

Petition for *Inter Partes* Review of U.S. Patent No. 10,080,472

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

DYSON TECHNOLOGY LIMITED AND DYSON, INC.,
Petitioners,

v.

OMACHRON INTELLECTUAL PROPERTY INC.,
Patent Owner.

Case No. IPR2024-_____

U.S. PATENT NO. 10,080,472

PETITION FOR *INTER PARTES* REVIEW

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1003	<i>Curriculum Vitae</i> of Robert Giachetti
1004	File History of U.S. 10,080,472 (App. No. 15/051,272)
1005	PCT Publication No. 2007/084543 to Butler et al. (“Butler”)
1006	U.K. Patent Application No. 2,400,309 to Oh et al. (“Oh”)
1007	U.K. Patent Application No. 2,372,431 to Organ (“Organ”)
1008	U.S. Patent No. 2,149,135 (“Eriksson-Jons”)
1009	French Patent No. 1,094,603 (“FRMartelliere”)
1010	Certified English Translation of French (“Martelliere”)
1011	Japanese Patent No. S5350580 (“JPIshii”)
1012	Certified English Translation of Japanese Patent No. S5350580 (“Ishii”)
1013	Plaintiffs’ Infringement Contentions in <i>SharkNinja Operating LLC v. Dyson, Inc.</i> , No. 1:23-cv-12372-ADB (D. Mass.)
1014	Petitioners’ Stipulation
1015	U.S. Patent Publication No. 2008/0115315 to White et al. (“White”)
1016	Exhibit H-3 to Plaintiffs’ Infringement Contentions in <i>SharkNinja Operating LLC v. Dyson, Inc.</i> , No. 1:23-cv-12372-ADB (D. Mass.)
1017	https://evacuumstore.com/c-1908-electrolux-history.aspx
1018	https://collection.sciencemuseumgroup.org.uk/objects/co8419389/gobl-in-clean-sweep-cylinder-vacuum-cleaner-cylinder-vacuum-cleaner

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1019	United States District Courts — National Judicial Caseload Profile https://www.uscourts.gov/sites/default/files/data_tables/fcms_na_distprofile1231.2023.pdf
1020	The Parties’ Revised Proposed Schedule in <i>SharkNinja Operating LLC v. Dyson, Inc.</i> , No. 1:23-cv-12372-ADB (D. Mass.)

LIST OF CHALLENGED CLAIMS

Reference Number	Claim Limitation
Claim 1	
[1pre]	A hand vacuum cleaner having a front end, a rear end and comprising:
[1a]	a main housing;
[1b]	a dirty fluid inlet;
[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;
[1d1]	a pre-motor filter comprising an upstream side and a downstream side,
[1d2]	the pre-motor filter is positioned in a pre-motor filter housing having an openable cover,
[1d3]	the cyclone axis extends through the pre-motor filter housing;
[1e]	a suction motor positioned in the main housing and located downstream of the pre-motor filter and rearward of the cyclone bin assembly;
[1f]	an air flow path extending from the pre-motor filter to the suction motor;
[1g]	a clean air outlet downstream of the suction motor; and,
[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,
[1h2]	wherein a projection of the first handle portion extends through the suction motor,
[1h3]	wherein the pre-motor filter housing is openable without moving the handle with respect to the cyclone chamber, and
[1h4]	wherein the pre-motor filter housing cover is openable while the cyclone bin assembly is in fluid flow communication with the suction motor.
Claim 2	
[2a]	The hand vacuum cleaner of claim 1 wherein the suction motor comprises a fan and a motor and
[2b]	an upstream side of the fan is positioned proximate the cyclone

Reference Number	Claim Limitation
	inlet.
Claim 3	
[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.
Claim 4	
[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.
Claim 5	
[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.
Claim 6	
[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.
Claim 7	
[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.
Claim 8	
[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,
[8b]	the pre-motor filter is positioned axially outwardly from the second end of the cyclone chamber and downstream of the cyclone chamber,
[8c]	the cyclone air outlet is positioned at a location spaced from the front end of the pre-motor filter.
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.

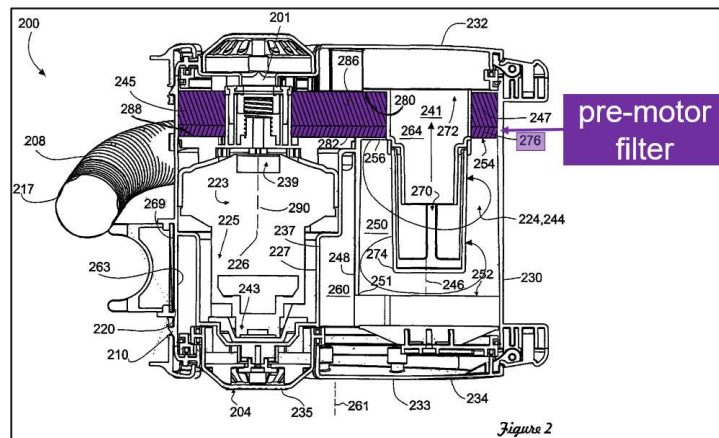
Reference Number	Claim Limitation
Claim 10	
[10]	The hand vacuum cleaner of claim 1 wherein the suction motor has a suction motor axis and when the hand vacuum cleaner is carried by the handle, the suction motor axis extends generally horizontally.
Claim 11	
[11]	The hand vacuum cleaner of claim 10 wherein when the hand vacuum cleaner is carried by the handle, the cyclone axis extends generally horizontally.
Claim 12	
[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.
Claim 13	
[13]	The hand vacuum cleaner of claim 1 wherein the pre-motor filter comprises a physical filter media.
Claim 14	
[14pre]	A hand vacuum cleaner having a front end, a rear end and comprising:
[14a]	a main housing;
[14b]	a dirty fluid inlet;
[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;
[14d1]	a pre-motor filter comprising an upstream side and a downstream side,
[14d2]	the pre-motor filter is positioned in a pre-motor filter housing having an openable cover;
[14e]	a suction motor positioned in the main housing and located downstream of the pre-motor filter and rearward of the cyclone bin assembly;
[14f]	an air flow path extending from the pre-motor filter to the suction motor;
[14g]	a clean air outlet downstream of the suction motor; and,
[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

Reference Number	Claim Limitation
	provided at the first location,
[14h2]	a projection of the first handle portion extends through the suction motor, and
[14h3]	the pre-motor filter housing is openable without moving the handle with respect to the cyclone chamber;
[14h4]	wherein the pre-motor filter housing cover is openable while the cyclone chamber is in fluid flow communication with the suction motor, and
[14h5]	wherein the first and second locations are provided other than on the openable pre-motor filter housing cover.
Claim 15	
[15a]	The hand vacuum cleaner of claim 14 wherein the suction motor comprises a fan and a motor and
[15b]	an upstream side of the fan is positioned proximate the cyclone air inlet.
Claim 16	
[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.
Claim 17	
[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.
Claim 18	
[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.
Claim 19	
[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.
Claim 20	
[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.
Claim 21	

Reference Number	Claim Limitation
[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,
[21b]	the pre-motor filter is positioned axially outwardly from the second end of the cyclone chamber and downstream of the cyclone chamber,
[21c]	the cyclone air outlet is positioned at a location spaced from the front end of the pre-motor filter.
Claim 22	
[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.
Claim 23	
[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.
Claim 24	
[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.
Claim 25	
[25]	The hand vacuum cleaner of claim 14 wherein the pre-motor filter comprises a physical filter media.

I. INTRODUCTION

The '472Patent relates to vacuum cleaners. It states that a cleaner's pre-motor filter can "become clogged" and purports to solve this problem by "[i]ncreasing the surface area of the upstream side of the **pre-motor filter**" so it "overlie[s] part of one or more additional components of the unit":



Ex1001, 1:18-19; 1:64-67, 2:6-9, 2:14-31, Fig. 2; Ex1002 ¶¶49-51.

However, none of the '472Patent's claims concern increasing pre-motor filter surface area, and only dependent claim 9 claims a pre-motor filter that "overlies" anything. Ex1001, Claims. Instead, the claims recite well-known configurations and features of vacuum cleaners, none of which provide any purported benefit. *Id.* That is presumably because Patent Owner ("PO") drafted these claims—six years after the specification was written—not to solve the purported problem identified in the '472Patent's specification, but instead in a (failed) attempt to read on Petitioner's products that are accused in co-pending district court litigation.

Nor do the '472Patent's claims' well-known elements provide any benefit over the prior art. PCT Application 2007/084543 ("Butler"), alone or in combination with the other references cited in this Petition, teaches each limitation of the claims. And U.S. Patent 2,149,135 ("Eriksson-Jons"), published in 1939, teaches these limitations when its dust bag is replaced by a cyclone chamber, a substitution obvious since the 1950s. Neither Butler nor Eriksson-Jons were before the Patent Office, and they render every claim of the '472Patent obvious.

II. STANDING (§42.104(A))

Petitioners certify that the '472Patent is available for IPR, and that Petitioners are not barred or estopped from requesting IPR to challenge the claims on the grounds herein.

III. RELIEF REQUESTED (§42.104(B))

Petitioners respectfully request review and cancellation under 35 U.S.C. §311 of claims 1-25 as follows¹:

Prior Art			Publication	Basis
International Publication	WO2007/084,543	(“Butler”)	07/26/2007	Pre-AIA 102(a), 102(b)

¹ Petitioners do not concede that any claims satisfy other requirements for patentability that cannot be raised in IPR, including §§101 and 112.

Prior Art	Publication	Basis
U.K. Patent Application 2,400,309 (“Oh”)	10/13/2004	
U.K. Patent Application 2,372,431 (“Organ”)	08/28/2002	
U.S. Patent 2,149,135 (“Eriksson-Jons”)	02/28/1939	
French Patent 1,094,603 (“Martelliere”)	05/23/1955	

Grounds	Claims	Basis
1	1–4, 8–17, 21–25	§103; Butler
2	1–2, 5, 7, 9–15 17– 18, 20, 22–25	§103; Butler and Oh
3	6, 19	§103; Butler, Oh, and Organ
4	1–25	§103; Eriksson-Jons and Martelliere

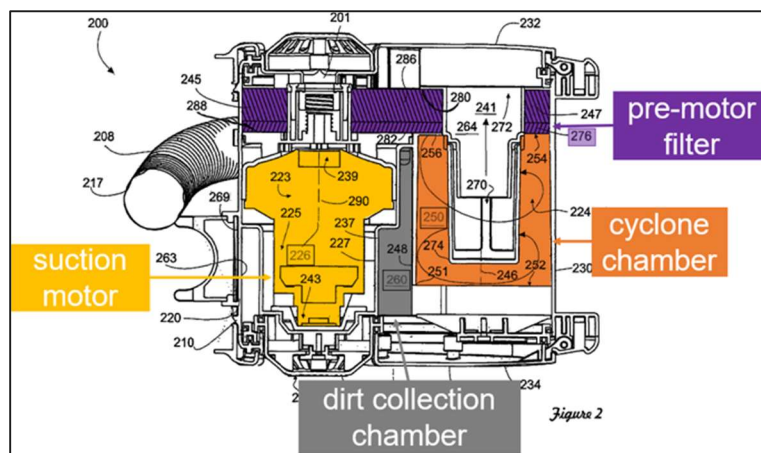
IV. OVERVIEW OF THE ’472PATENT

The ’472Patent, titled “Hand Carriable Surface Cleaning Apparatus,” issued from U.S. App. 15/051,272, filed 02/23/2016, and claims priority to 03/12/2010.² Ex1001.

² Petitioner reserves the right to challenge any alleged priority date.

A. The Specification

The '472 Patent identifies pre-motor filter clogging as an alleged problem with existing vacuums, and purports to solve it by “[i]ncreasing the surface area of the...**pre-motor filter**” by “configuring the pre-motor filter to overlie part of one or more additional components of the [vacuum],” including to “overlie part or all of the **cyclone chamber** as well as part or all of the **suction motor**,” or to “overlie part or all of the **dirt collection chamber**”:



Ex1001, 1:65-66, 2:6-9, 2:14-31, 2:42-43, Fig. 2; Ex1002 ¶¶49-51. Only dependent claim 9 claims a pre-motor filter that “overlies” components. Ex1001, Claim 9.

All independent claims and the other dependent claims mix-and-match well-known, interchangeable configurations that solve no purported problem. Ex1001, Claims. These features include a “cyclone bin assembly,” “pre-motor filter

housing having an openable cover,” “suction motor,” and “handle”—the combination of which solves no purported problem. *Id.*

B. The Prosecution History

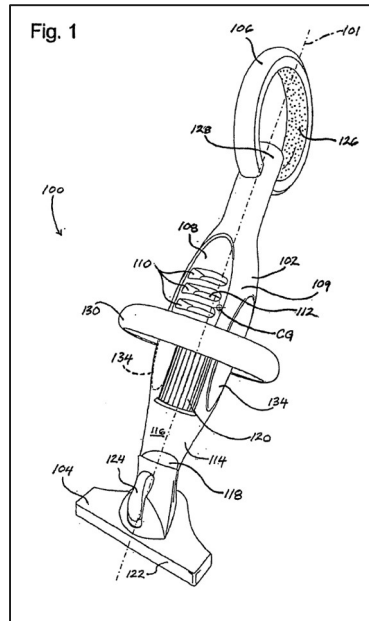
During prosecution, the pending claims were rejected several times as being anticipated by several references. The Applicant added configuration limitations, and a restriction on handle movement, which the Examiner referenced in the Reasons for Allowance. Ex1004, 178-81; Ex1002 ¶52.

None of the Examiner’s Reasons for Allowance addressed the problem the ’472Patent’s specification identifies—preventing filter clogging. Ex1004, 178-81. The features the Examiner identified were well-known, in references not before the Examiner—including Butler, which teaches each of them.

V. OVERVIEW OF PRIOR ART

A. Butler

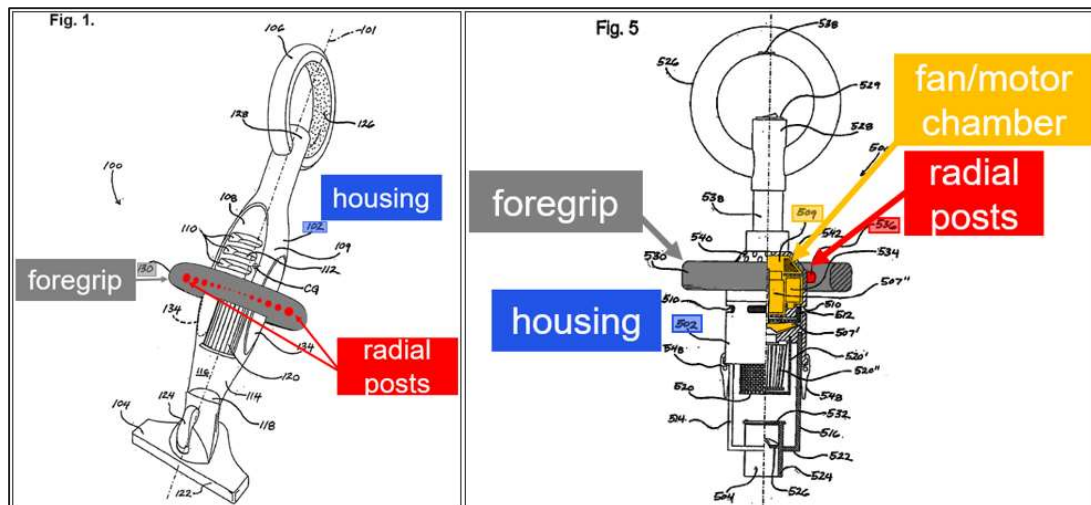
Butler teaches “an improved vacuum cleaner for cleaning raised and vertical surfaces,” including stairs:



Ex1005, 3:10-12, Fig. 1; Ex1002 ¶54.

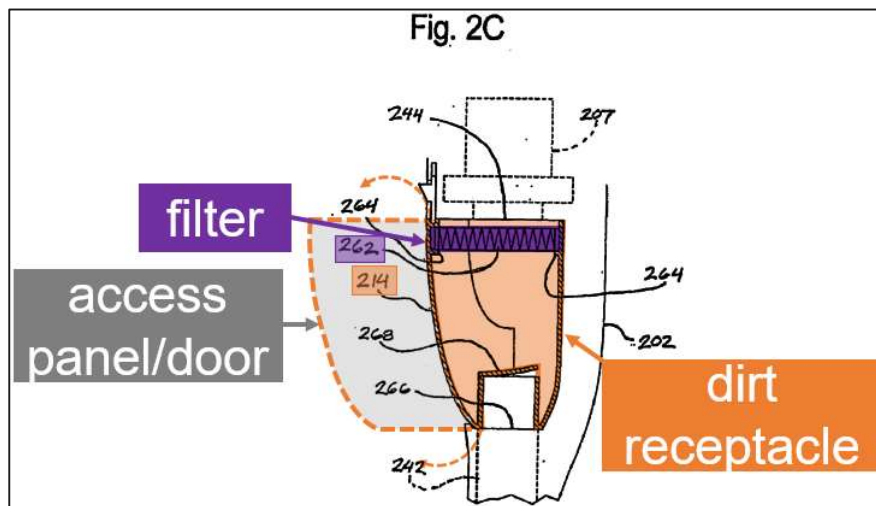
Butler's single system is configurable for various uses. Ex1002 ¶¶73-77. Butler's components, (handles, grips, dirt receptacles, air filters, and cleaning tools) "may be interchangeable with one another to provide the user with various cleaning options," and their arrangement may be "used individually 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.

Butler's vacuum has a "**foregrip**" position at the suction motor (in the "**fan/motor chamber**") and connects to the vacuum cleaner's "**housing**" at multiple locations via "**radial posts**":



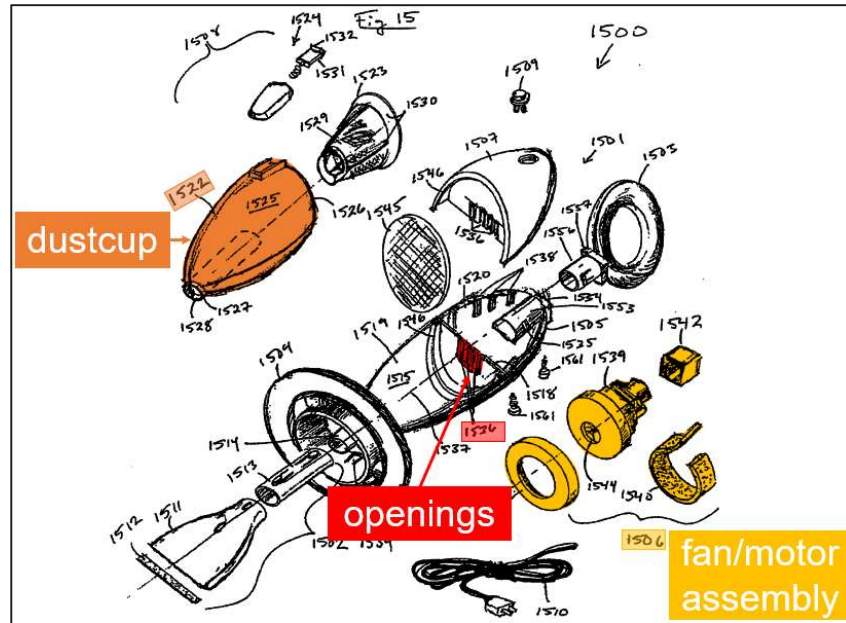
Ex1005, Figs. 1, 5; Ex1002 ¶55.

Butler uses a “**dirt receptacle**...covered by an **access panel or door**” and a pre-motor filter, “**filter 262**,” “positioned in the top of the **dirt receptacle**”:



Ex1005, 17:17-19, 18:26-27, Fig. 2C(modified); Ex1002 ¶56.

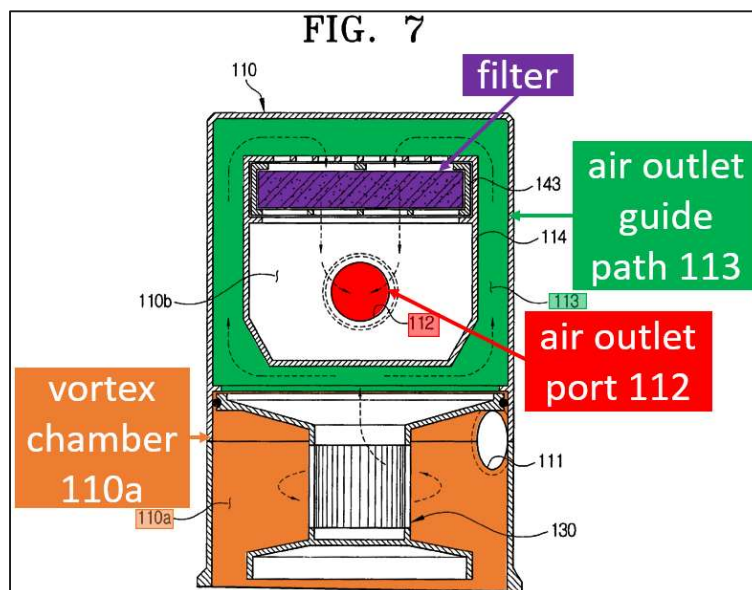
Butler’s “**dustcup 1522**” “may comprise...a cyclonic separation chamber.”
 Ex1005, 36:2-4. “[O]penings **1536**...allow air to pass from the **dustcup 1522** to the **fan/motor assembly 1506**”:



Ex1005, Fig. 15, 35:16-19; Ex1002 ¶57.

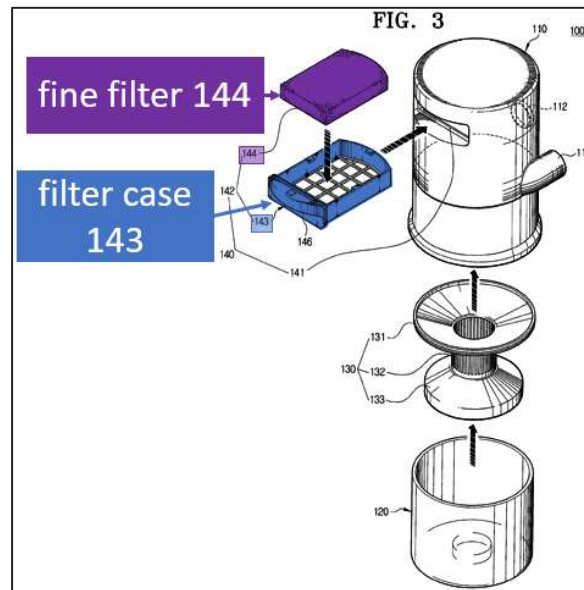
B. Oh

Oh teaches a “cyclone-type dust collecting apparatus.” Ex1006, 1:1-5. In Oh an “**air outlet guide path 113**” guides air from a cyclone chamber (“**vortex chamber 110a**”) through a “**filter**” to “**air outlet port 112**”:



Ex1006, Abstract, 6:32-7:7, Fig. 7; Ex1002 ¶58.

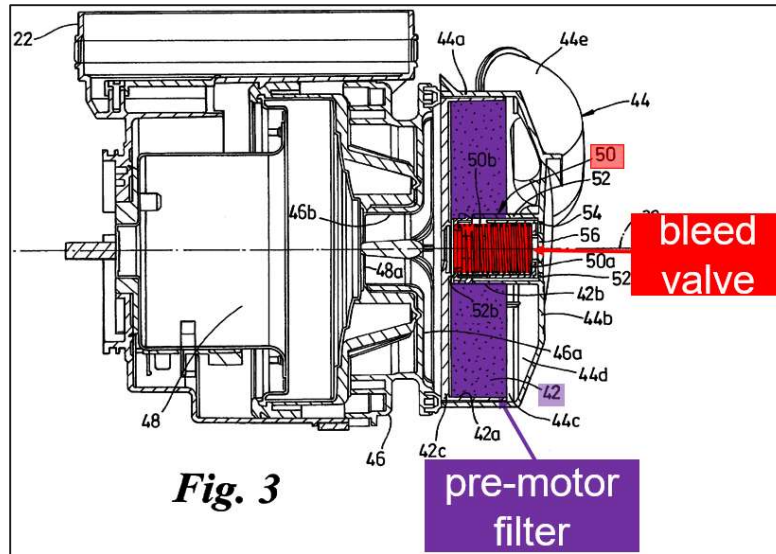
Oh's "filter assembly has a **filter case 143** and a **fine filter 144**" and is "detachably disposed, in the manner of a drawer":



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

C. Organ

Organ teaches a "vacuum cleaner, particularly of the cyclone separator type, and having a filter." Ex1007, Abstract. Organ's cleaner has a duct "which passes through the **[pre-motor] filter**" and contains a "**bleed valve**":



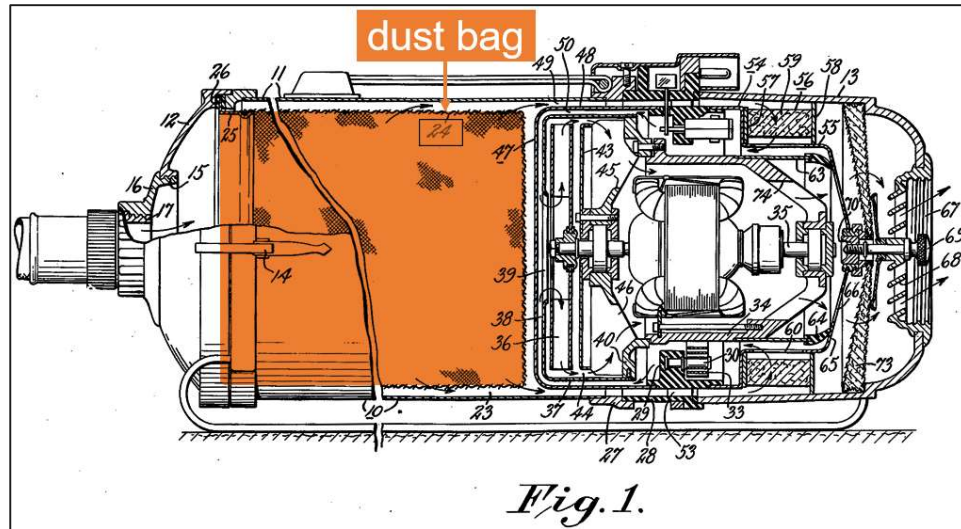
Ex1007, Abstract, Fig. 3; Ex1002 ¶¶59-60. Because Organ’s **bleed valve** remains closed when the **filter** is operational but opens when the **filter** is blocked, “the risk of overheating of the motor due to blocking of the [pre-motor] filter is minimised.”

