vacuum cleaner of claim 1 obvious and further renders obvious that each of the upstream and downstream sides of the pre-motor filter has a front end positioned proximate the front end and extending rearwardly. (Limitation [8a]).

425. In my opinion, the combination of Eriksson-Jons and Martelliere renders the hand vacuum cleaner of claim 14 obvious and further renders obvious that each of the upstream and downstream sides of the pre-motor filter has a front end positioned proximate the front end and extending rearwardly. (Limitation [21a]).

426. In my opinion, the combination of Eriksson-Jons and Martelliere renders

obvious claims 1 and 14. Ground 4, [1]/[14].

427. A POSA would have recognized that the **upstream** and **downstream sides** of the pre-motor filer (**filter 56**, Ground 4, [1d1]/[14d1]) in Eriksson-Jons each have a **front end** positioned proximate **the front end** and extending rearwardly, as shown in the annotated figure below:



Ex1008, Fig. 1.

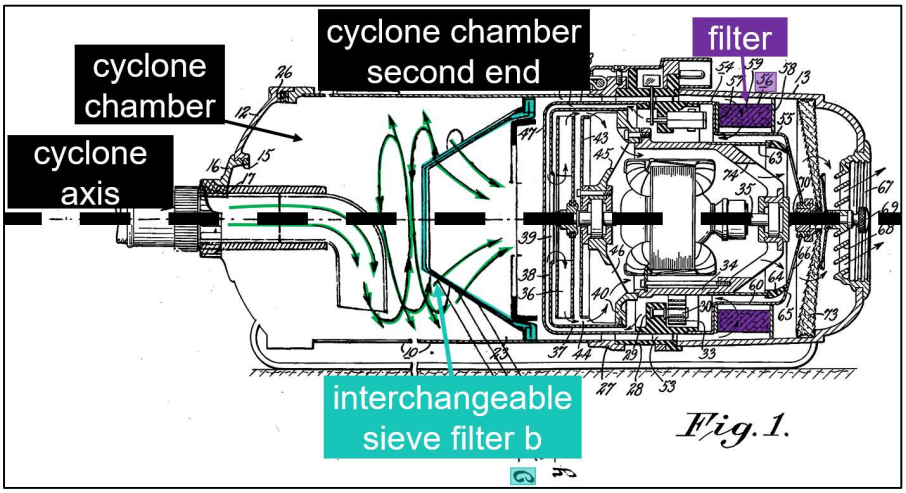
428. Further, in my opinion, a POSA would have understood that **filter 56** has a **front end** and a rear end because it is a three-dimensional object, and would have further understood that **filter 56**'s front end is positioned proximate to the hand vacuum's **front end** (*see* Ground 4, [1pre]/[14pre]), as depicted above, including because **filter 56**'s front end is closer to the hand vacuum's front end than **filter 56**'s rear end is and these limitations do not require any particular distance or placement to be proximate.

b. [8b]/[21b]

Reference Number	Claim Limitation
[8b]	"the pre-motor filter is positioned axially outwardly from the second end of the cyclone chamber and downstream of the cyclone chamber,"
[21b]	"the pre-motor filter is positioned axially outwardly from the second end of the cyclone chamber and downstream of the cyclone chamber,"

429. In my opinion, the combination of Eriksson-Jons and Martelliere teaches that the pre-motor filter is positioned axially outwardly from the second end of the cyclone chamber and downstream of the cyclone chamber.

430. In my opinion, the Eriksson-Jons and Martelliere combination teaches that the pre-motor filter (**filter 56**, Ground 4, [1d1]/[14d1]) is positioned axially outwardly from the **second end** of the **cyclone chamber** (located at the "**interchangeable sieve filter b**," Ground 4, [1c]/[14c]) and downstream of the **cyclone chamber**, as shown in the modified figure below:



Ex1008, Fig. 1 (modified); Ex1010, Fig. 1.

431. A POSA would have understood that **filter 56** in the Eriksson-Jons and Martelliere combination is positioned axially outwardly of the **cyclone chamber**'s **second end** because **filter 56** is positioned rearwardly away from the **cyclone chamber**'s **second end** along the **cyclone axis**, as shown above. Further, a POSA would have understood that **filter 56** is downstream of the **cyclone chamber** because air flows from the **cyclone chamber** to **filter 56**, as shown above.