Ex1007, 7, 2.³

D. Eriksson-Jons

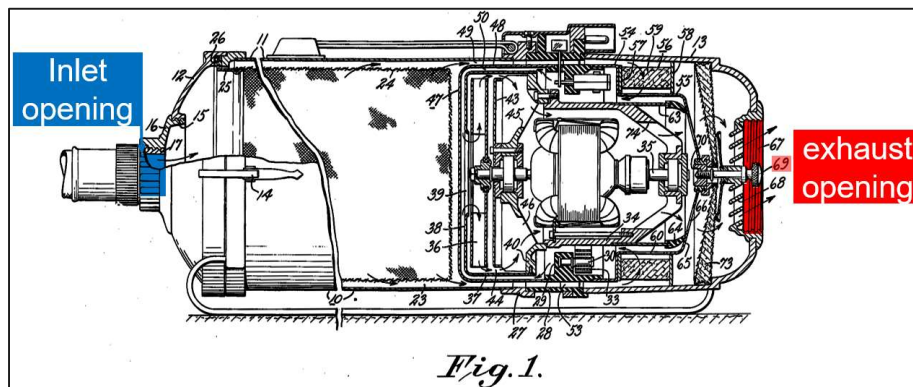
Eriksson-Jons teaches a vacuum with a “**dust bag 24** or other [dust] separating member”:

³ Organ cites are by page number.



Ex1008, 1(right):19-22,⁴ Fig. 1; Ex1002 ¶¶61-62.

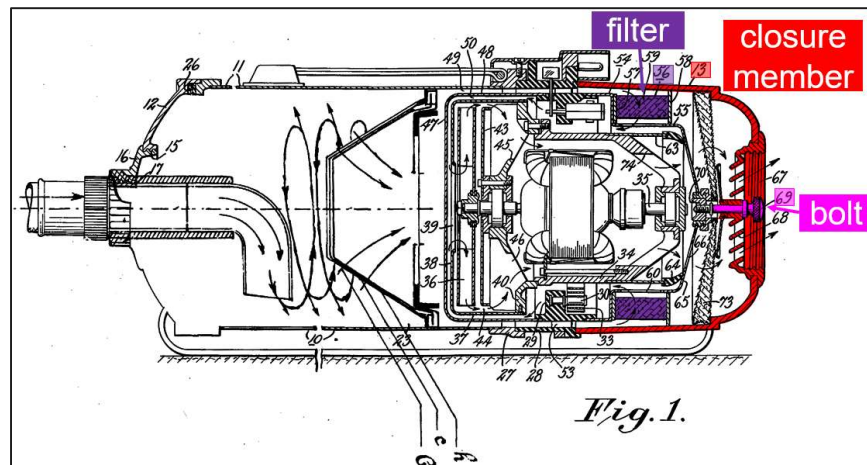
Air enters through an **inlet opening** and exits via an **exhaust opening 67**:



Ex1008, Fig. 1, Claim 1, 2(left):53-2(right):9; Ex1002 ¶¶64-65.

Eriksson-Jons's openable **pre-motor filter** cover, **removable closure member 13**, is opened by removing **bolt 69**:

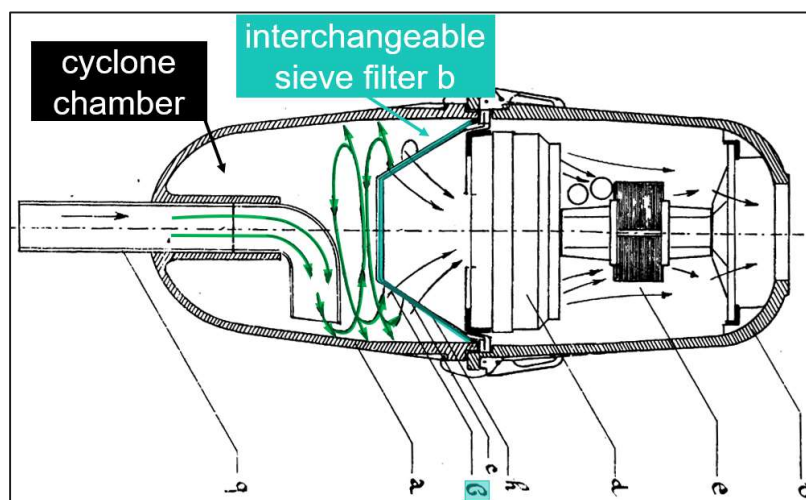
⁴ Because Eriksson-Jons does not include column numbers, Dyson uses the citation format [page][(side of page)]:[line] for this reference.



Ex1008, Fig. 1, 2(right):16-19; Ex1002 ¶63.

E. Martelliere

Martelliere teaches a vacuum with a **cyclone chamber** that uses the “‘Whirlwind’ principle” to separate dust from air, and is located upstream of an “interchangeable sieve filter b”:



Ex1010, 1, Fig. 1; Ex1002 ¶¶66-67.

VI. LEVEL OF ORDINARY SKILL IN THE ART

A POSA would have had a bachelor's degree in mechanical engineering or a similar field and 2-3 years of experience in fluid dynamics and/or machine design for devices related to fluid dynamics, 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.

VII. CLAIM CONSTRUCTION

Petitioners are unaware of any “prior claim construction determination” related to the '472Patent. 37 C.F.R. §42.100(b). “[C]laim terms need only be construed to the extent necessary to resolve the controversy.” *Wellman, Inc. v. Eastman Chem. Co.*, 642 F.3d 1355, 1361 (Fed. Cir. 2011) (internal citation omitted). Petitioner does not believe that any claim construction is necessary to resolve the parties' controversy in this Petition, and the claims should be given their plain and ordinary meaning for purposes of this IPR.⁵

⁵ Petitioners and PO submitted claim construction briefing for certain '472Patent terms. Case No. 1:23-cv-12372, Dkts. 121-122.

VIII. THE CHALLENGED CLAIMS ARE UNPATENTABLE

A. Ground 1: Butler Renders 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

Butler teaches a single vacuum system that is configurable, including with various handles and cleaning tools. Ex1002 ¶¶73-77. Butler’s components—handles, grips, dirt receptacles, filters, and tools—“may be interchangeable with one another to provide the user with various cleaning options,” and the arrangement of these components 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). Butler’s invention “may be used with any type of dirt separation system using any theory of operation,” and thus “various different types of dirt receptacle[s] may be used, and may be interchangeable with one another.” *Id.*, 16:25-28.

As described below, a POSA would have found it obvious to combine Butler’s components, including because it involves combining known elements (vacuum handles, grips, filters, cleaning tools, and dust chambers) according to known methods and techniques (simple component rearrangement) to yield predictable results (effective cleaning for different uses). Ex1002 ¶¶73-76. Doing so 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; Ex1002 ¶76. 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. Ex1002 ¶76.

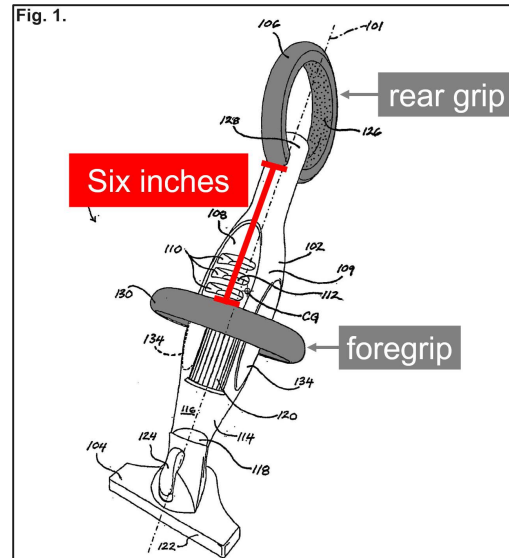
A POSA would have reasonably expected success: these components, all taught by Butler, were well known, and Butler expressly teaches that the components are interchangeable to reconfigure for various uses. Ex1002 ¶77.

2. [1]/[14]

a. [1pre]/[14pre]⁶

To the extent the preambles are limiting, Butler teaches them. Ex1002 ¶¶78-87. 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:

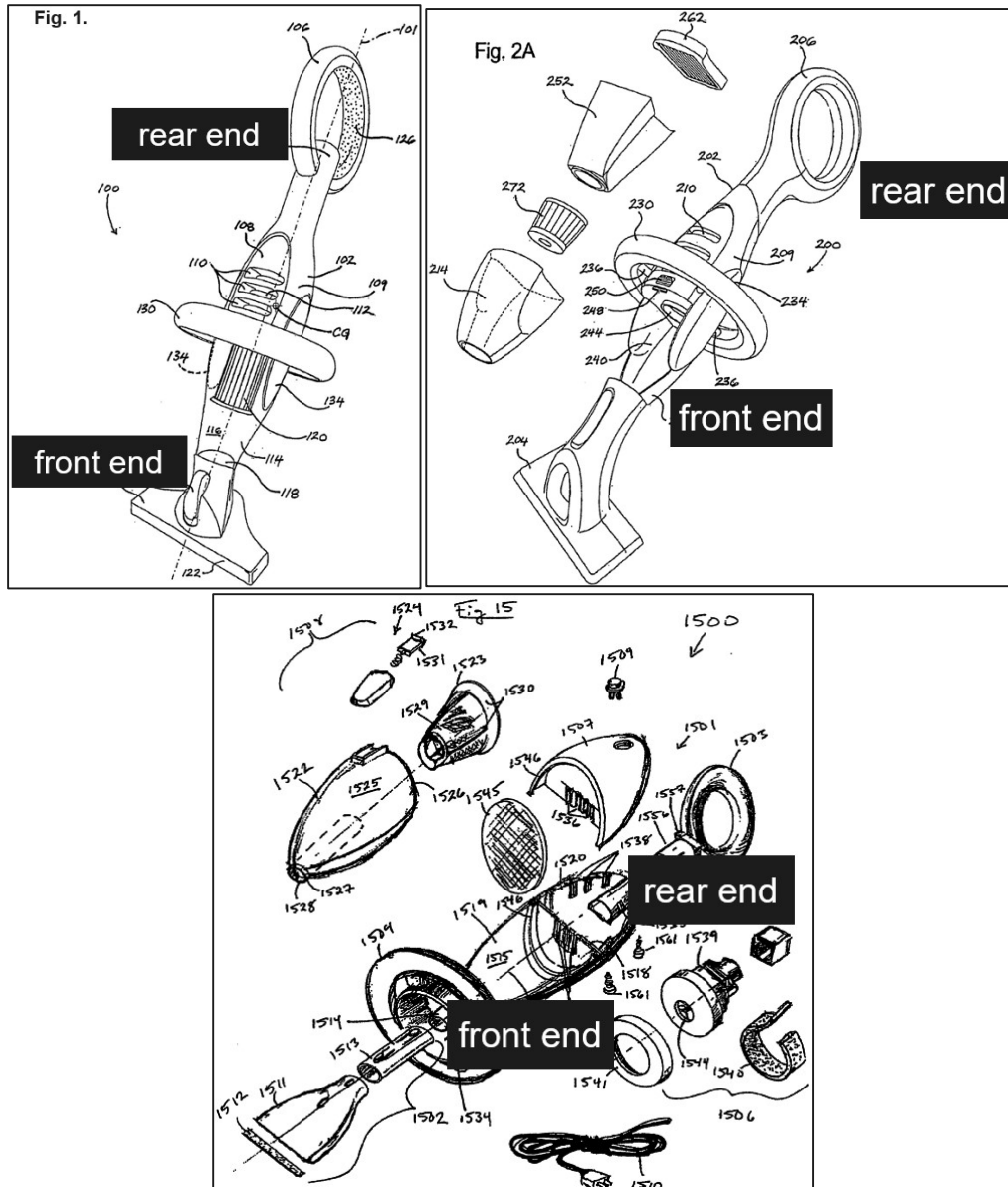
⁶ See LIST OF CHALLENGED CLAIMS for the correlation between the claim language and the abbreviations used in the headers of Section VIII.



Ex1005, 15:5-6, 26:1-10, Fig. 1; Ex1002 ¶¶80-85.

Butler teaches that its “compact” and “maneuver[able]” design is “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.

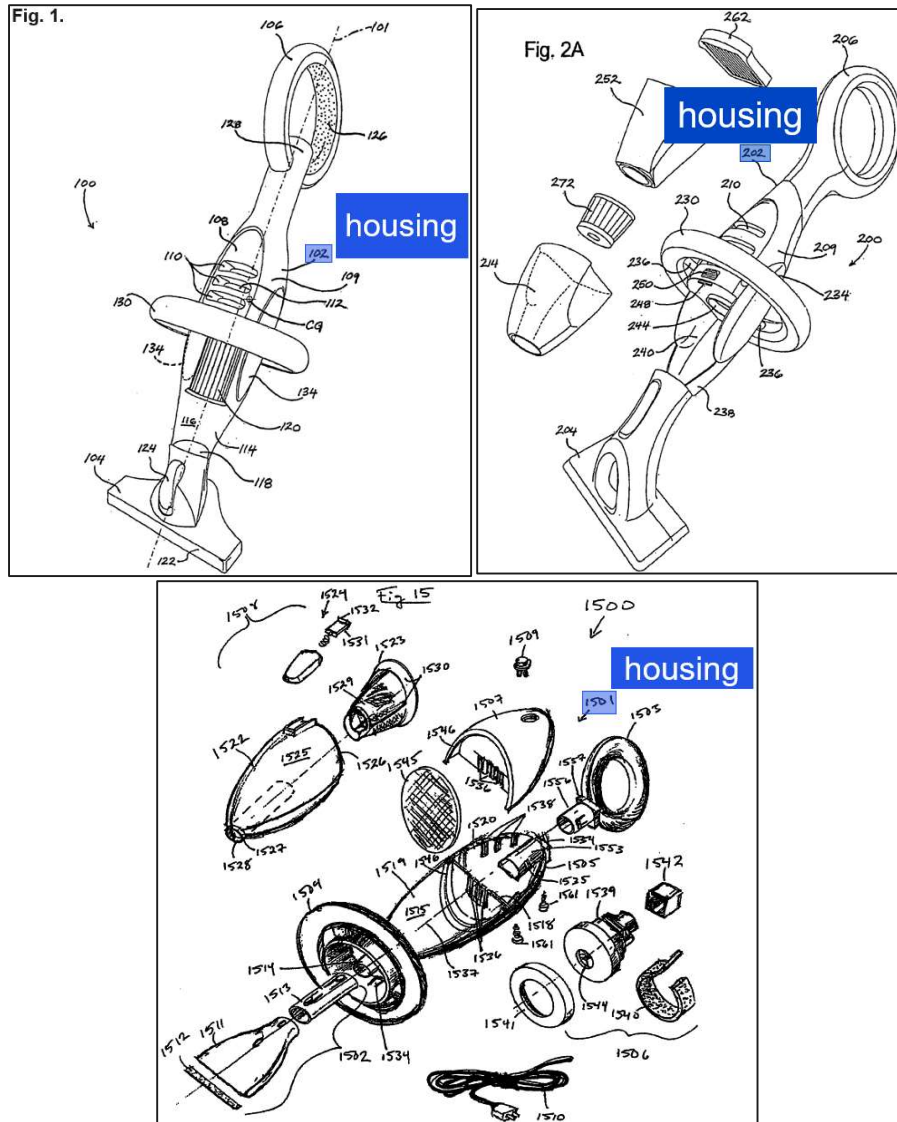
Butler’s hand vacuum includes a front and rear end. Ex1002 ¶86. Butler’s hand vacuum is a three-dimensional object, which a POSA would understand has a **front end** and a **rear end** as identified below:



Ex1005, Figs. 1, 2A, 15, Abstract, 3:20-23; Ex1016, 2-3; Ex1002 ¶86.

b. [1a]/[14a]

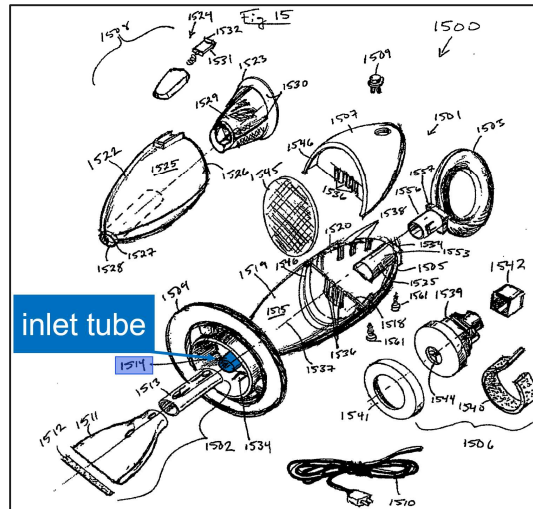
Butler teaches this limitation. Ex1002 ¶¶88-90. Butler teaches that its hand vacuum has a main housing, “**housing 102**”/“**housing 202**”/“**housing 1501**”:



Ex1005, Figs. 1, 2A, 15, 7:14-17, 15:20-22, 34:20-23, 35:4-8; Ex1002 ¶¶88-90.

c. [1b]/[14b]

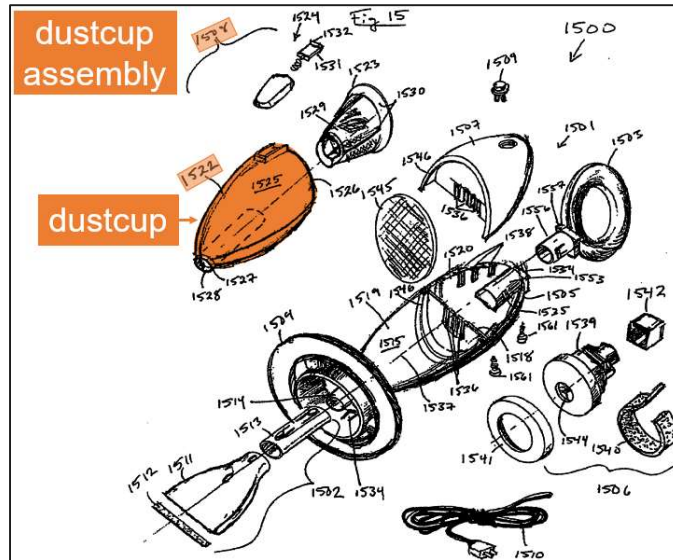
Butler teaches this limitation. Ex1002 ¶¶91-94. Butler teaches a dirty fluid inlet, “inlet tube 1514,” which “serves as an inlet for a dirt and dust laden airstream coming into the vacuum”:



Ex1005, Fig. 15, 35:8-11, 36:9-12; *id.*, Fig. 2D (depicting “inlet air passage 242” and “inlet port 270”); Ex1002 ¶¶92-94.

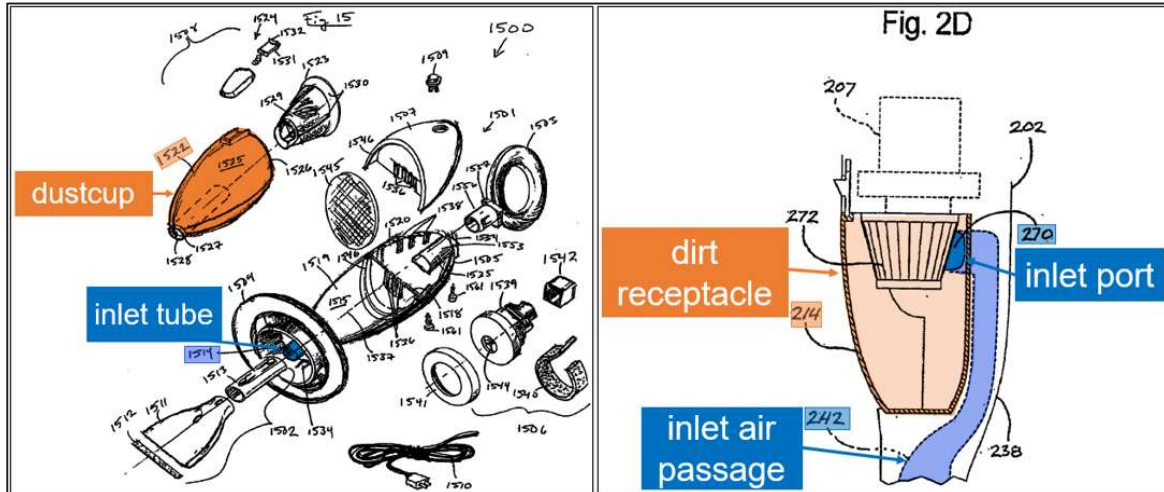
d. [1c]/[14c]

Butler teaches these limitations. Ex1002 ¶¶95-112. Butler teaches a cyclone bin assembly (**dustcup assembly 1508**) that comprises a cyclone chamber (**dustcup 1522**’s cyclonic separation chamber). “[**D**]ustcup assembly 1508 comprises a **dustcup 1522**,” which “may comprise...a cyclonic separation chamber”:



Ex1005, 35:27-36:4, Fig. 15; *id.*, Fig. 2D (“dirt receptacle 214”), 18:3-10 (“dirt receptacle 214 [that] comprises a cyclone separation chamber”); Ex1002 ¶¶97-100.

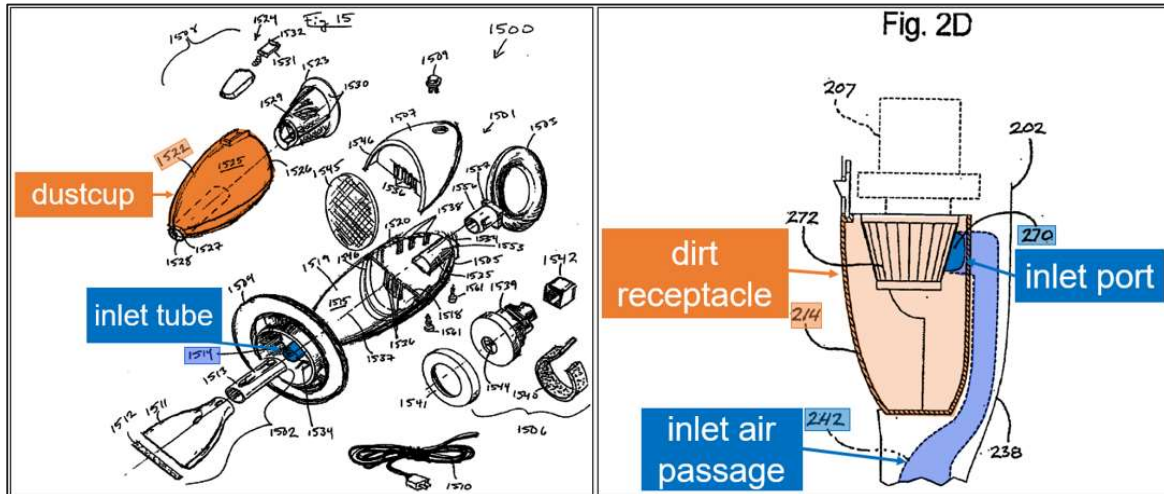
Butler’s cyclone chamber is downstream of the dirty fluid inlet:



Ex1005, 17:26-27, 18:7-10, 35:14-24; Figs. 15, 2D; Ex1002 ¶¶101-106.

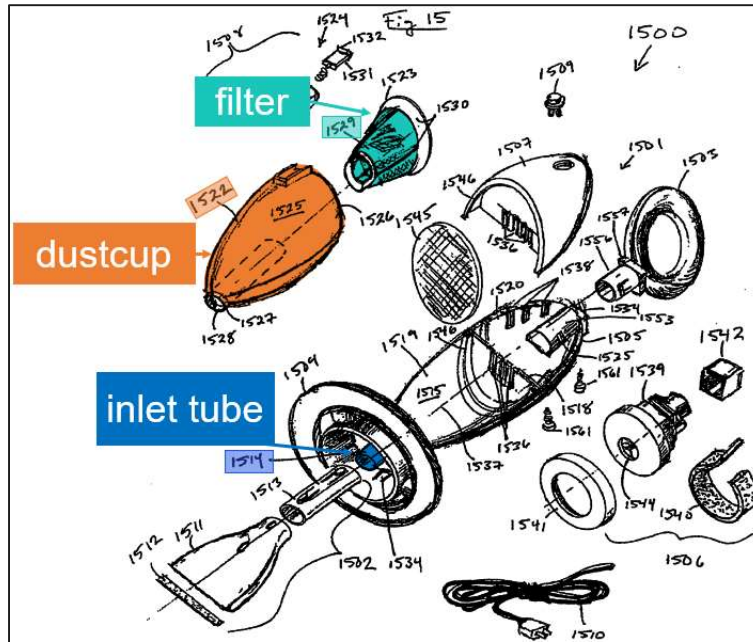
Butler teaches a cyclone air inlet. Ex1002 ¶107. A POSA would have understood the point at which Butler’s dirty fluid inlet (**inlet tube 1514/inlet air passage 242**) “terminates at an inlet port” (**inlet port 270** or the “end” of Butler’s

inlet tube 1514 that is “adjacent to the dustcup chamber 1519 and forms an air passage into the dustcup chamber 1519”) is a cyclone air inlet, because it is the inlet through which the “dirt and dust laden airstream” enters Butler’s cyclone chamber:



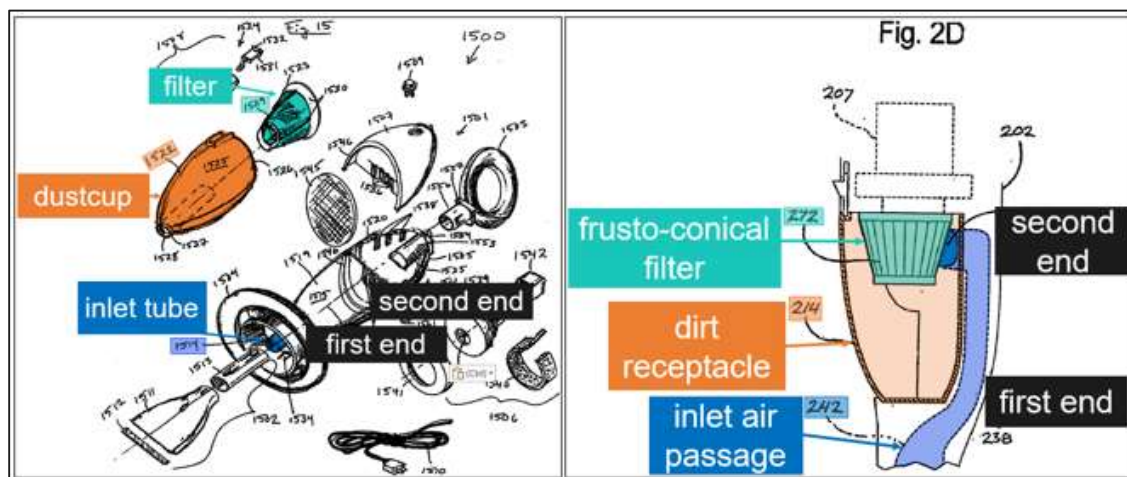
Ex1005, 17:26-27, 18:7-10, 35:14-16, 35:8-9, 35:22-24, Figs. 15, 2D; Ex1002 ¶107.

Butler teaches a cyclone air outlet. Ex1002 ¶¶108-109. In Figure 15, air exits the cyclone chamber through the “**filter 1529**” of a “generally frusto-conical filter assembly 1523 [that] extends into the **dustcup 1522**”:



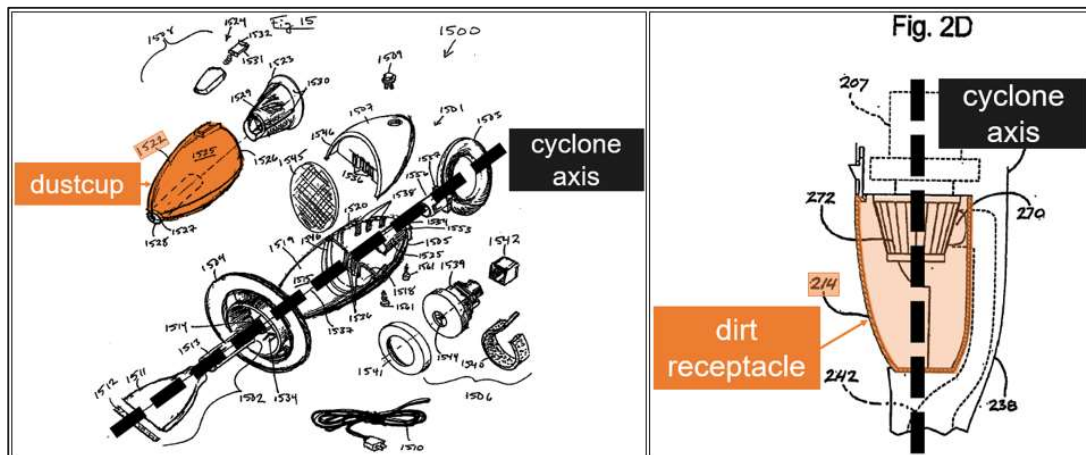
Ex1005, 36:4-5, Fig. 15; *id.*, Fig. 2D, 18:10-12 (air exiting the cyclone chamber through “frusto-conical filter 272”); Ex1002 ¶¶108-109.

Butler’s cyclone chamber has a **first end** and a **second end** as shown, where the cyclone outlet is located at the **second end**:



Ex1005, Figs. 15, 2D; *see also id.*, Fig. 2C; Ex1002 ¶¶110-111.

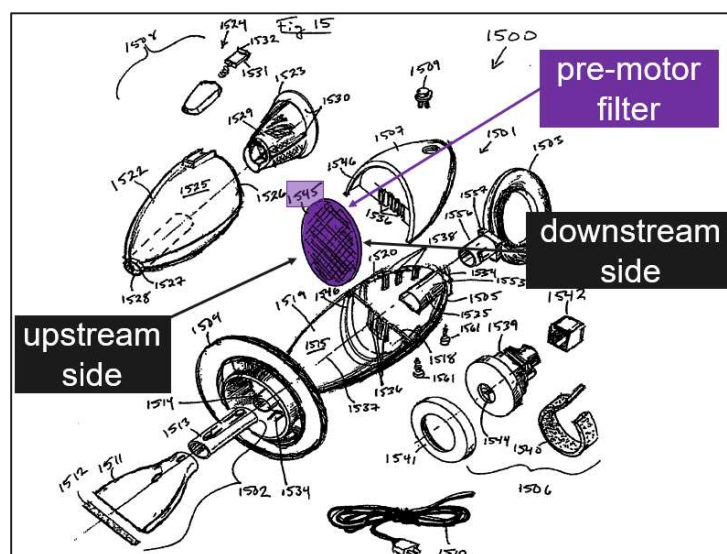
Butler's cyclone chamber (**dustcup 1522/dirt receptacle 214**'s cyclonic separation chamber) has a **cyclone axis** around which “[w]orking airflow is swirled”:



Ex1005, 18:3-5, Figs. 15, 2D; *see also id.*, Fig. 2C, Ex1002 ¶112.

e. [1d1]/[14d1]

Butler teaches these limitations. Ex1002 ¶¶113-118. Butler teaches “**pre-motor filter 1545**” with an **upstream side** and a **downstream side**:



filter assembly

filter

dustcup

upstream side

downstream side

Fig. 15

1500

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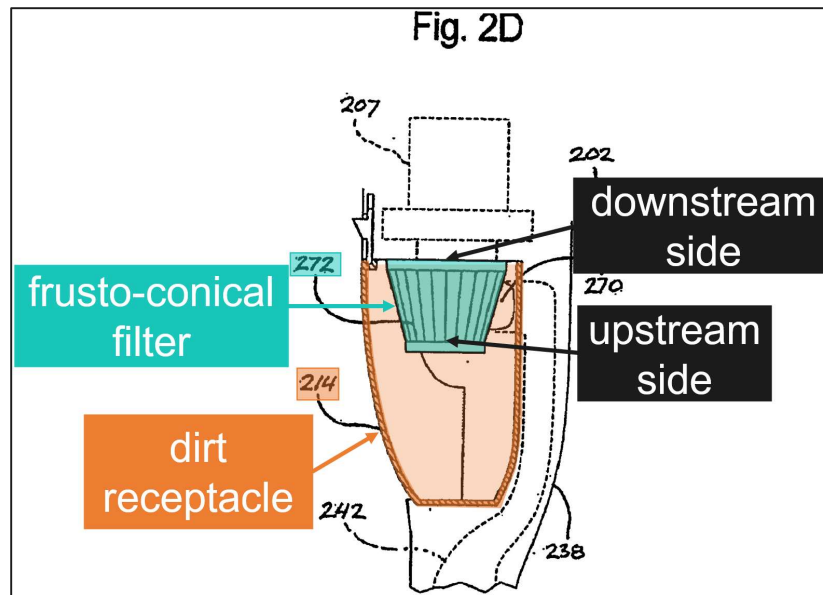
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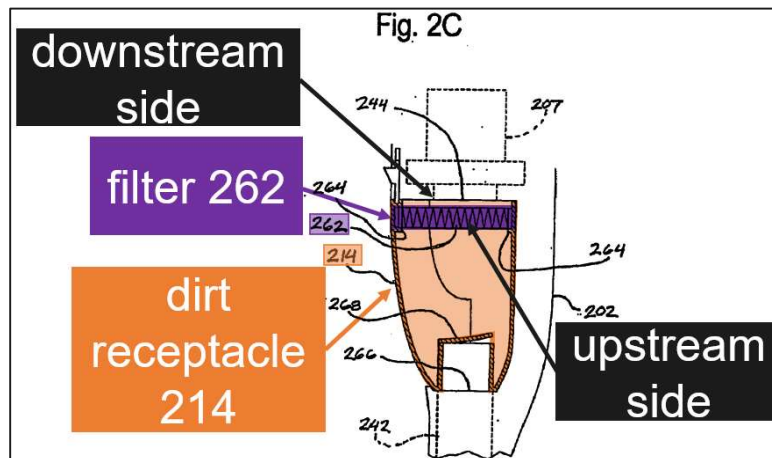
Ex1005, 36:4-5, Fig. 15; Ex1002 ¶115.

24



Ex1005, 18:10-12, Fig. 2D; *id.*, 15:20-26 (identifying location of “fan/motor chamber 209, with a fan/motor 207” as downstream of **filter 272**); Ex1002 ¶116.

Butler also teaches “**filter 262**” with an **upstream side** and a **downstream side** in “**dirt receptacle 214**” and is upstream of Butler’s motor:

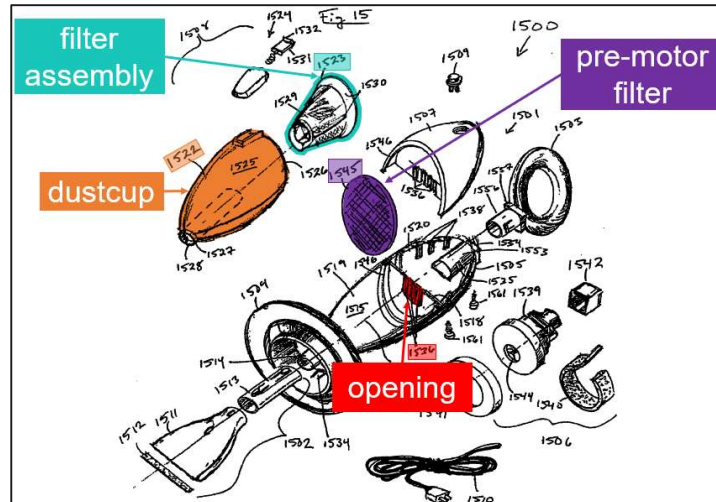


Ex1005, Fig. 15, 17:15-25; *id.*, 15:20-26 (identifying location of “fan/motor chamber 209, with a fan/motor 207” as downstream of **filter 262**); Ex1002 ¶117.

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**. Ex1002 ¶118. 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. A POSA therefore 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. Ex1002 ¶118.

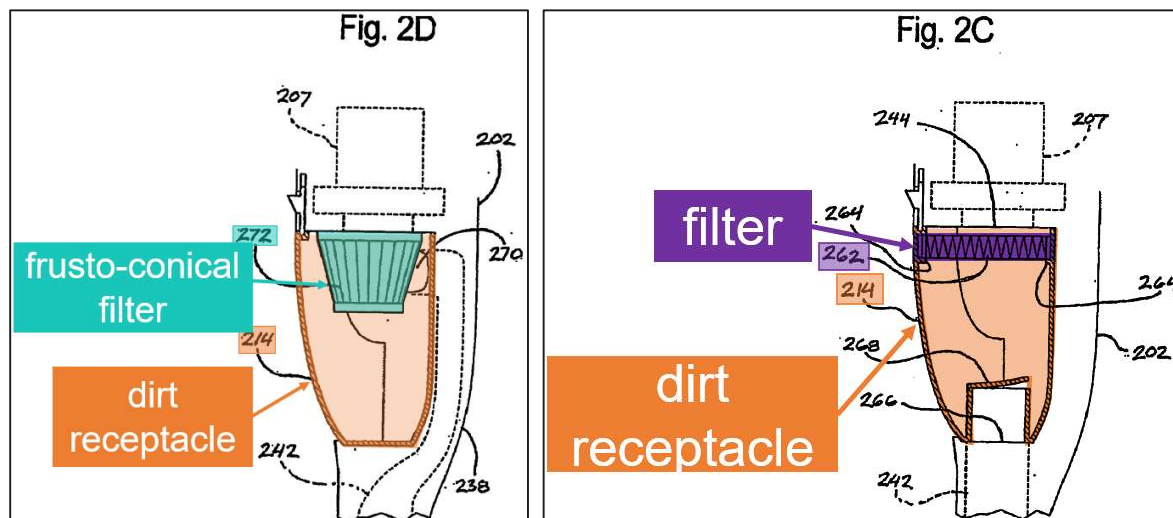
f. [1d2]/[14d2]

Butler teaches and renders obvious these limitations. Ex1002 ¶¶119-129. Butler’s pre-motor filter is positioned in a pre-motor filter housing. Ex1002 ¶120. 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”:



Ex1005, 36:4-5, 35:20-22, Fig. 15; Ex1002 ¶120.

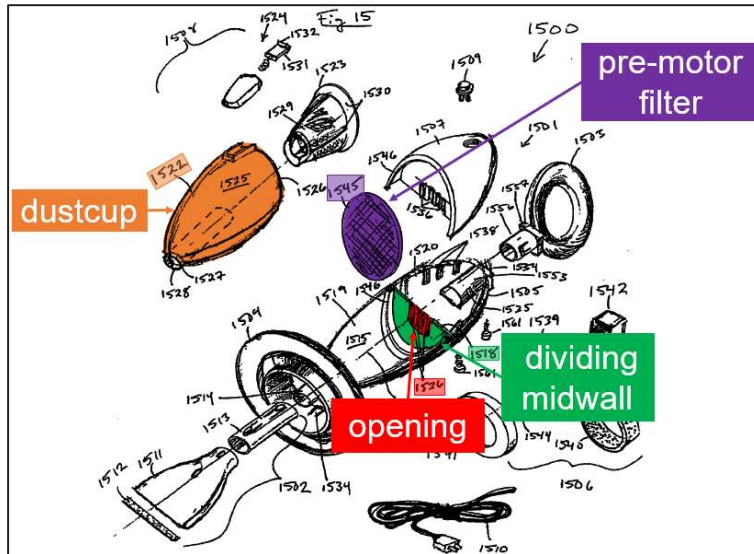
Similarly, in Figures 2C-2D, Butler teaches a “**frusto-conical filter 272**” housed in “**dirt receptacle 214,**” and a “**filter 262**” “positioned in the top of the **dirt receptacle [214]**” with “[s]uitable ridges 264 or other features [t]o hold the **filter 262** in place”:



Ex1005, Fig. 2C, 2D, 17:15-25, 18:10-11; Ex1002 ¶121.

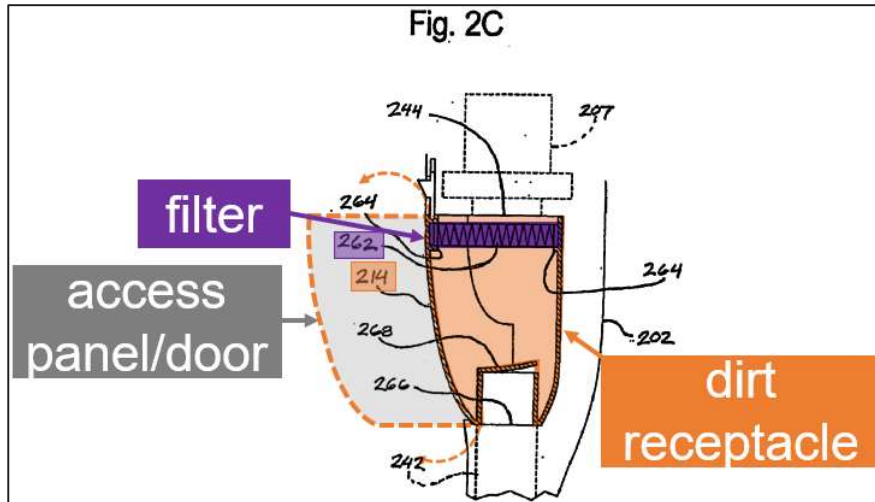
A POSA would have understood Butler's "**dirt receptacle 214**"/"**dustcup 1522**" are interchangeable pre-motor filter housings because they house Butler's pre-motor filters. Ex1002 ¶122.

To the extent PO 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**." Ex1002 ¶¶123-124. 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"); Ex1002 ¶123. 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 "**dustcup 1522** is [] installed in the dustcup chamber 1519":



Ex1005, Fig. 15, 35:16-22; Ex1002 ¶123. Connecting at the “**dividing midwall 1518**” facilitates a tight seal, improving suction and avoiding accidental dirt spillage, which would 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; Ex1002 ¶124.

Butler teaches the pre-motor filter housing having an openable cover. Ex1002 ¶¶125-126. 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:

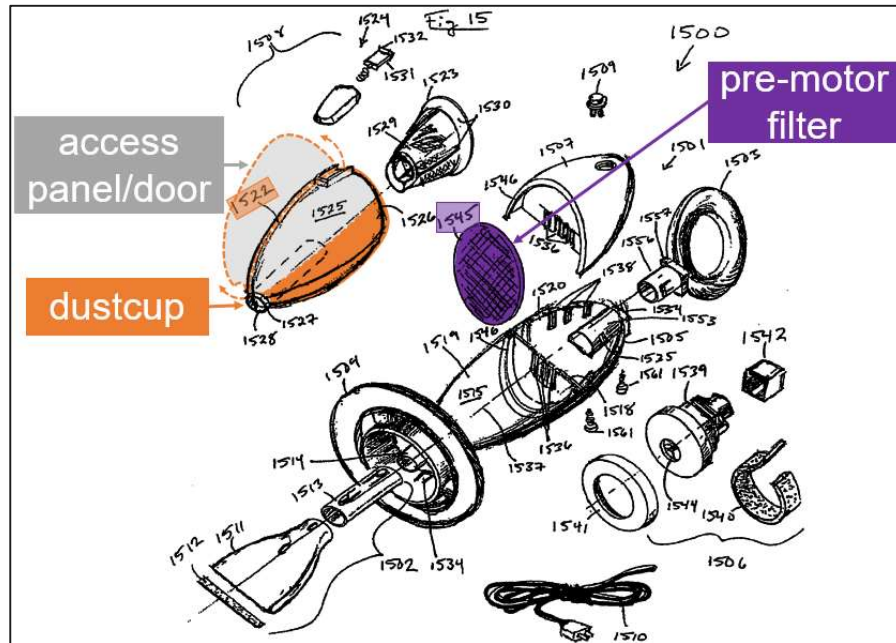


Ex1005, 18:26-27, 18:27-19:5, Fig. 2C(modified); Ex1002 ¶125.

A POSA would have understood 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. Ex1005, 8:15-17 (noting need to service filters); Ex1002 ¶126. 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, 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**." Ex1002 ¶126. 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. Ex1002 ¶126.

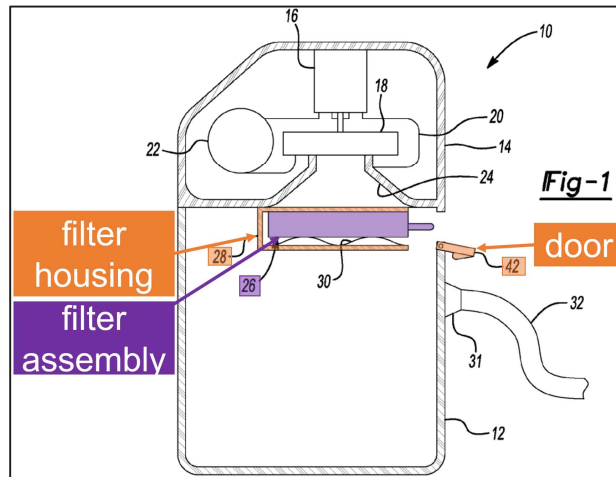
Butler therefore teaches and renders obvious that “**dustcup 1522**,” like “**dirt receptacle 214**,” is a pre-motor filter housing having an openable cover:



Ex1005, Fig. 15(modified); Ex1002 ¶126.

To the extent PO argues Butler’s pre-motor filter is not housed in a “pre-motor filter housing having an openable cover,” it would have been obvious to modify Butler to include a housing having an openable cover specifically for Butler’s pre-motor filter. Ex1002 ¶¶127-129. A POSA would have understood an openable pre-motor filter housing—independent of dustcup 1522—would have certain benefits, including supporting and protecting the pre-motor filter while allowing access to the pre-motor filter without exposing the dirty contents of the dustcup. Ex1002 ¶127.

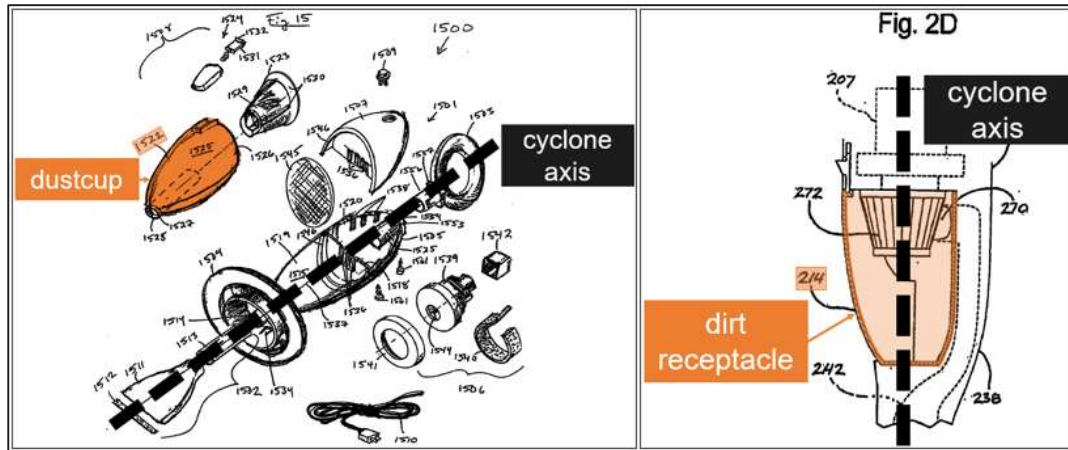
Such pre-motor filter housings were well known. Ex1002 ¶¶128-129. For example, US2008/0115315 teaches a “**filter housing 28**” and an openable “**door 42**” (cover) that allows access to the “**filter assembly 26**” “from the exterior of the housing,” which makes cleaning less “cumbersome and messy”:



Ex1015, Fig. 1, ¶¶4, 21, 25; Ex1002 ¶128. This modification would have only required the addition of a housing wall for Butler’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 (improved access to and protection for the pre-motor filter). Ex1002 ¶129.

g. [1d3]

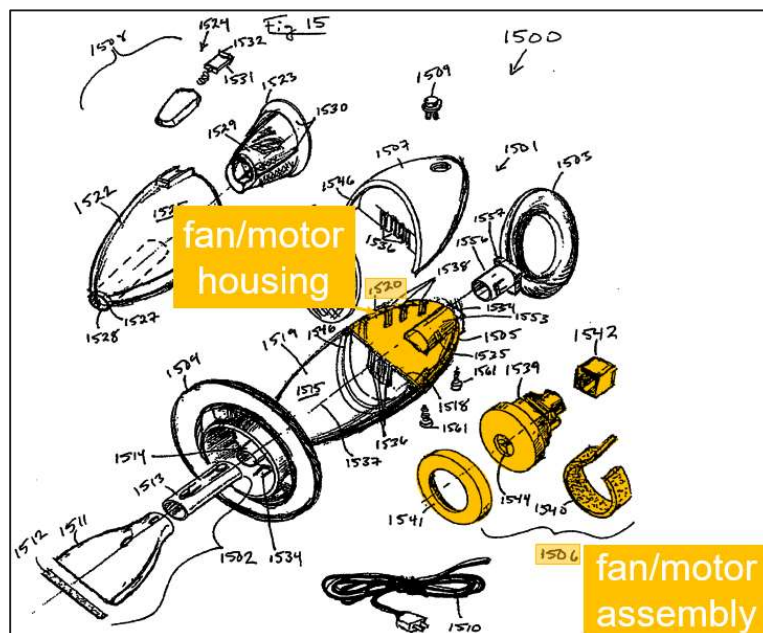
Butler teaches this limitation. Ex1002 ¶¶130-132. Butler’s **cyclone axis** extends through Butler’s pre-motor filter housing (**dustcup 1522/dirt receptacle 214**):



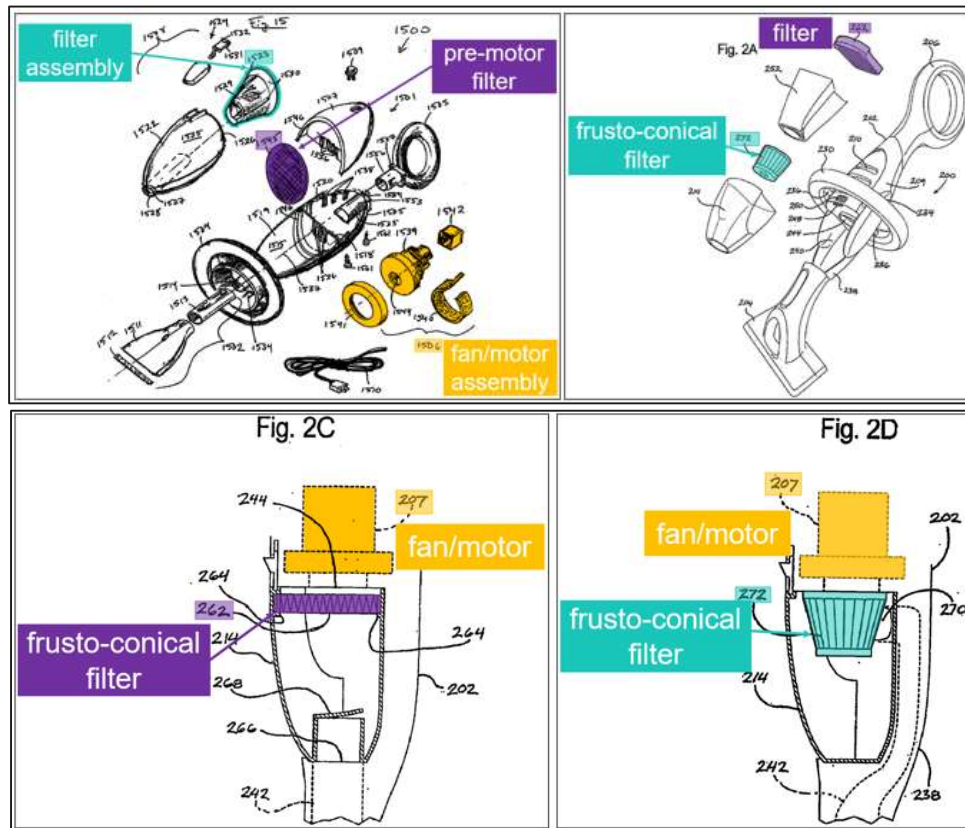
Ex1005, Figs. 15, 2D; Ex1002 ¶131. This limitation is also met when Butler is modified to include a separate pre-motor filter housing ([1d2]). Ex1002 ¶¶132.