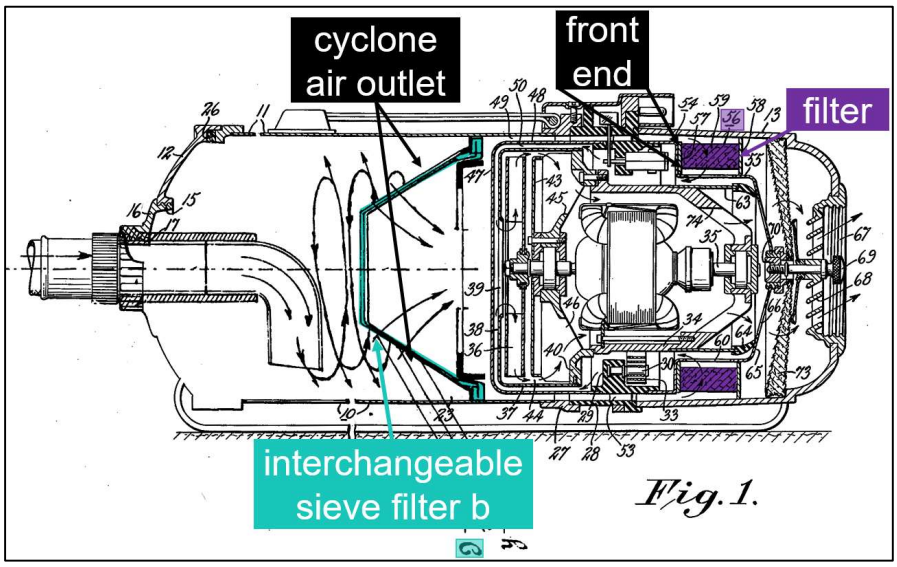
c. [8c]/[21c]

Reference Number	Claim Limitation
[8c]	"the cyclone air outlet is positioned at a location spaced from the front end of the pre-motor filter."
[21c]	"the cyclone air outlet is positioned at a location spaced from the front end of the pre-motor filter."

432. In my opinion, the combination of Eriksson-Jons and Martelliere teaches that the cyclone air outlet is positioned at a location spaced from the front end of the pre-motor filter.

433. In my opinion, a POSA would have understood that, in the Eriksson-Jons and Martelliere combination, the **cyclone air outlet** (the interface of the "**interchangeable sieve filter b**," Ground 4, [1c]/[14c]) is positioned at a location spaced from the **front end** of the pre-motor filter (**filter 56**,

Ground 4, [1d1]/[14d1]) because there is distance between them, as shown in the modified figure below:



Ex1008, Fig. 1 (modified); Ex1010, Fig. 1.

434. Finally, a POSA would have understood that the **filter 56**'s **front end** is the end closest to the hand vacuum's **front end** (Ground 4, [1pre]/[14pre]).

10. **Eriksson-Jons and Martelliere Render Claim [9] Obvious**

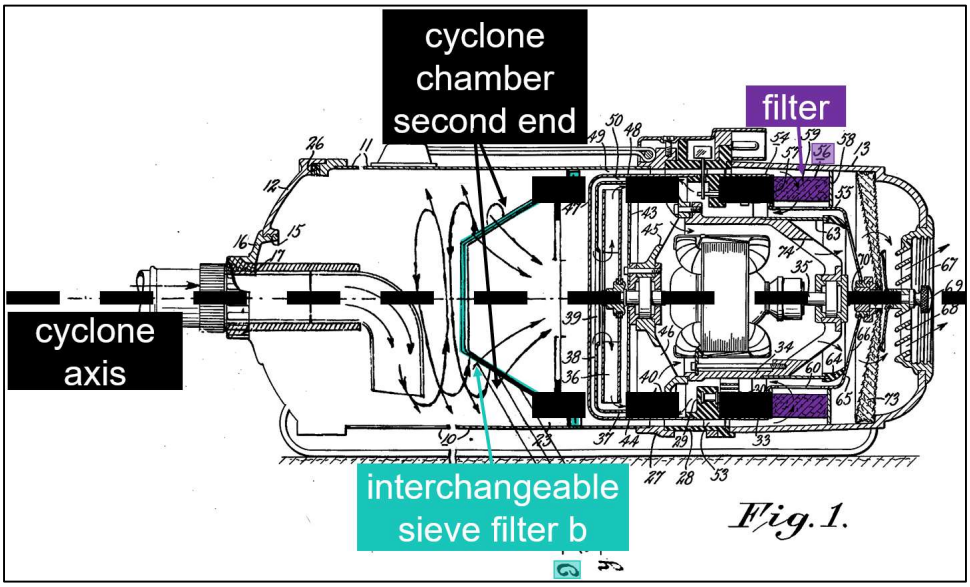
Reference Number	Claim Limitation
[9]	"The hand vacuum cleaner of claim 1 wherein the pre-motor filter is positioned axially outwardly from the second end of the cyclone chamber and downstream of the cyclone chamber, the pre-motor filter overlies at least a portion of the second end of the cyclone chamber."

435. In my opinion, the combination of Eriksson-Jons and Martelliere renders the hand vacuum cleaner of claim 1 obvious and further teaches that the

pre-motor filter is positioned axially outwardly from the second end of the cyclone chamber and downstream of the cyclone chamber, the pre-motor filter overlies at least a portion of the second end of the cyclone chamber.

436. In my opinion, the combination of Eriksson-Jons and Martelliere renders obvious claim 1. Ground 4, [1].

437. In my opinion, the combined teachings of Eriksson-Jons and Martelliere teach a pre-motor filter positioned axially outwardly from the second end of the cyclone chamber and downstream of the cyclone chamber. Ground 4, [8b]/[21b]. Further, the pre-motor filter (**filter 56**, Ground 4, [1d1]/[14d1]) overlies at least a portion of the **second end** of the **cyclone chamber** (located at the "**interchangeable sieve filter b**," Ground 4, [1c]/[14c]), as shown in the modified figure below:



Ex1008, Fig. 1 (modified); Ex1010, Fig. 1.

438. A POSA would have understood that **filter 56** overlies at least a portion of "**interchangeable sieve filter b**" because **filter 56** is proximate to, larger than, and radially outward of "**interchangeable sieve filter b**," as shown in the modified figure above.

11. Eriksson-Jons and Martelliere Render Claims [10]/[22] Obvious

Reference Number	Claim Limitation
[10]	"The hand vacuum cleaner of claim 1 wherein the suction motor has a suction motor axis and when the hand vacuum cleaner is carried by the handle, the suction motor axis extends generally horizontally."
[22]	"The hand vacuum cleaner of claim 14 wherein the suction motor has a suction motor axis and when the hand vacuum cleaner is carried by the handle, the suction motor axis extends generally horizontally."

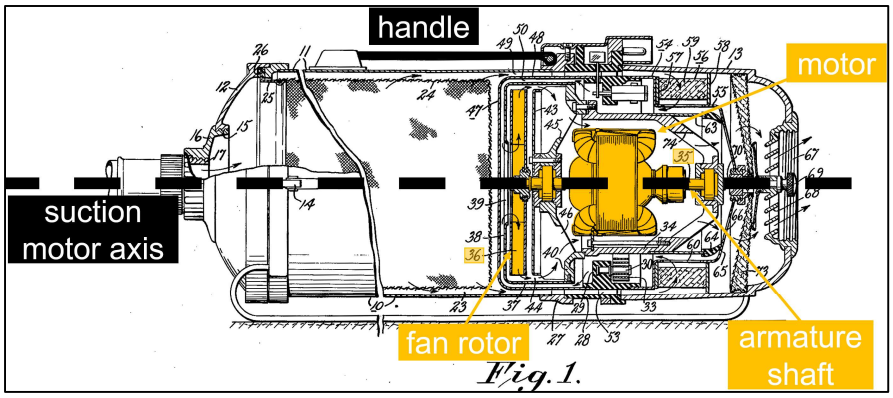
439. In my opinion, the combination of Eriksson-Jons and Martelliere renders the hand vacuum cleaner of claim 1 obvious and further teaches that the suction motor has a suction motor axis and when the hand vacuum cleaner is carried by the handle, the suction motor axis extends generally horizontally. (Claim 10).

440. In my opinion, the combination of Eriksson-Jons and Martelliere renders the hand vacuum cleaner of claim 14 obvious and further teaches that the suction motor has a suction motor axis and when the hand vacuum cleaner

is carried by the handle, the suction motor axis extends generally horizontally. (Claim 22).

441. In my opinion, the combination of Eriksson-Jons and Martelliere renders obvious claims 1 and 14. Ground 4, [1]/[14].

442. A POSA would have understood that Eriksson-Jons's suction motor (**motor**, **armature shaft 35**, and **fan rotor 36**, Ground 4, [1e]/[14e]) has a **suction motor axis** and when the hand vacuum is carried by the **handle** (Ground 4, [1h1]/[14h1]), the **suction motor axis** extends generally horizontally, as shown in the annotated figure below:



Ex1008, Fig. 1.

12. Eriksson-Jons and Martelliere Render Claims [11]/[12]/[23]/[24] Obvious

Reference Number	Claim Limitation
[11]	"The hand vacuum cleaner of claim 10 wherein when the hand vacuum cleaner is carried by the handle, the cyclone axis extends generally horizontally."
[12]	"The hand vacuum cleaner of claim 1 wherein when the hand vacuum cleaner is carried by the handle, the cyclone axis extends generally horizontally."
[23]	"The hand vacuum cleaner of claim 22 wherein when the hand vacuum cleaner is carried by the handle, the cyclone axis extends generally horizontally."
[24]	"The hand vacuum cleaner of claim 14 wherein when the hand vacuum cleaner is carried by the handle, the cyclone axis extends generally horizontally."