h. [1e]/[14e]

Butler teaches these limitations. Ex1002 ¶¶133-137. Butler teaches a **suction motor** positioned in the main housing, downstream of the pre-motor filter and rearward of the cyclone bin assembly:

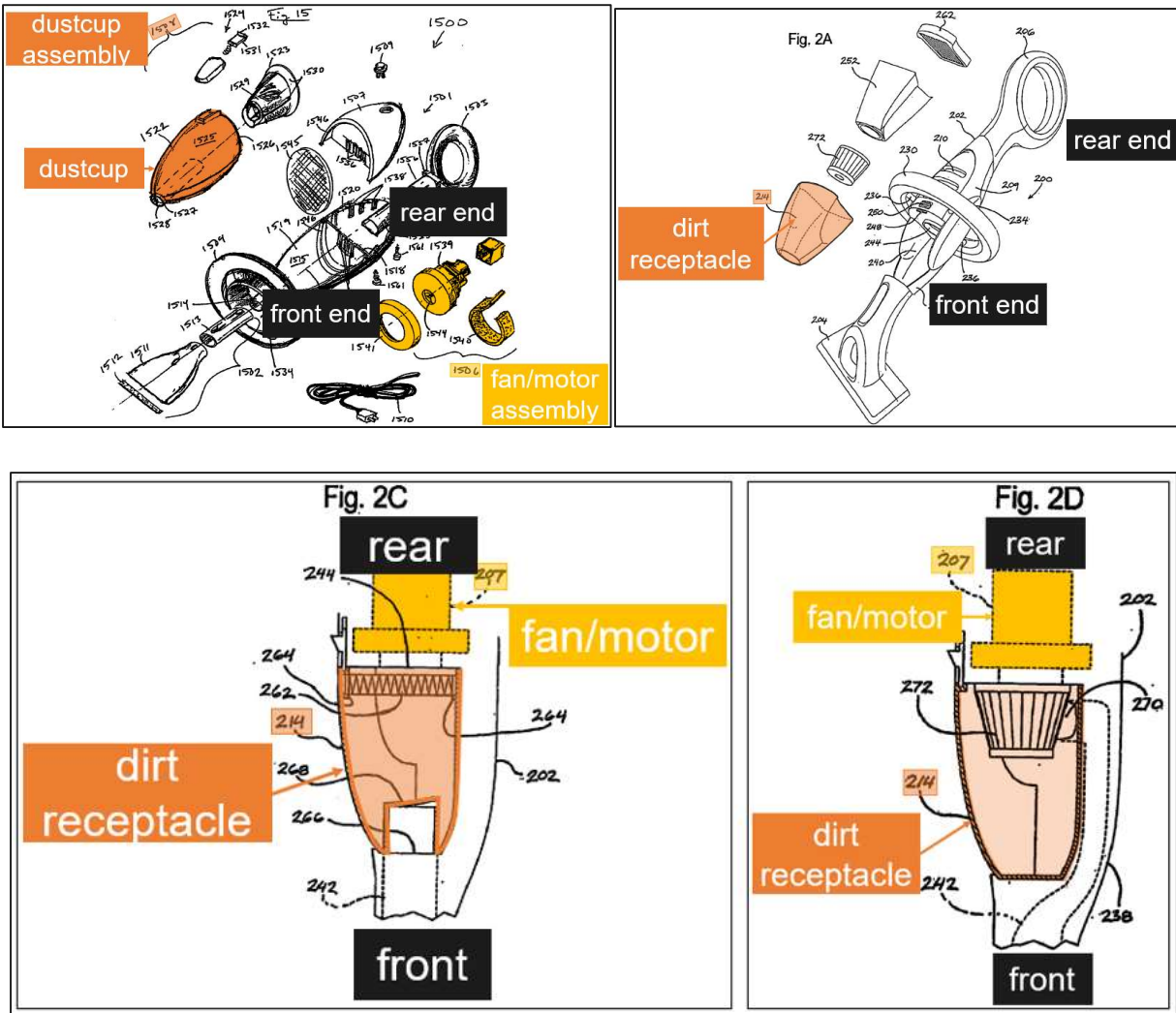


Ex1005, Fig. 15, Abstract, 7:17-19; 15:19-24; 35:4-15; *id.*, Figs. 2C, 2D (“fan/motor 207”). Ex1002 ¶134. In Butler, air flows from the pre-motor filter (“pre-motor filter 1545”/“filter 262”/“filter 272”/“filter assembly 1523”) downstream to the suction motor (“fan/motor assembly”):



Ex1005, 17:17-18, 18:10-11, 35:16-19, 35:20-21, Figs. 15, 2A, 2C-2D; *id.*, Figs. 3-5, 16; Ex1002 ¶135.

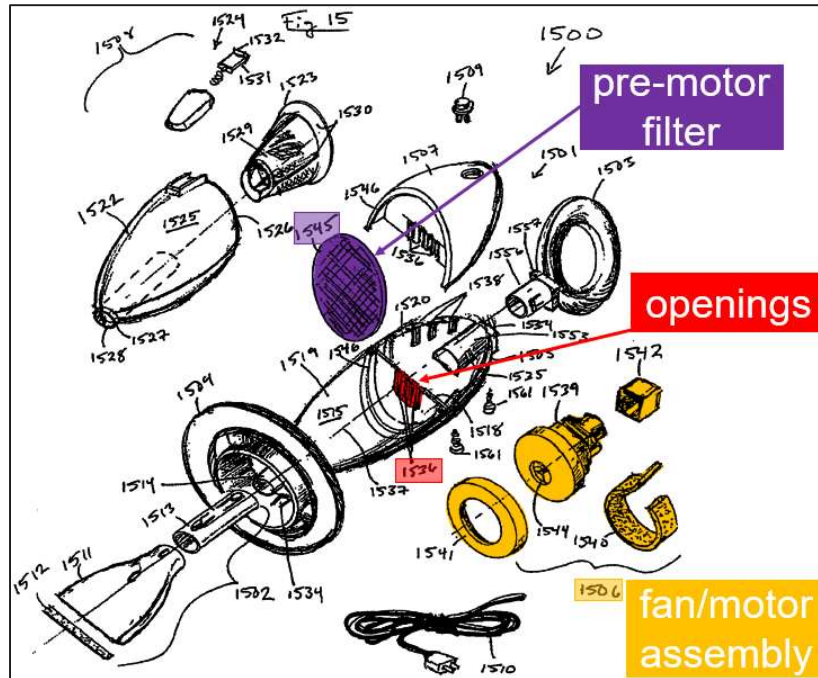
Butler’s suction motor (“fan/motor assembly”) is rearward of Butler’s cyclone bin assembly (“dustcup assembly 1508”/“dirt receptacle 214”) at least because it is nearer the **rear end** of the vacuum:



Ex1005, 17:15, 35:5-6, Figs. 15, 2A, 2C-2D; Ex1002 ¶¶136-137.

i. [1f]/[14f]

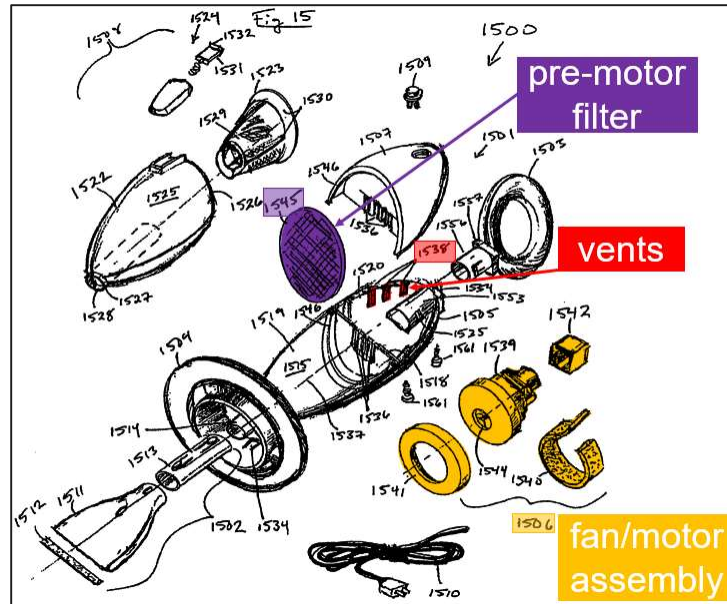
Butler teaches these limitations. Ex1002 ¶¶138-139. Butler teaches that air flows from Butler’s “**pre-motor filter**” to the suction motor, “**fan/motor assembly**” through the “**openings 1536**”:



Ex1005, Fig. 15, 35:18-19, 35:20-21; *id.*, Figs. 2A, 2C-2D, 3-5, 16, 18:24-26 (“**dirt receptacle 214**” “connected by suitable air conduits” to “**fan/motor 207**”); Ex1002 ¶139.

j. $[1g]/[14g]$

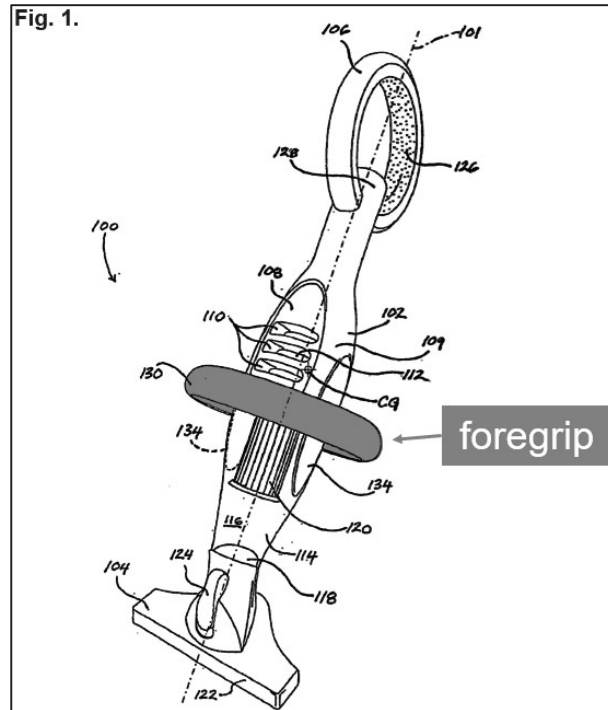
Butler teaches these limitations. Ex1002 ¶¶140-143. Butler’s “exhaust path for the **fan/motor assembly 1506**” includes “**vents 1538**”:



Ex1005, 35:19-20, Fig. 15; Ex1002 ¶141. Similarly, Butler’s “**outlet apertures 210**...exhaust the working airflow from the **fan/motor chamber 209** to the atmosphere.” Ex1005, 15:24-27. A POSA would have understood the air exhausted from “**vents 1538/outlet apertures 210**” is clean air because it has been cleaned by the cyclone and filters. Ex1002 ¶¶142-143. Thus, Butler’s “**vents 1538/outlet apertures 210**” are a clean air outlet downstream of the suction motor. Ex1002 ¶143.

k. $[1h1]/[14h1]$

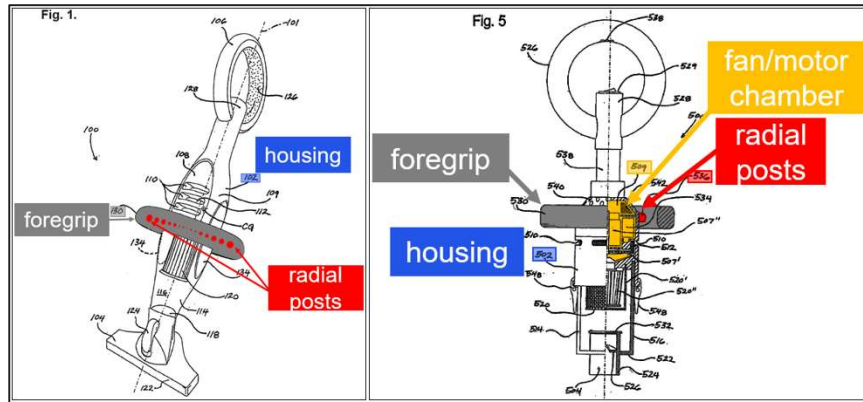
Butler teaches these limitations and renders them obvious. Ex1002 ¶¶144-160. Butler teaches a handle, “**foregrip**”:



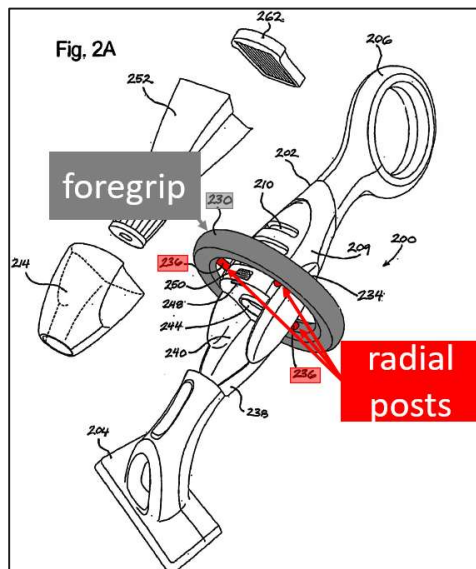
Ex1005, Fig. 1, 3:28-4:1; Ex1002 ¶146.

Butler’s “**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. Ex1002 ¶147.

As one example, 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**:”



Ex1005, 11:26-12:2, Figs. 1, 5; Ex1002 ¶148. 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):

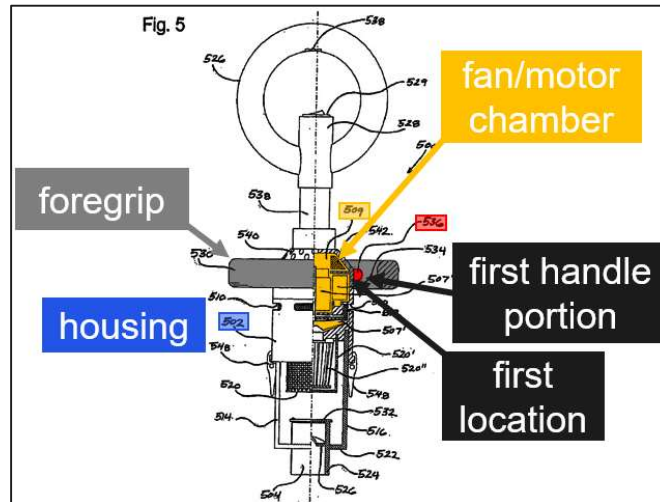


Ex1005, Fig. 2A; Ex1002 ¶149.

Butler’s suction motor is in the main housing ([1e]/[14e]), and the “**foregrip**” [] surrounds [the] **fan/motor chamber** [] in which the **fan/motor** [] is located.”

Ex1005, 20:12-13. A POSA would have understood a **first location** is at a

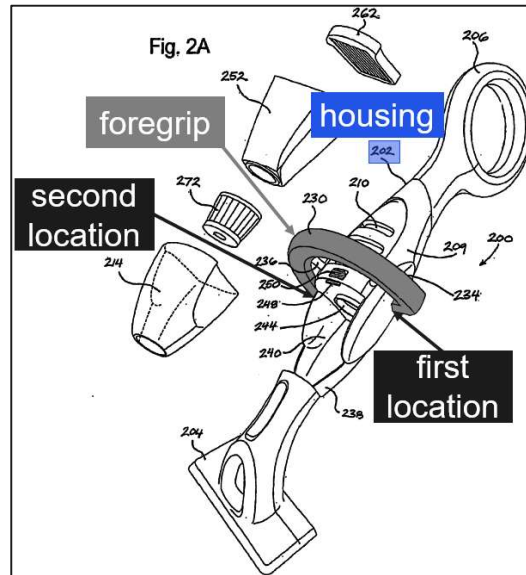
position of the suction motor (“**fan/motor**” in the “**fan/motor chamber**”) and the **first handle portion** (one of the “**radial posts**”) is connected at the first location:



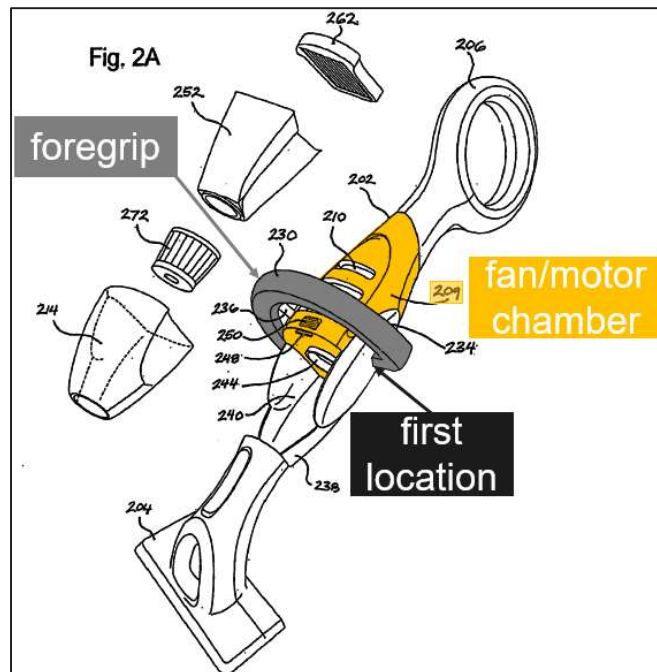
Ex1005, Fig. 5; Ex1002 ¶150. A POSA would have understood the “**radial posts**” are a handle portion—Butler explains that the posts “provide one or more gaps between the foregrip 130 and the housing 102 into which the user may fit his or her fingers or hand,” Ex1005, 11:28-12:2, and one of the purposes of fitting a user’s fingers or hand into those gaps is for a user to grasp the **post**. Ex1002 ¶151. 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. Ex1002 ¶152.

Butler’s **foregrip** may also “be formed as a partial loop.” Ex1005, 19:15-17. A POSA would understand 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 2A:

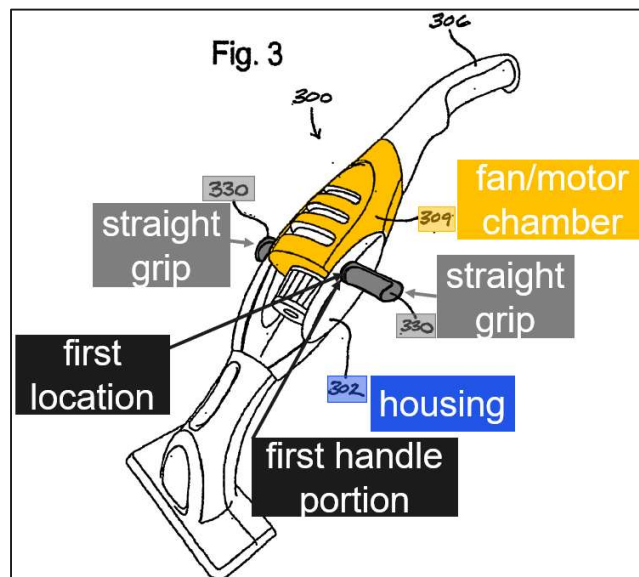


Ex1005, Fig. 2A(modified); Ex1002 ¶¶153-154. Because this handle forms a “partial loop” around the suction motor, a POSA would understand that the **first location** of the “partial loop” “foregrip” would connect to the hand vacuum at a position of the suction motor in the main housing, such as that depicted in modified Figure 2A:



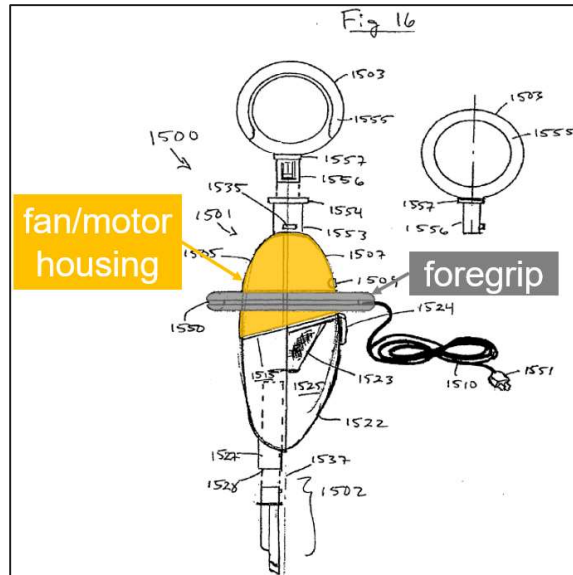
Ex1005, Fig. 2A(modified); Ex1002 ¶155.

In yet another configuration, Butler teaches 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**”:

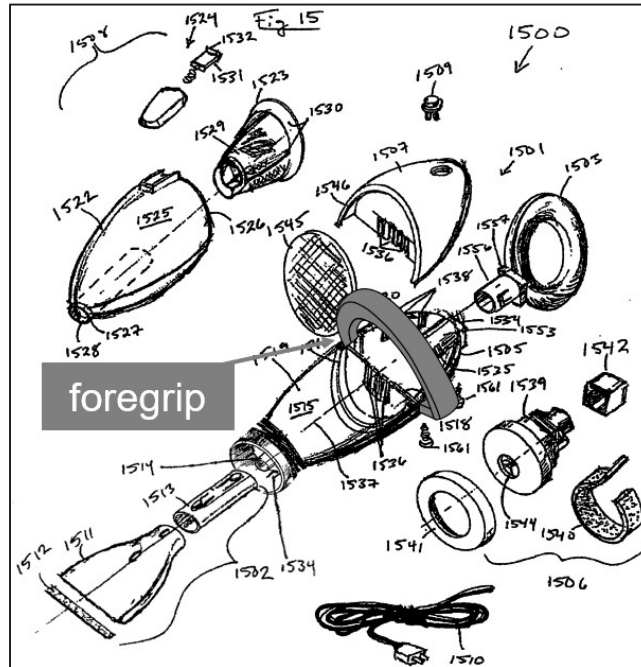


Ex1005, 19:18-22, Fig. 3; Ex1002 ¶156. A POSA would have understood the “straight grips 330” are a handle consisting of two handle portions, connected to the hand vacuum at first and second locations, where the **first handle portion** is connected at the **first location**, which is at a position adjacent to the suction motor in the main housing, shown above. Ex1002 ¶157.

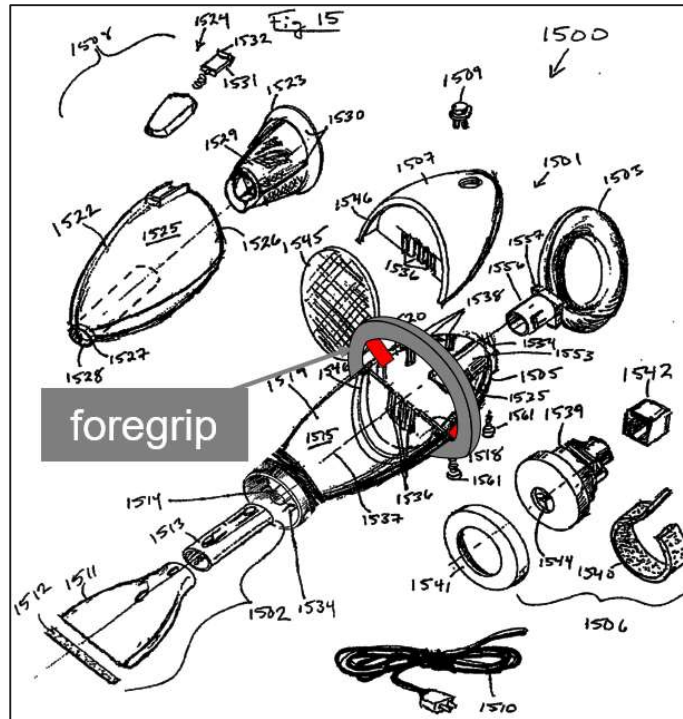
Butler also teaches that the handle (“foregrip”) configuration shown in Figures 15-16 may be at a location surrounding the **fan/motor chamber**:



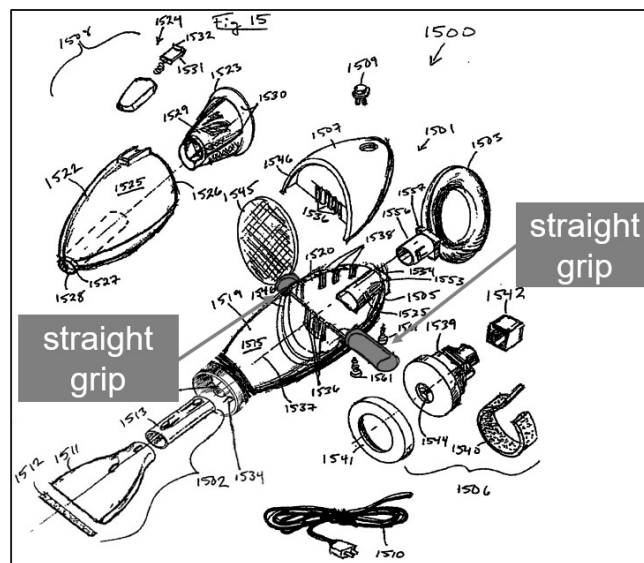
12, Ex1002 ¶159. A POSA would have understood each of the handle configurations described above could be used to replace Figure 15's **foregrip 1504** at a location surrounding the suction motor, as illustrated in the following modified figures, and would have found such configurations obvious for the same reasons:



Ex1005, Figs. 15, 2A(modified); Ex1002 ¶159.



Ex1005, Figs. 15, 5(modified); Ex1002 ¶159.

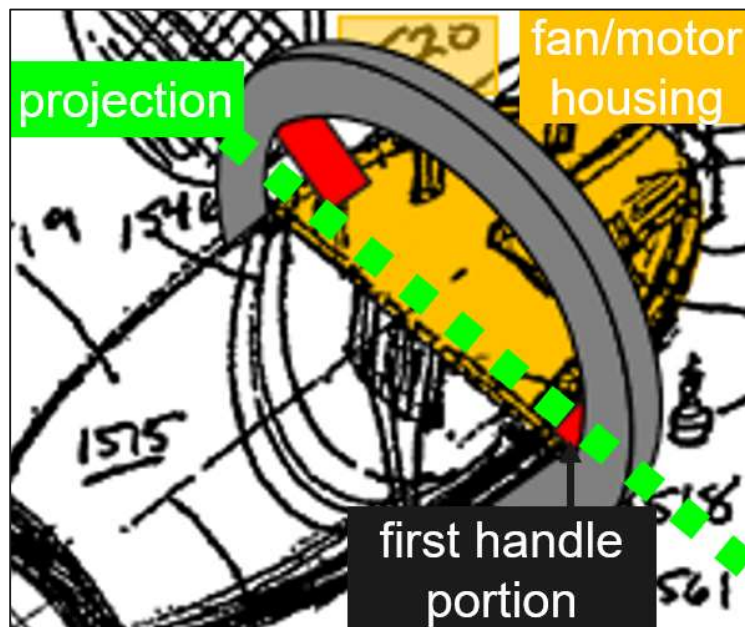
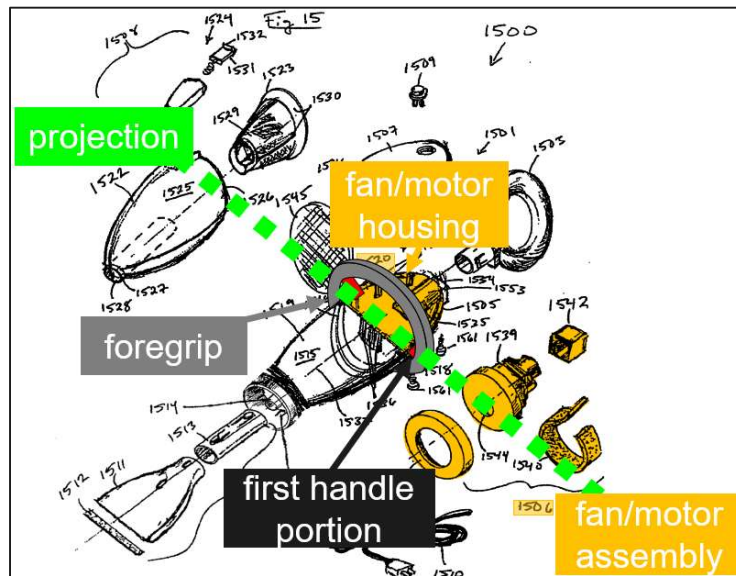


Ex1005, Figs. 15, 3(modified); Ex1002 ¶159. A POSA would therefore have understood all of the above configurations above to meet these limitations.

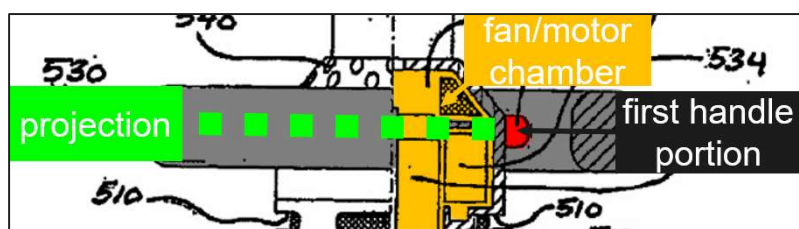
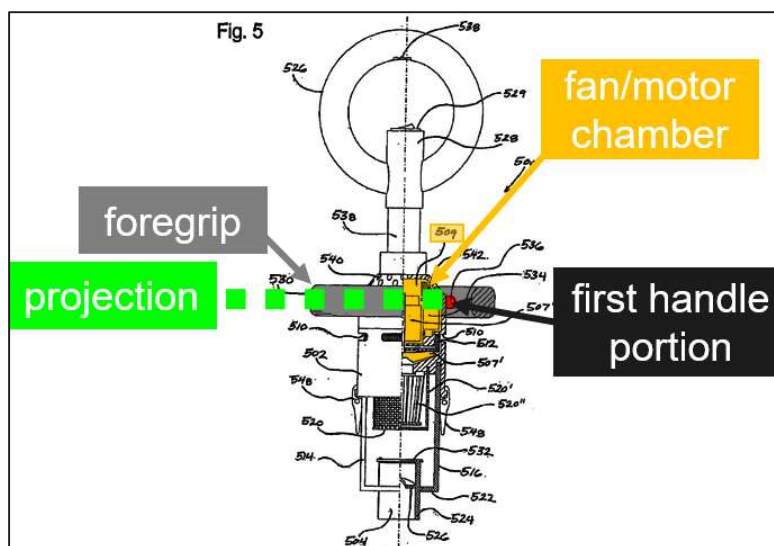
Ex1002 ¶¶159-160.

l. $[1h2]/[14h2]$

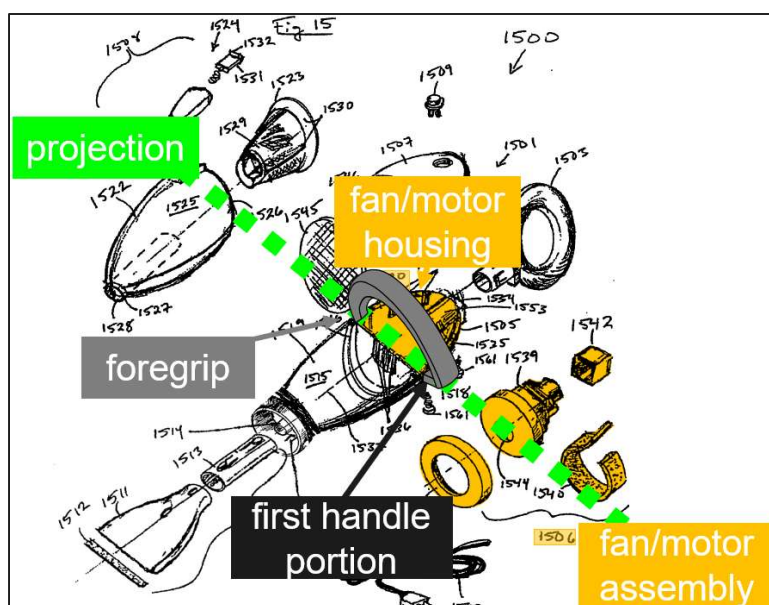
Butler teaches these limitations. Ex1002 ¶¶161-162. In each of Butler’s handle configurations ([1h1]/[14h1]), a projection of the **first handle portion** extends through the suction motor (“**fan/motor assembly**”), as shown:

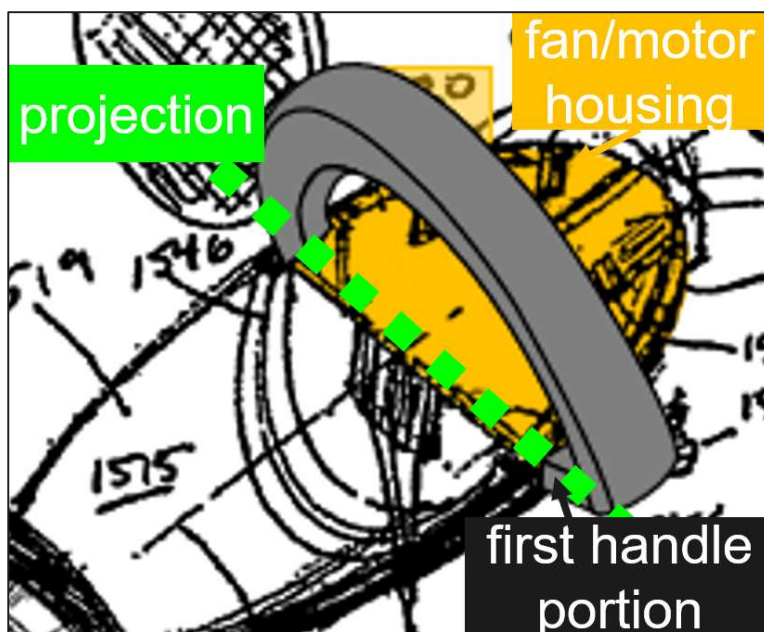


Ex1005, Figs. 15, 5(modified); Ex1002 ¶162.

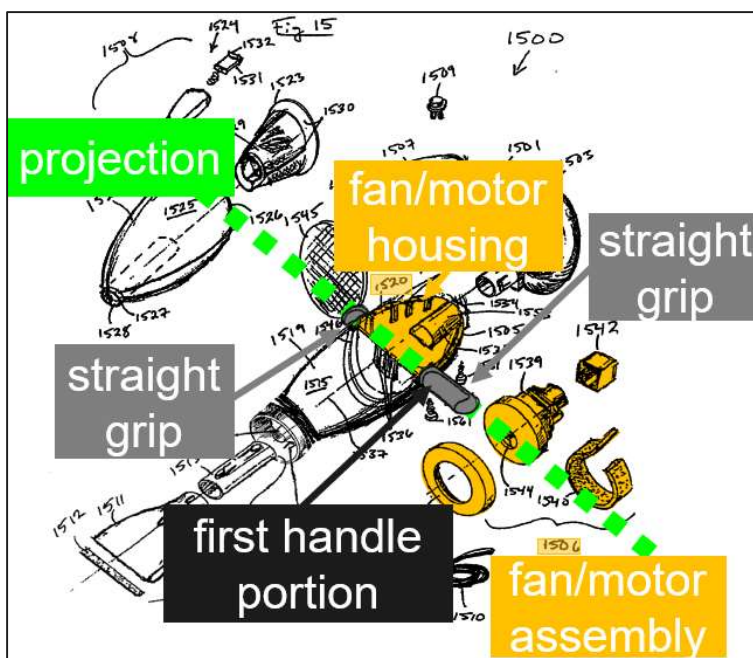


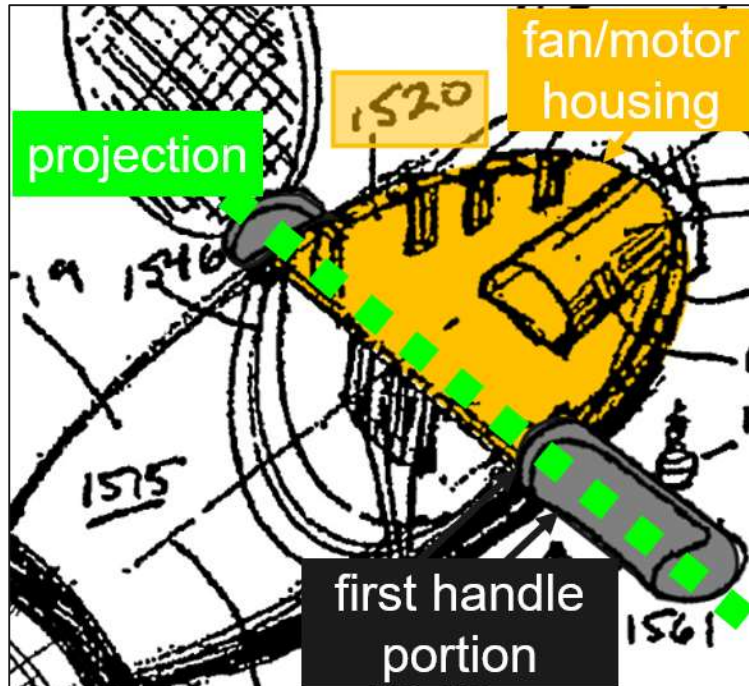
Ex1005, Fig. 5; Ex1002 ¶162.





Ex1005, Figs. 15, 2A(modified); Ex1002 ¶162.



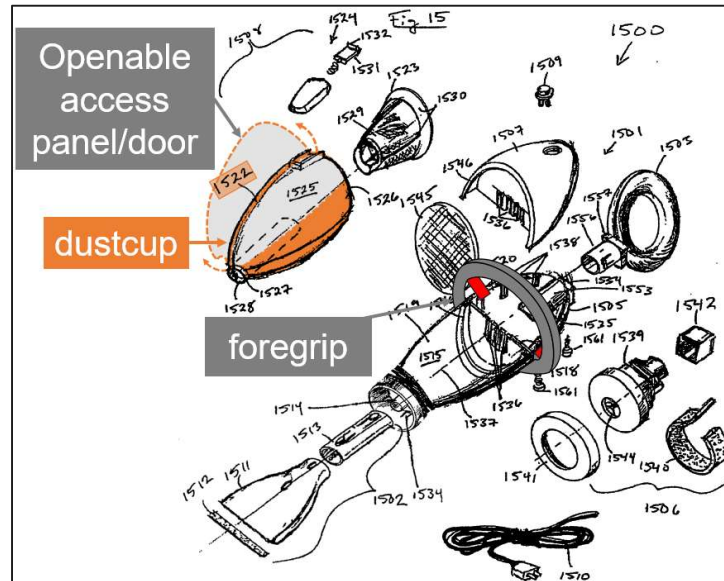


Ex1005, Figs. 15, 3(modified); Ex1002 ¶162.

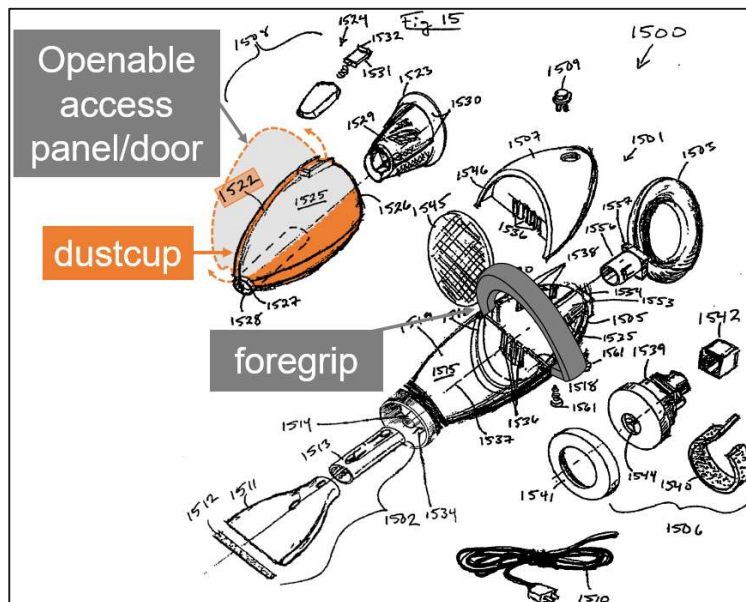
m. [1h3]/[14h3]

Butler teaches these limitations. Ex1002 ¶¶163-165. Butler teaches and renders obvious an openable pre-motor filter housing (“**dustcup 1522**”/“**dirt receptacle 214**” having an “access panel or door”) ([1d2]/[14d2]), and a cyclone chamber (“**dustcup 1522**”/“**dirt receptacle 214**”’s “cyclon[e/ic]” “separation chamber”), ([1c]/[14c]). Butler teaches that, in each of Figure 15’s handle configurations described in [1h1]/[14h1], the handle is at a position of the suction motor. A POSA would have recognized that, in each of Figure 15’s handle configurations described in [1h1]/[14h1], Butler’s pre-motor filter housing is openable without moving the handle with respect to the cyclone chamber at least

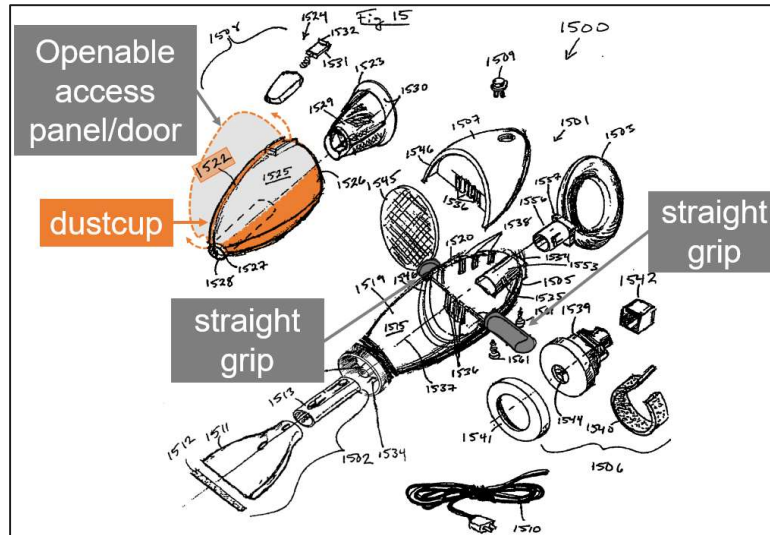
because Butler's handle is at a position of the suction motor, not the pre-motor filter housing:



Ex1005, Figs. 15, 5(modified); Ex1002 ¶¶164-165.



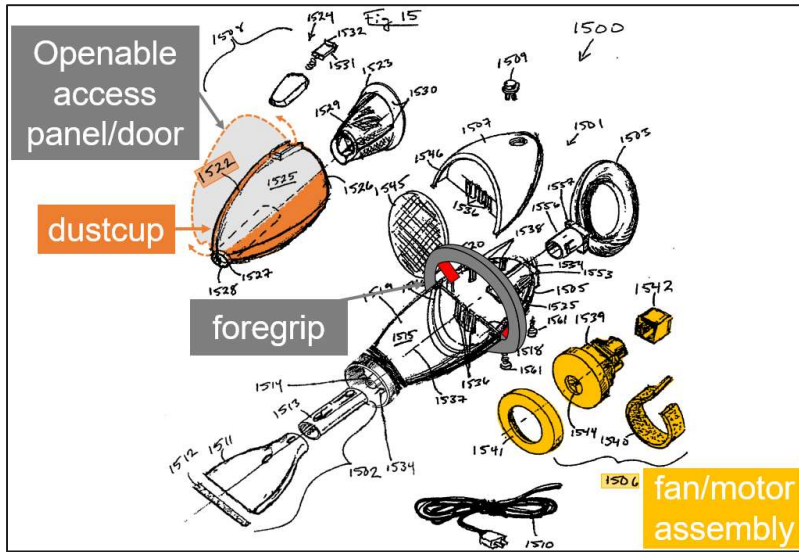
Ex1005, Figs. 15, 2A(modified); Ex1002 ¶¶164-165.



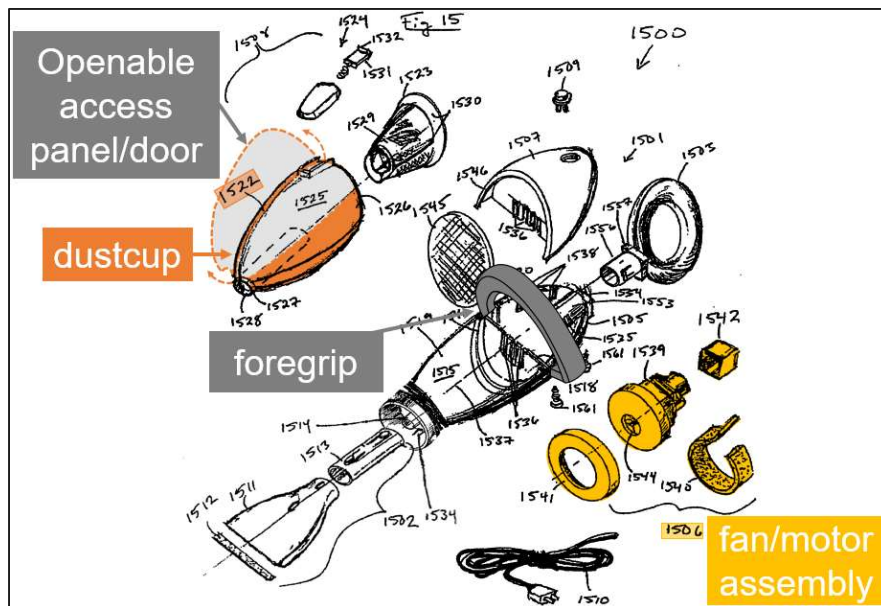
Ex1005, Figs. 15, 3(modified); *see also id.*, Figs. 2A, 2C, 3, 16; Ex1002 ¶¶164-165.

n. [1h4]/[14h4]

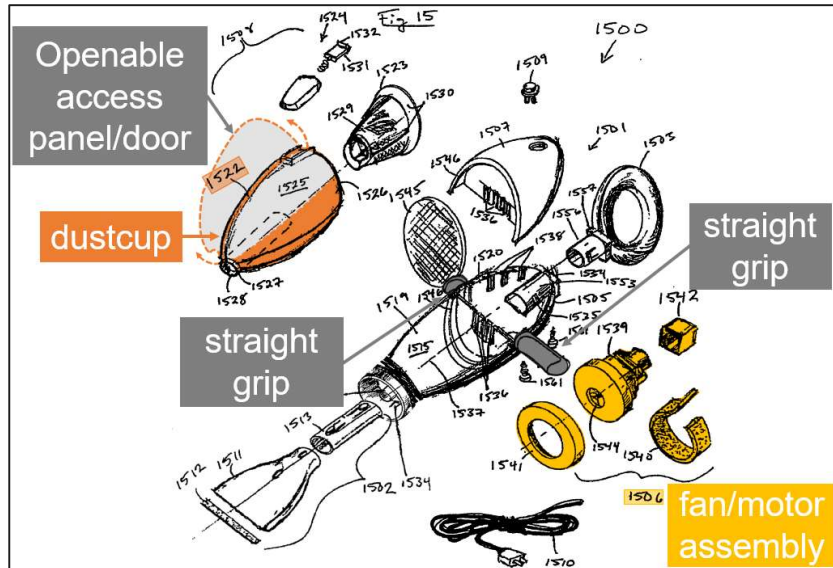
Butler teaches these limitations. Ex1002 ¶¶166-169. Butler's pre-motor filter housing cover (“**dustcup 1522**”/“**dirt receptacle 214**”’s “access panel or door”) is openable while the cyclone bin assembly (“**dustcup assembly 1508**”/“**dirt receptacle 214**”) is in fluid flow communication with the suction motor (“**fan/motor assembly**”): Butler’s “access panel or door” is opened without blocking an airway, removing the cyclone bin assembly, or removing the suction motor:



Ex1005, Figs. 15, 5(modified); Ex1002 ¶168.



Ex1005, Fig. 15, 2A(modified); Ex1002 ¶168.

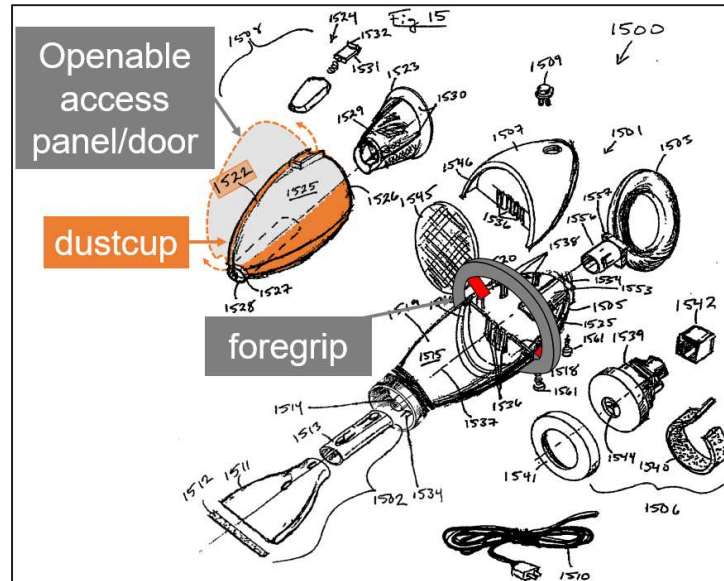


Ex1005, Figs. 15, 3(modified); Ex1002 ¶168.