443. In my opinion, the combination of Eriksson-Jons and Martelliere renders the hand vacuum cleaner of claim 10 obvious and further teaches that when the hand vacuum cleaner is carried by the handle, the cyclone axis extends generally horizontally. (Claim 11).

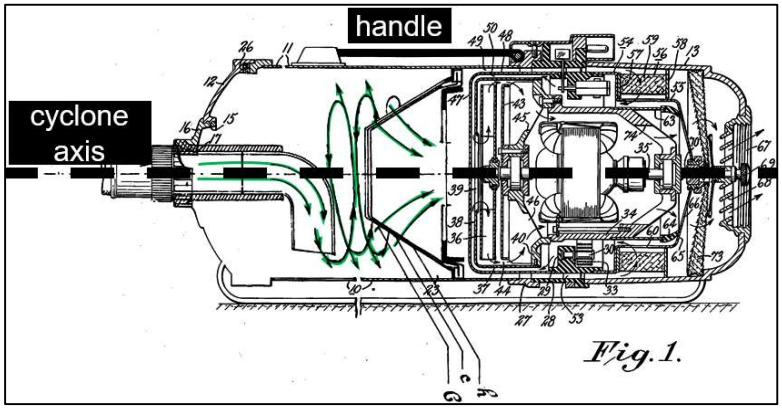
444. In my opinion, the combination of Eriksson-Jons and Martelliere renders the hand vacuum cleaner of claim 1 obvious and further teaches that when the hand vacuum cleaner is carried by the handle, the cyclone axis extends generally horizontally. (Claim 12).

445. In my opinion, the combination of Eriksson-Jons and Martelliere renders the hand vacuum cleaner of claim 22 obvious and further teaches that when the hand vacuum cleaner is carried by the handle, the cyclone axis extends generally horizontally. (Claim 23).

446. In my opinion, the combination of Eriksson-Jons and Martelliere renders the hand vacuum cleaner of claim 14 obvious and further teaches that when the hand vacuum cleaner is carried by the handle, the cyclone axis extends generally horizontally. (Claim 24).

447. In my opinion, the combination of Eriksson-Jons and Martelliere renders obvious claims 1, 10, 14 and 22. Ground 4, [1]/[14], [10]/[22].

448. A POSA would have understood that, in the Eriksson-Jons and Martelliere combination, the **cyclone axis** (*see*, Ground 4, [1c]/[14c]) extends generally horizontally when the hand vacuum is carried by the **handle** (Ground 4, [1h1]/[14h1]), as shown in the modified figure below:



Ex1008, Fig. 1; Ex1010, Fig. 1

13. Eriksson-Jons and Martelliere Render Claims [13]/[25] Obvious

Reference Number	Claim Limitation
[13]	"The hand vacuum cleaner of claim 1 wherein the pre-motor filter comprises a physical filter media."
[25]	"The hand vacuum cleaner of claim 14 wherein the pre-motor filter comprises a physical filter media."

449. In my opinion, the combination of Eriksson-Jons and Martelliere renders the hand vacuum cleaner of claim 1 obvious and further teaches that the pre-motor filter comprises a physical filter media. (Claim 13).

450. In my opinion, the combination of Eriksson-Jons and Martelliere renders the hand vacuum cleaner of claim 14 obvious and further teaches that the pre-motor filter comprises a physical filter media. (Claim 25).

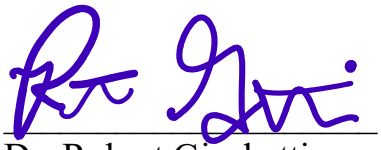
451. In my opinion, the combination of Eriksson-Jons and Martelliere renders obvious claims 1 and 14. Ground 4, [1]/[14].

452. Eriksson-Jons's "**filter**" is a physical filter media made of "**suitable filtering material 59**." Ex1008, 2(left):16-23, 2(left):63-75.

XI. SECONDARY CONSIDERATIONS OF NON-OBVIOUSNESS

453. I am unaware of any secondary considerations of non-obviousness that provide evidence that the claims of the '472Patent are not obvious. To the contrary, PO admits that no licensed patent-practicing product has ever been sold (Related Litigation Dkt. 58 ¶107; Dkt. 93 at 18). To the extent PO argue there are secondary considerations of non-obviousness, I reserve the right to respond.

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 Section 1001 of the Title 18 of the United States Code. I declare under penalty of perjury that the foregoing is true and correct.

Signature: 

Dr. Robert Giachetti

Dated: 5/19/24