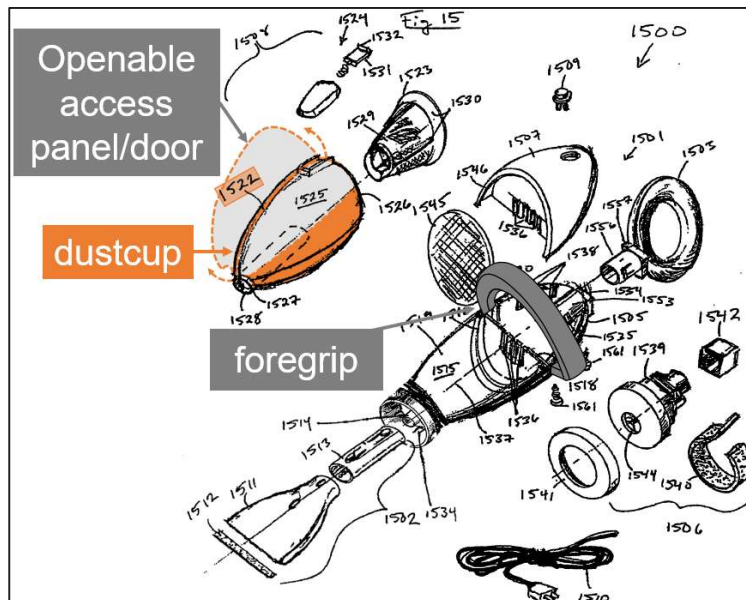
Because the cyclone chamber is contained within the cyclone bin assembly ([1c]/[14c]), a POSA would have understood the cyclone chamber is in fluid flow communication with the suction motor for the same reasons. Ex1002 ¶169.

o. [14h5]

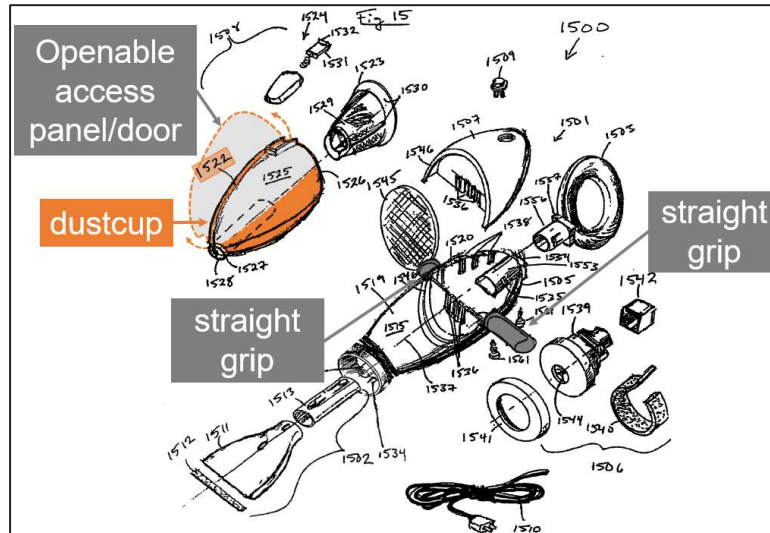
Butler teaches this limitation. Ex1002 ¶¶170-171. Butler's handle connects to the vacuum at a first and second location ([1h2]/[14h2]), which are provided other than on the openable pre-motor filter housing cover (“**dustcup 1522**”/“**dirt receptacle 214**”’s “access panel or door” ([1h2]/[14h2])):



Ex1005, Figs. 15, 5(modified); Ex1002 ¶171.



Ex1005, Figs. 15, 2A(modified); Ex1002 ¶171.



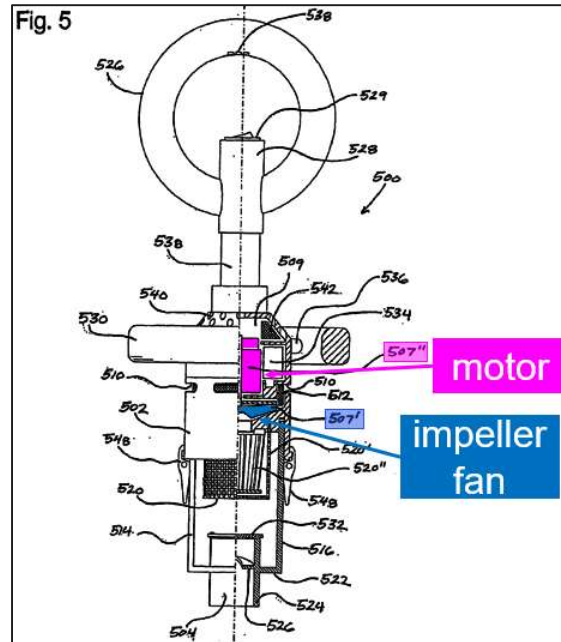
Ex1005, Figs. 15, 3(modified); Ex1002 ¶171.

3. [2]/[15]

Butler renders claims 1 and 14 obvious and teaches the additional limitations of these claims. Ex1002 ¶¶172-179.

a. [2a]/[15a]

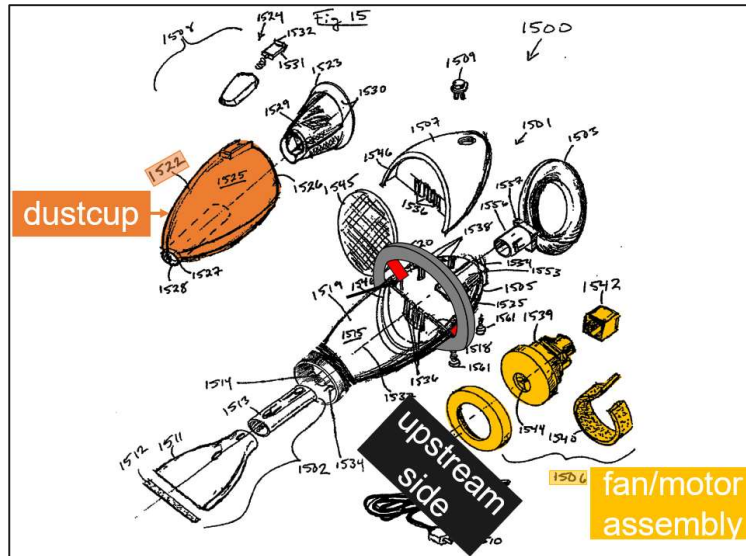
Butler's suction motor (“**fan/motor 507**”) comprises a fan (“**impeller fan 507**”) and a motor (“**motor 507**”):



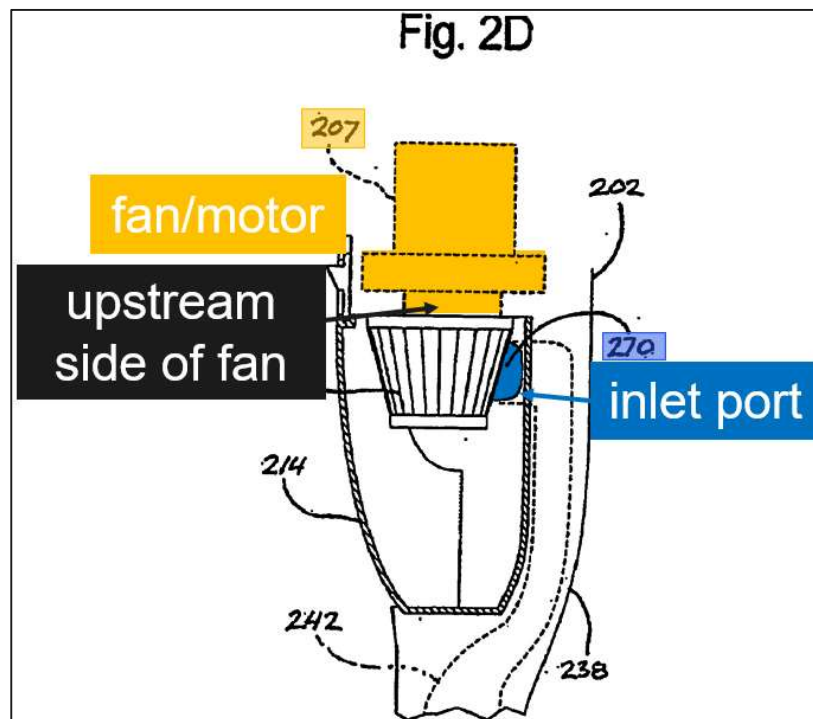
Ex1005, Fig. 5, 20:12-14; *id.*, Abstract (“A vacuum fan and a motor are located within the housing”), Fig. 15; Ex1002 ¶¶173-176.

b. [2b]/[15b]

Butler teaches that an upstream side of the fan is positioned proximate the cyclone inlet. Ex1002 ¶¶177-179. The side of the “**fan/motor assembly**” (which contains the “fan”) nearer the “**dustcup 1522**” is the **upstream side** of the fan, positioned proximate Butler’s cyclone air inlet ([1c]/[14c]):



Ex1005, Figs. 15, 5(modified), 35:14-19; Ex1002 ¶179; *id.*, Fig. 2D (showing upstream side of fan/motor 207 proximate inlet port 270):

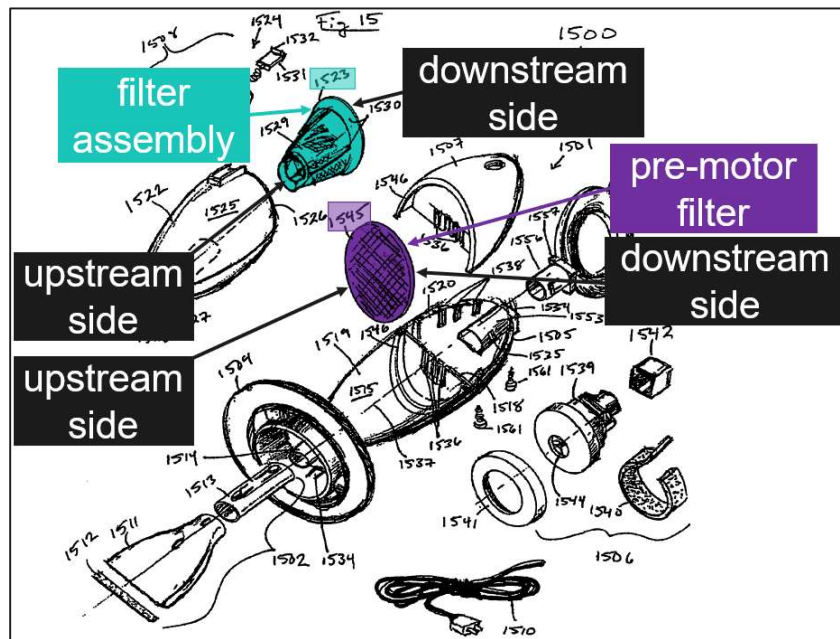


Ex1005, Fig. 2D, 17:26-27, 18:7-10; Ex1002 ¶179.

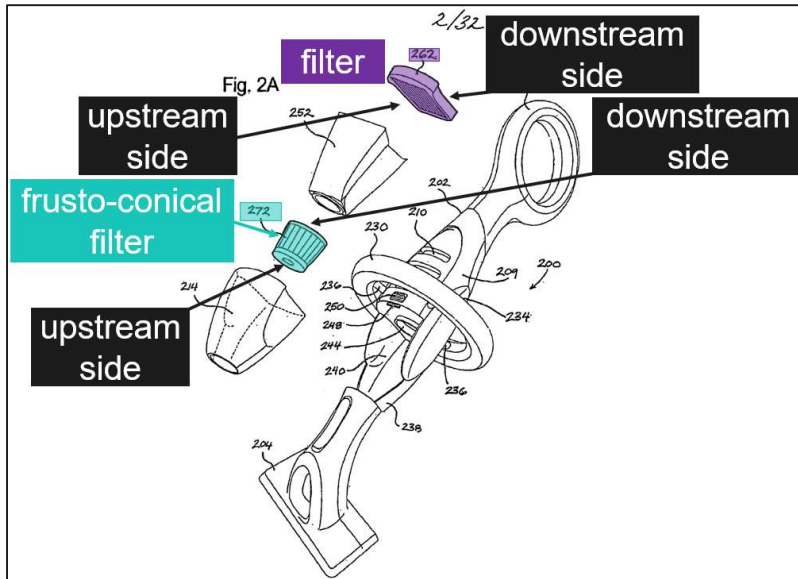
4. [3]/[16]

Butler renders claims 1 and 14 obvious and teaches the additional limitations of these claims. Ex1002 ¶¶180-183.

The **downstream side** of each of Butler's pre-motor filters is spaced further from the cyclone chamber than the pre-motor filter's **upstream side**:



Ex1005, Fig. 15, 35:14-19; Ex1002 ¶¶183.

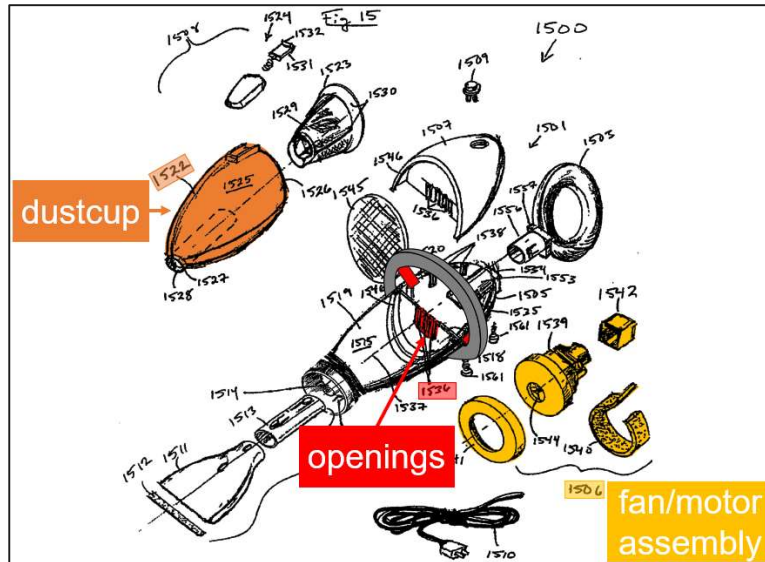


Ex1005, Fig. 2A, 17:17-18 (“a **filter 262** is positioned in the top of the dirt receptacle to filter air passing therethrough”), 18:10-12 (“**filter 272** is located over the fan/motor inlet opening 244”); *id.* Figs. 2C-2D; Ex1002 ¶183.

5. [4]/[17]

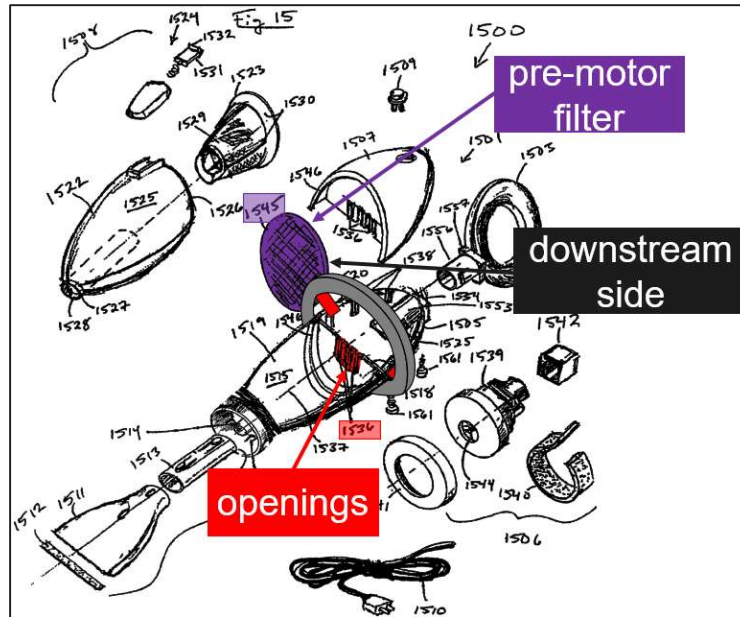
Butler renders obvious claims 3 and 14 and teaches and renders obvious the remaining limitations of these claims. Ex1002 ¶¶184-192.

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



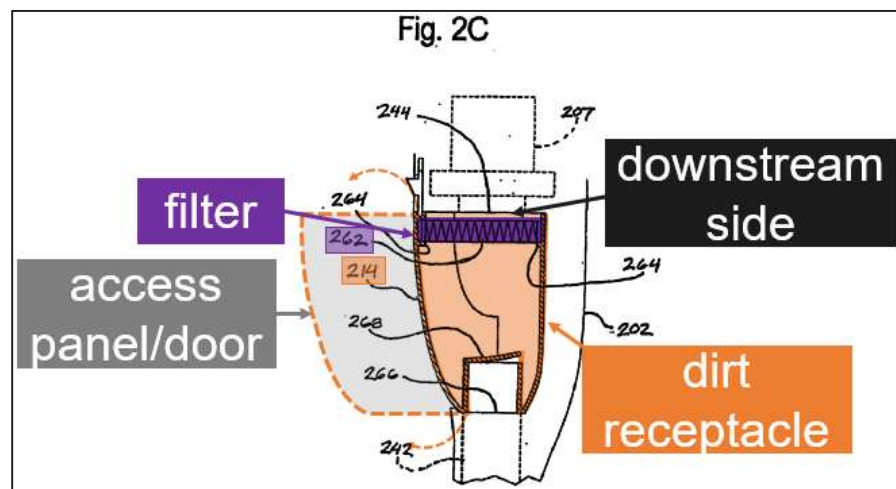
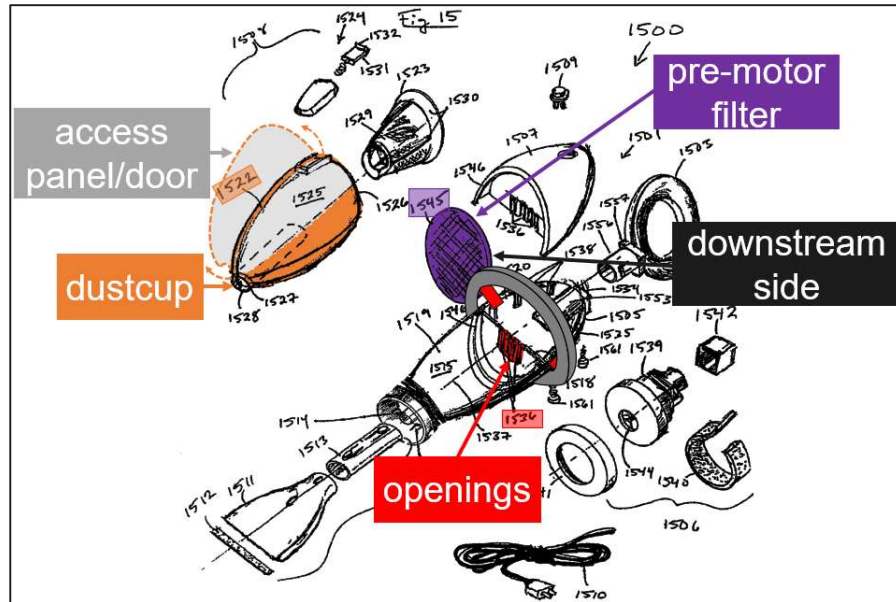
Ex1005, 35:14-20, Figs. 15, 5(modified); *id.*, Figs. 2A, 2C; Ex1002 ¶¶186-188. A POSA would have understood the bounded airflow path through “**openings 1536**” is a downstream header because it channels air downstream of Butler’s pre-motor filter. Ex1002 ¶189.

Butler’s downstream header is on the downstream side of the pre-motor filter: “[P]re-motor filter...cover[s] the vent **opening 1536**”:



Ex1005, Figs. 15, 5(modified), 35:20-22 (“**pre-motor filter**...[is] in front of the **opening 1536**”); Ex1002 ¶190.

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**), where the downstream header is positioned:



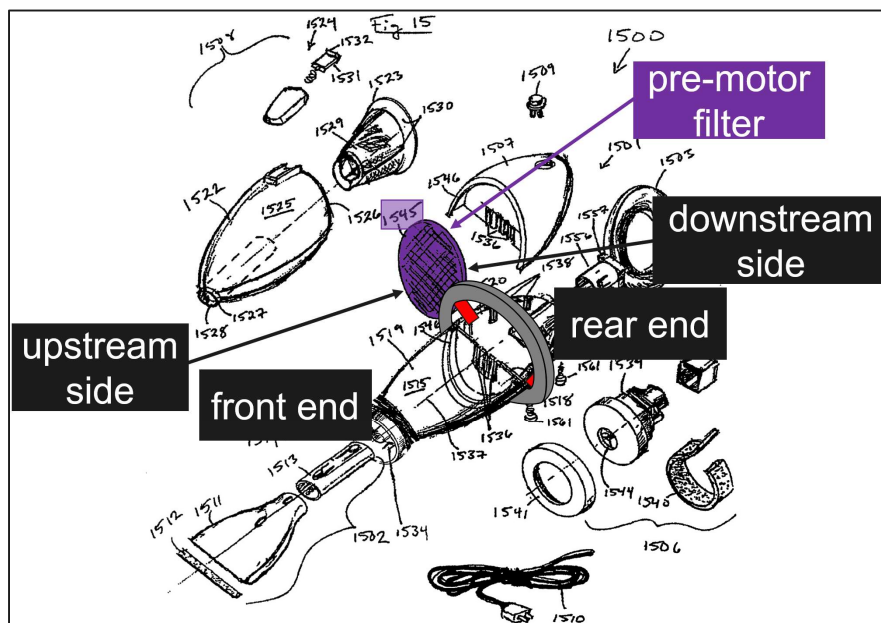
Ex1005, Figs. 15, 5(modified), 2C(modified); Ex1002 ¶191. When the openable cover is opened, the downstream header is opened. Ex1002 ¶192.

6. [8]/[21]

Butler renders claims 1 and 14 obvious and teaches the additional limitations of these claims. Ex1002 ¶¶193-207.

a. [8a]/[21a]

Butler teaches these limitations. Ex1002 ¶¶194-198. The **upstream side** and **downstream side** of Butler’s pre-motor filter each has a **front end** positioned proximate the **front end** and extending rearwardly. Ex1002 ¶¶196-197. Because Butler’s “**pre-motor filter 1545**” is three dimensional and has a thickness, both its **upstream side** and its **downstream side** ([1d1]/[14d1]) have a **front end**:

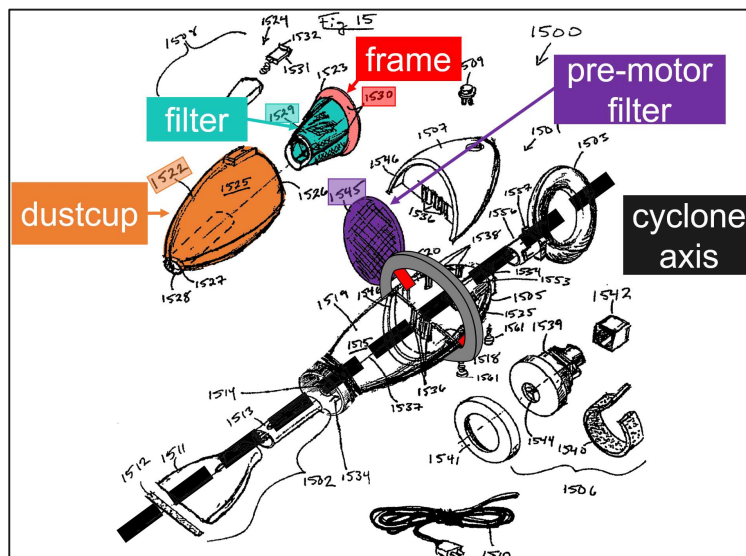


Ex1005, Figs. 15, 5(modified); Ex1002 ¶197. As a POSA would have understood, the **front ends** of the **upstream** and **downstream sides** of Butler’s “**pre-motor filter 1545**” are positioned proximate the **front end** of the hand vacuum (at least because they are positioned on the end of the side that is closest to the hand vacuum’s **front end**) and they extend rearwardly (towards the hand vacuum’s **rear end**). Ex1002 ¶198.

b. [8b]/[21b]

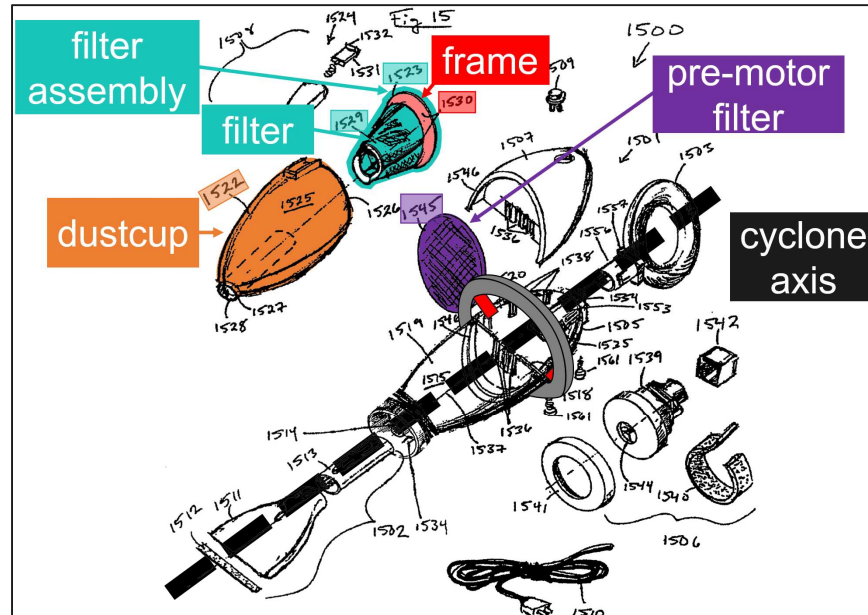
Butler teaches these limitations. Ex1002 ¶¶199-204.

Butler's pre-motor filter is positioned axially outwardly from the second end of the cyclone chamber and downstream of the cyclone chamber. Ex1002 ¶¶199-204. In Figure 15, Butler's "pre-motor filter 1545" is positioned axially outwardly from the second end of the cyclone chamber (the airflow interface at filter 1529). Ex1005, Fig. 15; Ex1002 ¶200. 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, ([1c]/[14c])) along the cyclone axis by the width of frame 1530. Ex1005; Ex1002 ¶200. Thus, pre-motor filter 1545 is positioned axially outwardly, along the cyclone axis, from filter 1529:



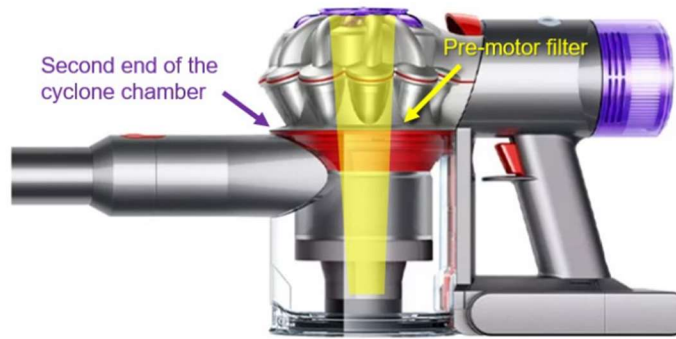
Ex1005, Figs. 15, 5(modified); Ex1002 ¶200. As shown above, Butler’s “**pre-motor filter 1545**” is positioned downstream of Butler’s cyclone chamber (**dustcup 1522**). Ex1002 ¶¶200-201.

Also, in Figure 15, Butler’s pre-motor “**filter assembly 1523**” is positioned axially outwardly from the second end of the cyclone chamber (the airflow interface at **filter 1529**) because it is displaced, along the **cyclone axis**, from the second end of the cyclone chamber by the width of “**frame 1530**”:



Ex1005, Figs. 15, 5(modified); Ex1002 ¶202. As shown above, Butler’s “**filter assembly 1523**” is positioned downstream of Butler’s cyclone chamber (cyclonic-separation chamber of **dustcup 1522**). Ex1002 ¶¶202-203.

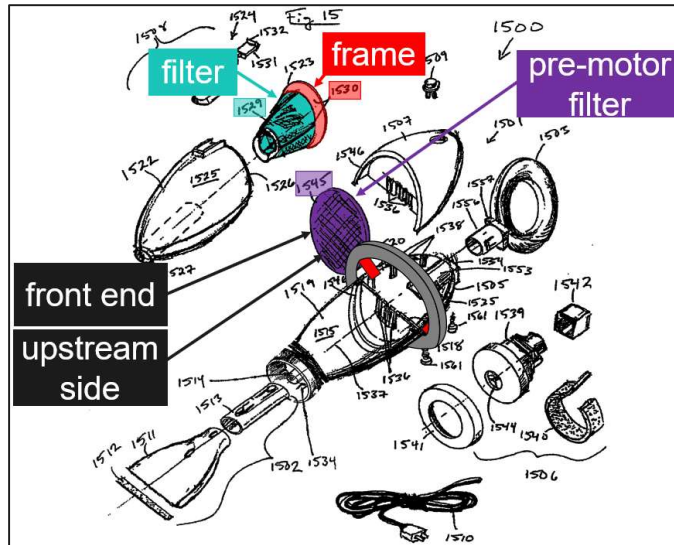
This is at least as much disclosure as PO has accused of infringement with respect to identical limitations in claim 9:

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)
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Ex1016, 25(annotations PO's); Ex1002 ¶204.

c. [8c]/[21c]

Butler teaches these limitations. Ex1002 ¶¶205-207. Butler teaches that the cyclone air outlet (airflow interface at **filter 1529**) is positioned at a location spaced from the **front end** of **pre-motor filter 1545**, because **pre-motor filter 1545** is separated (spaced) from **filter 1529** by the width of **frame 1530**:



Ex1005, 36:5, Figs. 15, 5(modified); Ex1002 ¶206. A POSA would have understood the **front end** of Butler’s “**pre-motor filter 1545**” is at its **upstream side**. Ex1002 ¶207.

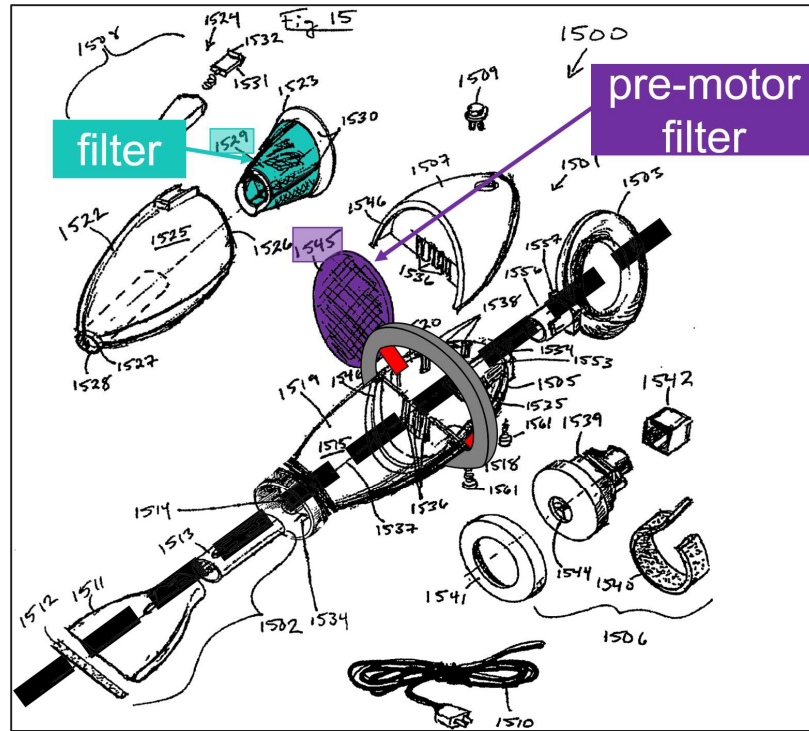
7. [9]

Butler renders claim 1 obvious and teaches the additional limitations of this claim. Ex1002 ¶¶208-212.

Butler's pre-motor filter is positioned axially outwardly from the second end of the cyclone chamber and downstream of the cyclone chamber ([8]/[21]).

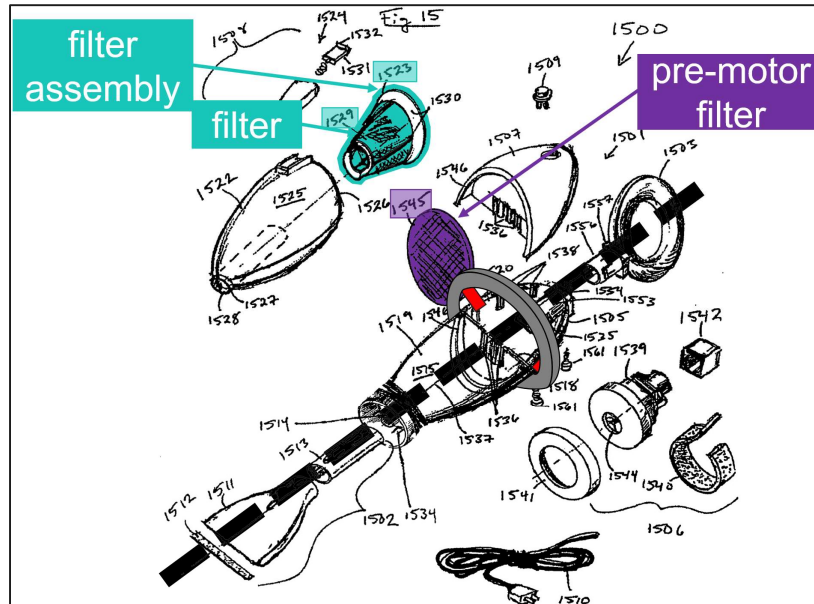
Ex1002¶209.

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**:



Ex1005, Figs. 15, 5(modified); Ex1002 ¶¶210-211.

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**:

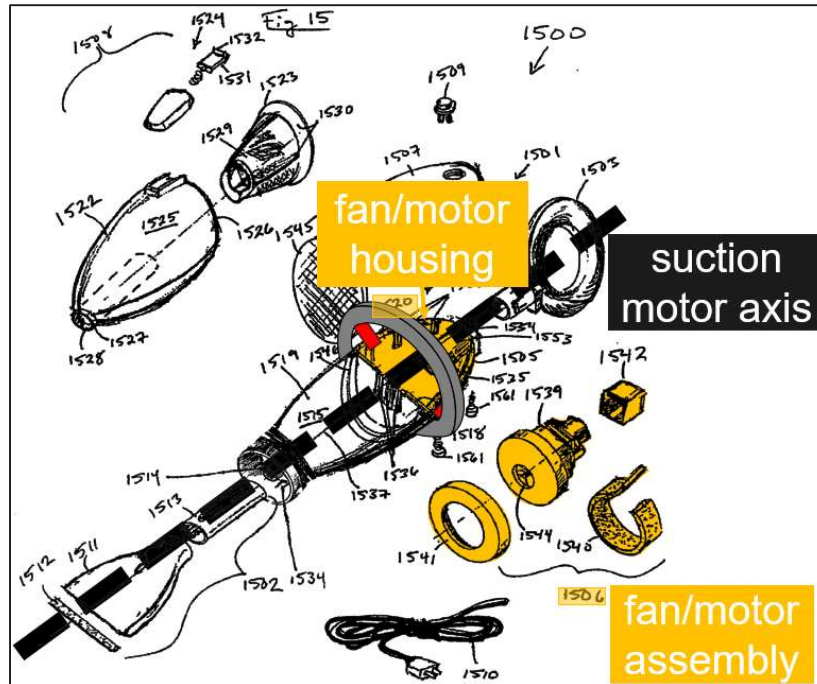


Ex1005, Figs. 15, 5(modified); *id.*, 36:5-7; Ex1002 ¶212.

8. [10]/[22]

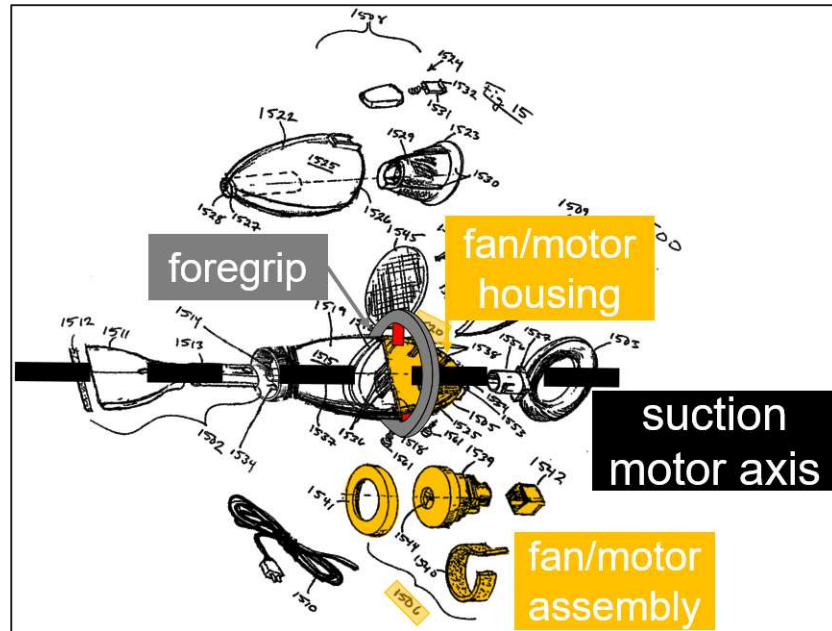
Butler renders claims 1 and 14 obvious and teaches the additional limitations of these claims. Ex1002 ¶¶213-217.

Butler's suction motor (**fan/motor assembly** housed in the **fan/motor housing**, ([1e]/[14e])) has a **suction motor axis**:

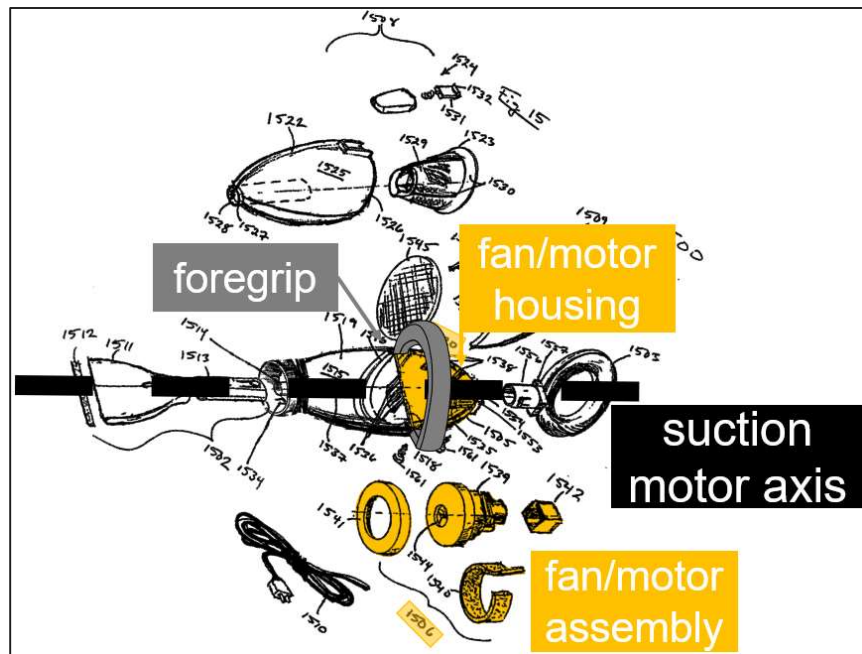


Ex1005, Figs. 15, 5(modified), 35:14-15; Ex1002 ¶¶215-216.

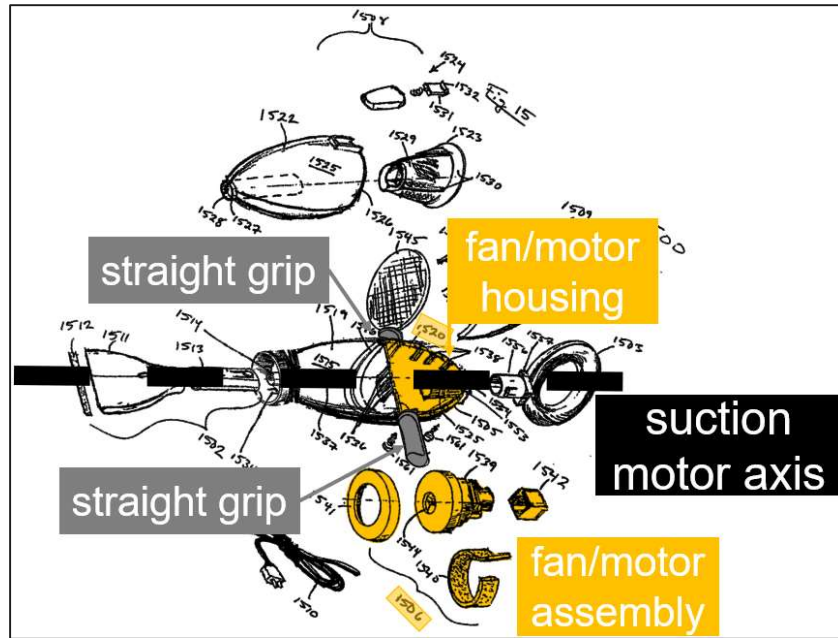
In each of Figure 15's handle configurations ([1h1]/[14h1]), the **suction motor axis** extends generally horizontally when the hand vacuum is carried by the handle, particularly when Butler's vacuum is oriented for "vertical cleaning" and "cleaning vertical surfaces" (Ex1005, 13:31-14:3, 29:1-5):



Ex1005, Figs. 15, 5(modified); Ex1002 ¶217.



Ex1005, Figs. 15, 2A(modified), Fig. 2A; Ex1002 ¶217.

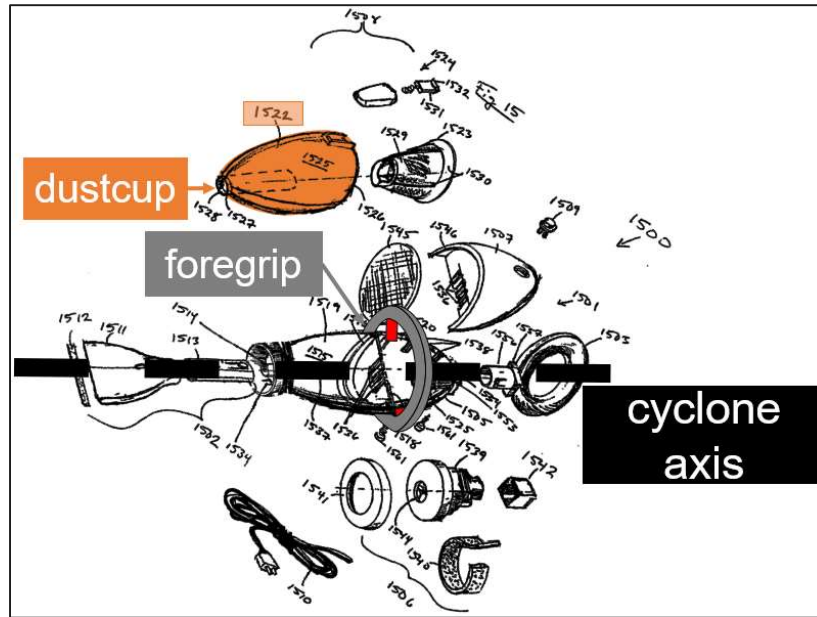


Ex1005, Figs. 15, 3(modified), Fig. 3; Ex1002 ¶217.

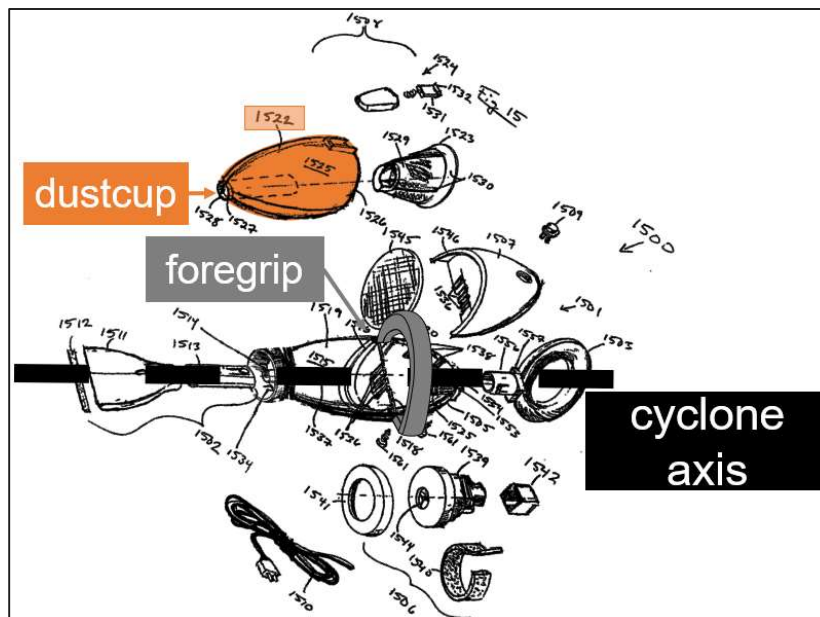
9. [11]/[12]/[23]/[24]

Butler renders claims 1, 10, 14, and 22 obvious and teaches the additional limitations of these claims. Ex1002 ¶¶218-223.

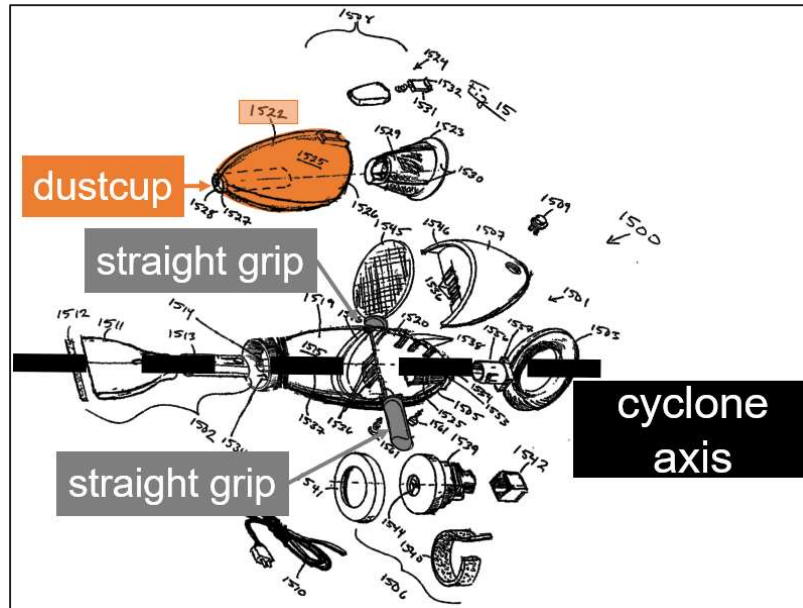
Butler teaches a **cyclone axis** ([1c]/[14c]). In each of Figure 15's handle configurations ([1h1]/[14h1]), Butler's **cyclone axis** extends generally horizontally when the vacuum cleaner is carried by the handle, particularly when Butler's vacuum is oriented for "vertical cleaning" and "cleaning vertical surfaces" (Ex1005, 13:31-14:3, 29:1-5):



Ex1005, Figs. 15, 5(modified), Fig. 5; Ex1002 ¶¶222-223.



Ex1005, Figs. 15, 2A(modified), Fig. 2A; Ex1002 ¶¶222-223.



Ex1005, Figs. 15, 3(modified), Fig. 3; Ex1002 ¶¶222-223.

10. [13]/[25]

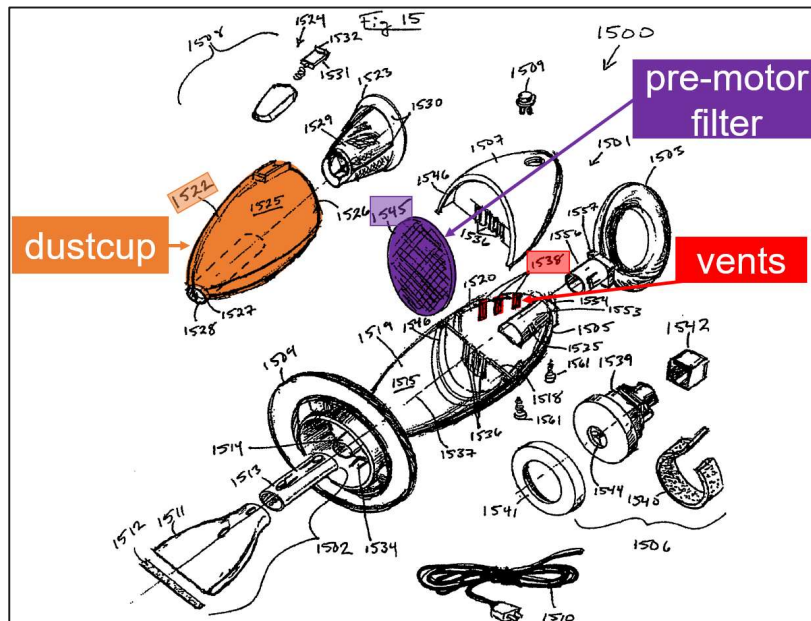
Butler renders claims 1 and 14 obvious and teaches the additional limitations of these claims. Ex1002 ¶¶224-227.

Butler teaches several pre-motor filters ([1d1]), and 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,” each of which are physical filter media. Ex1005, 7:28-8:2; Ex1002 ¶¶226-227.

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

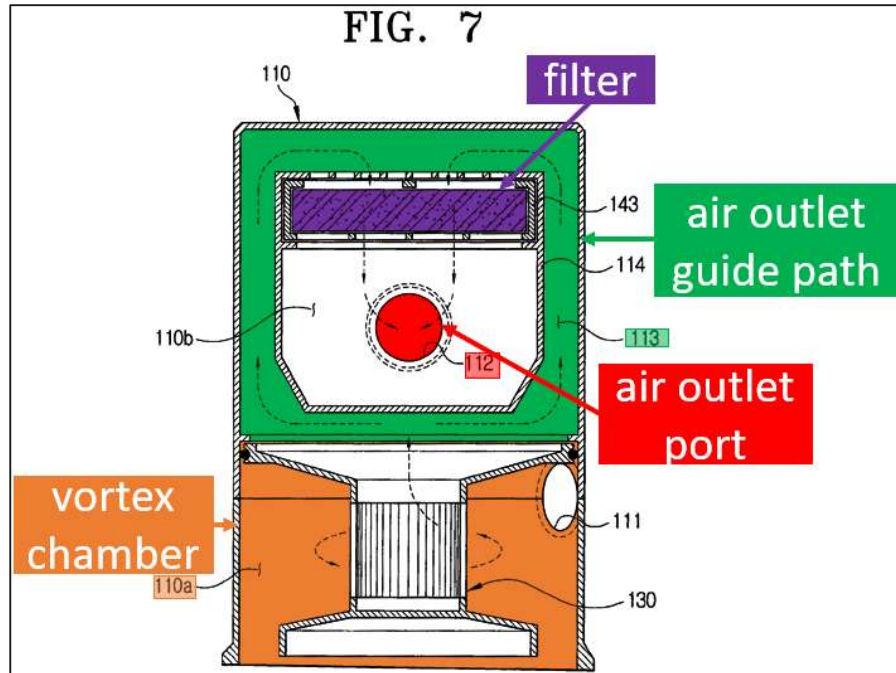
1. Motivation To Combine Butler And Oh

Butler teaches a hand vacuum with a cyclone chamber (**dustcup 1522**), a **pre-motor filter 1545**, a clean air outlet (**vents 1538**), and an airflow path that guides air from the **cyclone chamber**, through the **pre-motor filter**, and out the **vents**:



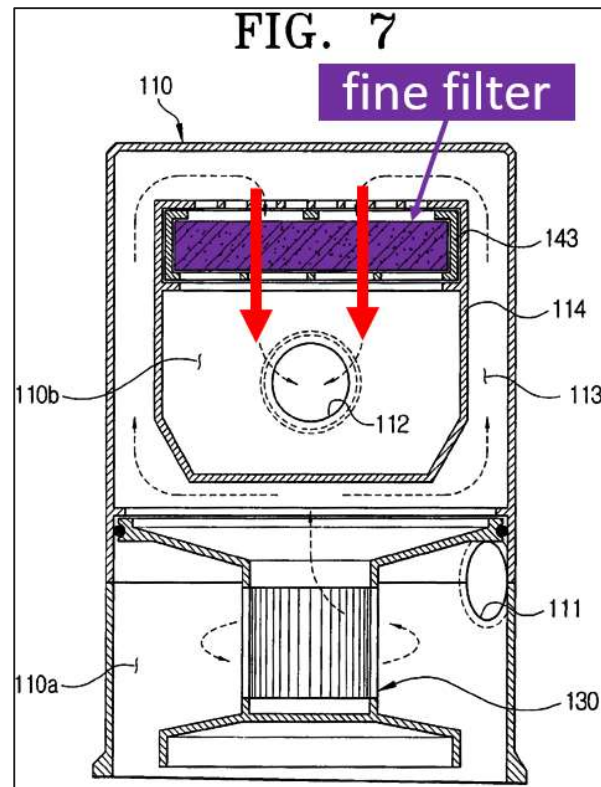
Ex1005, Fig. 15, 36:2-4, 35:20-21, 35:16-20; Ex1002 ¶¶228-229.

Oh also 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**:



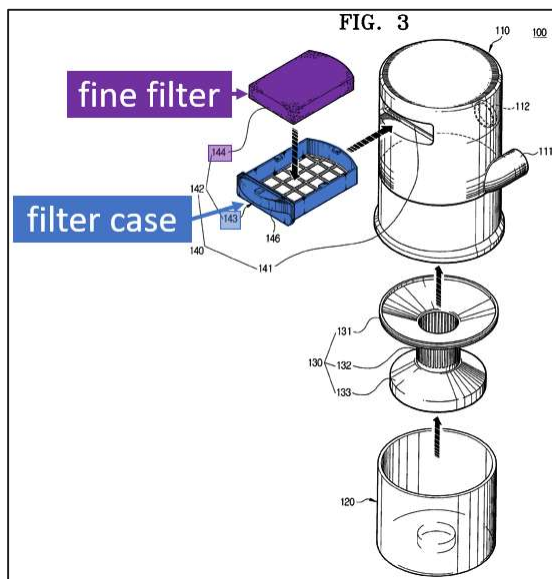
Ex1006, Fig. 7, 6:32-7:7; Ex1002 ¶230. “Clean air...is [] exhausted through the air outlet port 112, the air outlet path 220 of the main body 200 and the motor drive chamber 310 to the outside.” Ex1006, 5:5-11. A POSA would have understood from this disclosure—where Oh’s “filter” is upstream from its “motor drive chamber” in the airflow path—that Oh’s **filter** is a pre-motor filter, and that Oh teaches an airflow path from a cyclone chamber (**vortex chamber**) to the pre-motor **filter** and out an **air outlet port**. Ex1002 ¶¶231-232.

Oh teaches that this 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**”:



Ex1006, 7:17-19, Fig. 7; Ex1002 ¶233. 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.” Ex1006, 7:19-24; Ex1002 ¶234. 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. Ex1006, 7:17-24; Ex1002 ¶234.

Oh’s 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”:



Ex1006, 6:7-9, Fig. 3; Ex1002 ¶235.

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; Ex1002 ¶236.

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.

Ex1002 ¶237. **First**, 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; Ex1002 ¶238. 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 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; Ex1002 ¶238. 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. Ex1002 ¶238. A POSA would have also understood that this filter housing would provide additional support and protection for Butler's pre-motor filter. Ex1002 ¶238.

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). Ex1002 ¶239. 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. Ex1002 ¶239. A POSA would have understood 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). Ex1002 ¶239. 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 Bulter teaches) or by sliding a drawer-style filter case (as Oh teaches). Ex1002 ¶239.

A POSA would have had a reasonable expectation of success. Ex1002 ¶240. 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. Ex1002 ¶240. Similarly, Butler's pre-motor filter "may take any shape or form," "[o]ther [filter] variations will be apparent to those of ordinary skill in the art," and Butler's "pre-motor filter 1545 may be...attached in any known way." Ex1005, 7:28-30, 17:19-25, 35:20-22, 21:24-25. A POSA would have understood a drawer-style filter housing, such as Oh teaches, was a known way for attaching the pre-motor filter. Ex1002 ¶240.

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; Ex1002 ¶241. 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, to find ways to improve the filter-servicing process, and a POSA would have understood 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; Ex1002 ¶241. A POSA would have understood 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). Ex1002 ¶241. 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. Ex1002 ¶241. 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). Ex1002 ¶241.

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. Ex1002 ¶242.

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 simply replacing one pre-motor filter (Butler’s) with another (Oh’s). Ex1002 ¶243.

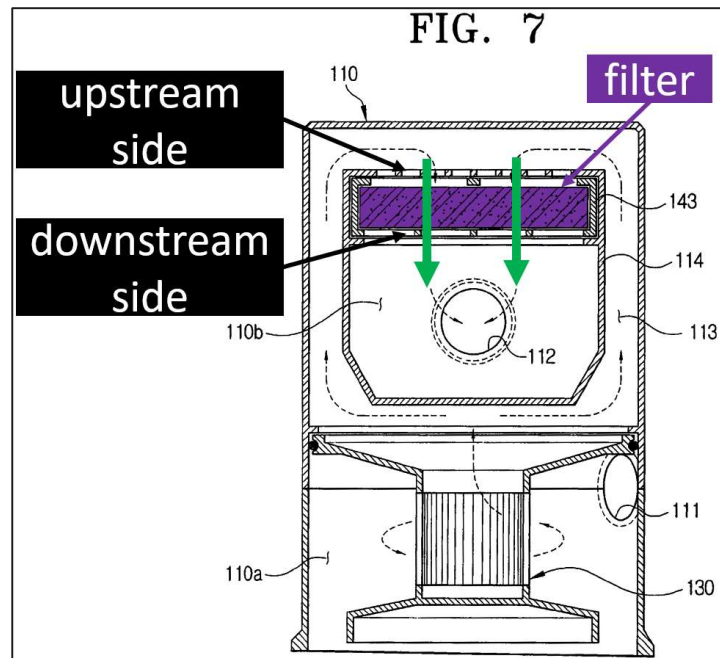
2. [1]/[14]

a. [1pre]/[14pre], [1a]/[14a], [1b]/[14b], [1c]/[14c]

The Butler-Oh combination teaches these limitations for the same reasons Butler does. Ground1, [1pre]/[14pre], [1a]/[14a], [1b]/[14b], [1c]/[14c]; Ex1002 ¶¶244-249.

b. [1d1]/[14d1]

The Butler-Oh combination teaches these limitations. Ex1002 ¶¶250-251. Butler and Oh each teach a pre-motor filter comprising an **upstream side** and a **downstream side**. Ground1, [1d1]/[14d1]; Ex1002 ¶251.

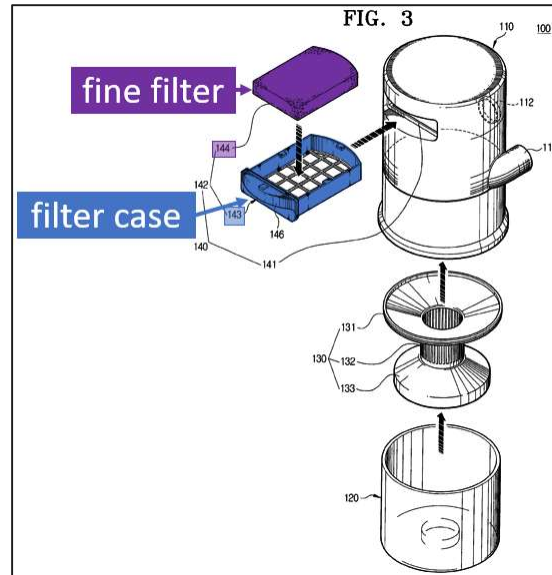


Ex1006, Fig. 7, 6:31-7:7 (“air flows along the air outlet guide path 113...and then flows from the upper portion towards the lower portion of the filter 140”), 6:3-9; Ex1002 ¶251.

c. [1d2]/[14d2]

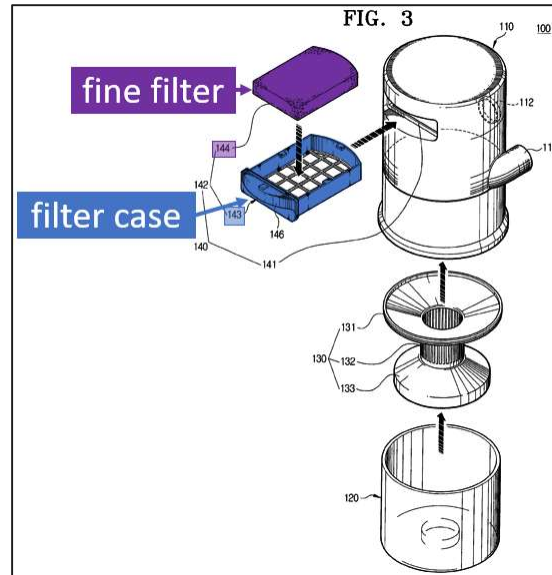
The Butler-Oh combination teaches these limitations. Ex1002 ¶¶252-255.

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; Ex1002 ¶253. A POSA would have understood Oh’s “**filter case 143**” is a pre-motor filter housing because it houses “**filter 144**.” Ex1002 ¶254. When these slidably removable filter-housing teachings are integrated into Butler, the pre-motor filter (Butler’s **pre-motor filter 1545** or Oh’s **filter 144**) is positioned in a pre-motor filter housing (Oh’s **filter case 143**). Ex1005, Fig. 15; Ex1006, Figs. 3, 7; Ex1002 ¶254.

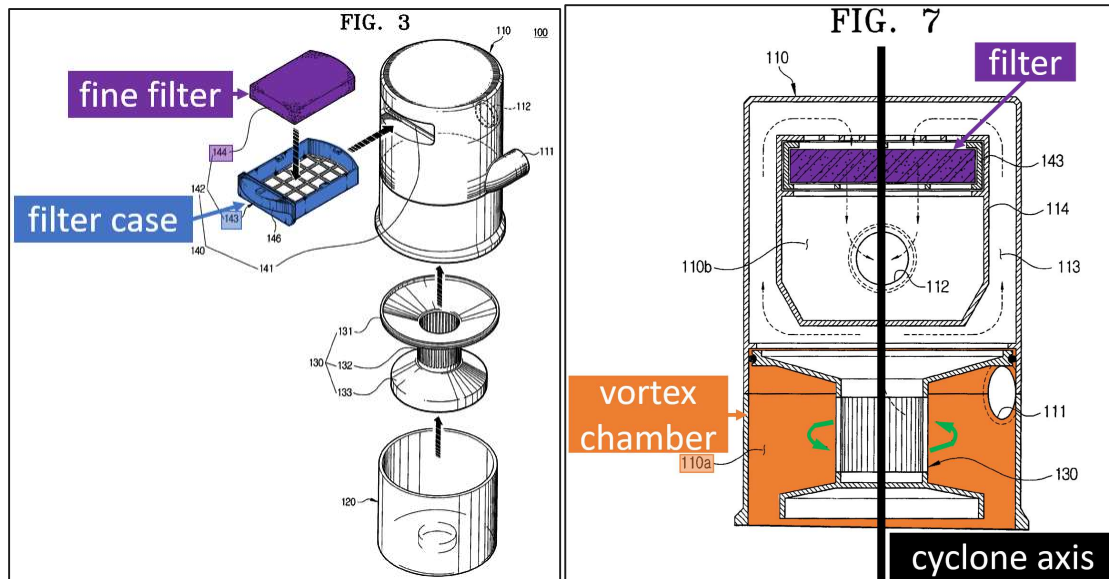
A POSA would have understood the pre-motor filter housing has an openable cover: Oh’s filter assembly 142 (which comprises the pre-motor filter housing, “**filter case 143**”) is “detachably disposed in the manner of a drawer,” which a POSA would understand is openable:



Ex1006, Fig. 3, 6:7-9; Ex1002 ¶255.

d. [1d3]

The Butler-Oh combination teaches these limitations. Ex1002 ¶256. Butler teaches a **cyclone axis**. Ground1, [1c]/[14c]. 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:



Ex1006, Figs. 3, 7, Abstract, 6:7-9; Ex1005, Fig. 15; Ex1002 ¶256.

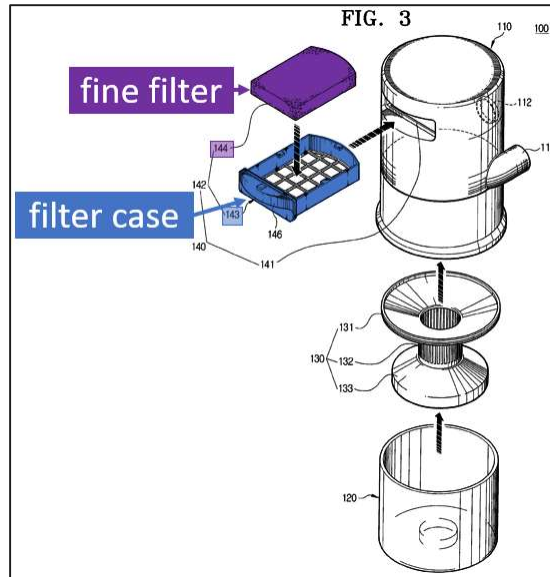
e. **[1e]/[14e], [1f]/[14f], [1g]/[14g], [1h1]/[14h1],**
[1h2]/[14h2]

The Butler-Oh combination teaches these limitations for the same reasons Butler teaches them. Ground1, [1e]/[14e], [1f]/[14f], [1g]/[14g], [1h1]/[14h1], [1h2]/[14h2]; Ex1002 ¶¶257-263.

f. $[1h3]/[14h3]$

The Butler-Oh combination teaches these limitations. Ex1002 ¶¶264-267. 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; Ground1, [1h1]/[14h1]; Ex1002 ¶265.

Oh's “**filter case 143**” is an openable pre-motor filter housing cover that is “detachably disposed, in the manner of a drawer”:



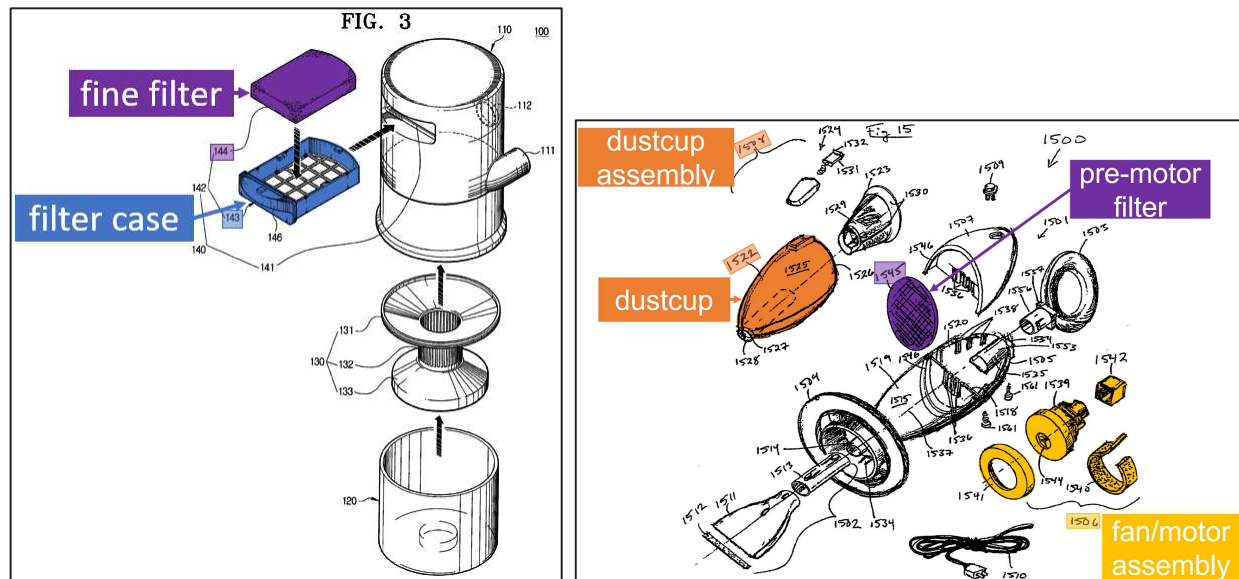
Ex1006, Fig. 3, 6:7-9; Ex1002 ¶266.

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). Ex1005, Figs. 15, 5; Ex1006, Figs. 3, 7; Ground1, [1h3]/[14h3]; Ex1002 ¶267.

g. [1h4]/[14h4]

The Butler-Oh combination teaches these limitations. Ex1002 ¶¶268-271. In the combined teachings of Butler and Oh, the pre-motor filter housing (filter case 143) 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 1506**): 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 this also applies when Butler is modified in view of Oh:



Ex1006, Fig. 3, 6:7-9; Ex1005, Fig. 15; Ex1002 ¶270.

Because the cyclone chamber is contained within the cyclone bin assembly, a POSA would have understood the cyclone chamber is in fluid flow communication with the suction motor for the same reasons. Ex1002 ¶271.

h. [14h5]

The Butler-Oh combination teaches this limitation. Ex1002 ¶¶272-273. Butler teaches this limitation. Ground1, [14h5]. A POSA would have understood 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**), not the pre-motor filter housing cover. Ground1, [14h5]; Ex1002 ¶273. Thus, in the Butler-Oh combination, the first and second locations are provided other than on the openable pre-motor filter housing cover. Ex1002 ¶273.

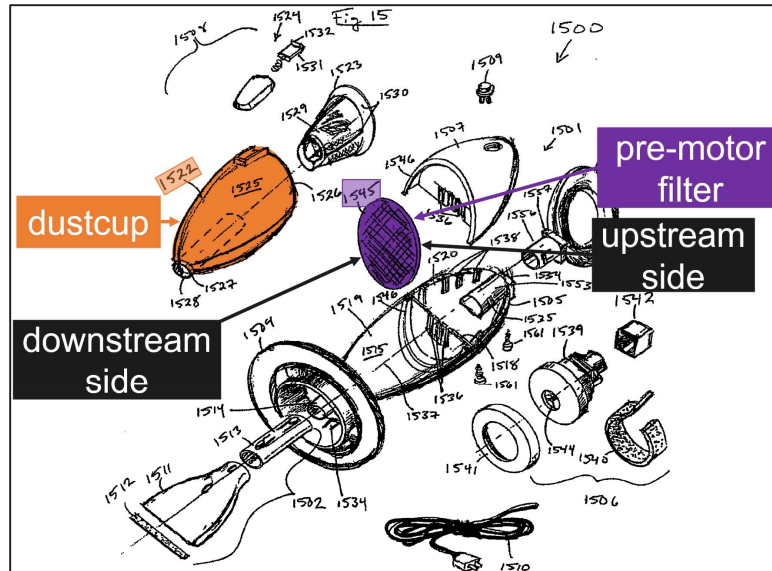
3. [2]/[15]

The combination of Butler and Oh teaches claims 1 and 14 and teaches the additional limitations of these claims for the same reasons Butler does. Ground1, [2]/[15]; Ex1002 ¶¶274-277.

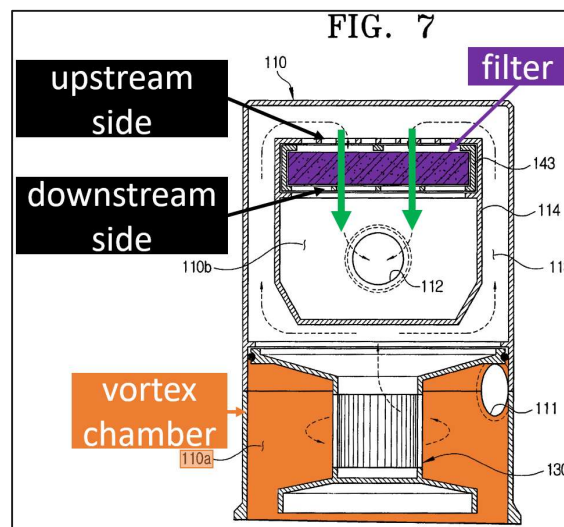
4. [5]/[18]

The Butler-Oh combination teaches claims 1 and 14 and teaches the remaining limitations of these claims. Ex1002 ¶¶278-281.

The Butler-Oh combination has a pre-motor filter with an upstream side and a downstream side. Ground2, [1d1]/[14d1]. The Butler-Oh combination modifies Butler's pre-motor filter to incorporate Oh's top-to-bottom pre-motor filter airflow orientation. Thus, in the Butler-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**:



Ex1005, Fig. 15; Ex1002 ¶¶280-281.

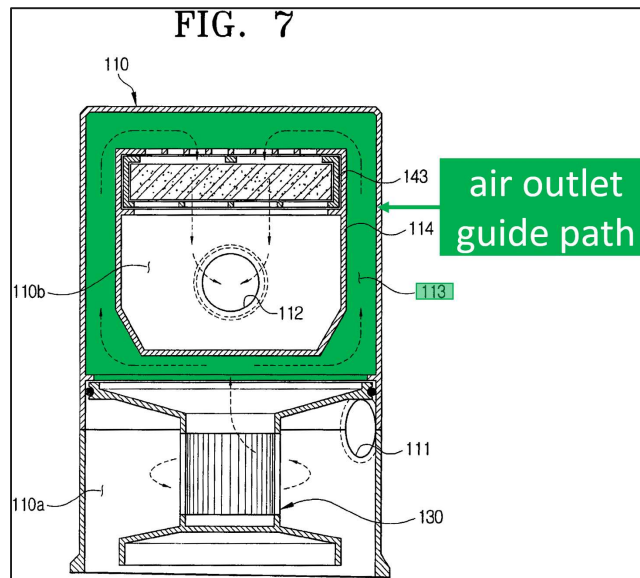


Ex1006, Fig. 7; Ex1002 ¶¶280-281.

5. [7]/[20]

The Butler-Oh combination teaches claims 5 and 18 and teaches the additional limitations of these claims. Ex1002 ¶¶282-288.

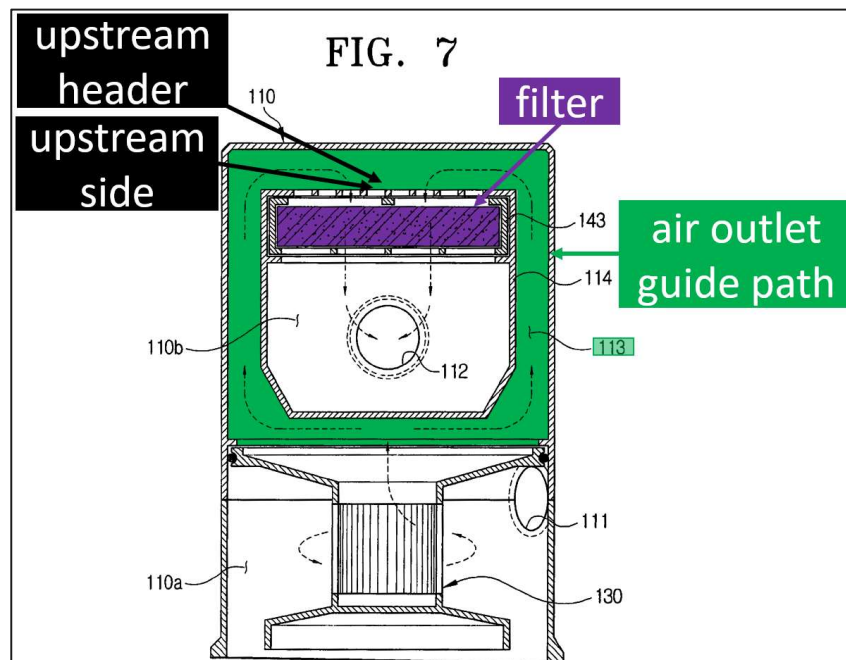
Oh teaches an “**air outlet guide path 113**”:



Ex1006, 7:1-7, Fig. 7; Ex1002 ¶285.

A POSA would have understood Oh's **air outlet guide path 113** is a bounded airflow path that comprises an upstream header. Ex1002 ¶286.

The **upstream header** is on the **upstream side** of the **pre-motor filter**:



Ex1006, Fig. 7; Ex1002 ¶287.

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 teachings. Ex1002 ¶288. When combined, 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. Ex1005, Fig. 15; Ex1006, Figs. 3, 7; Ex1002 ¶288.

6. [9]

The Butler-Oh combination teaches claim 5 and teaches the additional limitations of this claim for the same reasons Butler does. Ground1, [9]; Ex1002 ¶¶289-290.

7. [10]/[22]

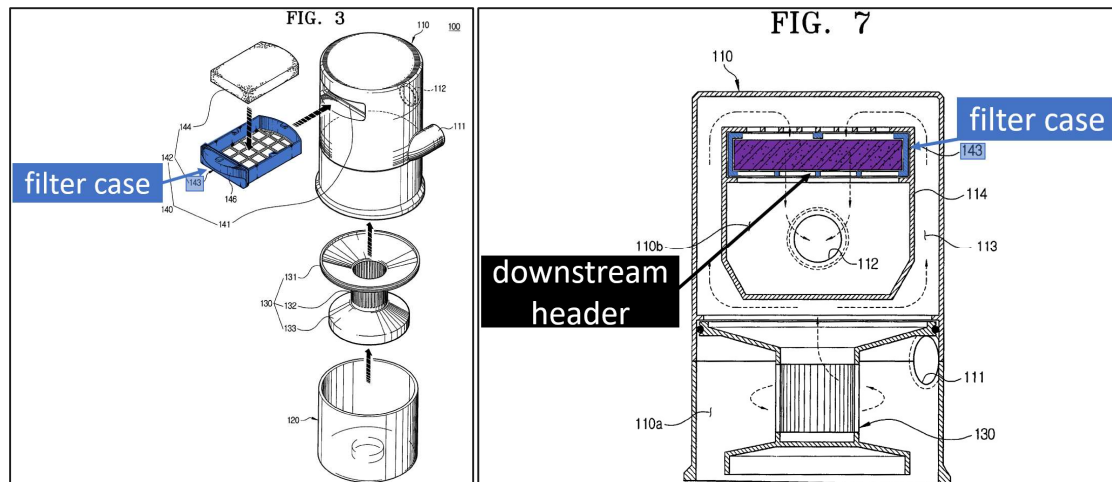
The Butler-Oh combination teaches claims 1 and 14 and teaches the additional limitations of these claims for the same reasons Butler does. Ground1, [10]/[22]; Ex1002 ¶¶291-292.

8. [11]/[12]/[23]/[24]

The Butler-Oh combination teaches claims 1, 10, 14, and 22 and teaches the additional limitations of these claims for the same reasons Butler does. Ground1, [11]/[12]/[23]/[24]; Ex1002 ¶¶293-298.

9. [13]/[25]

The Butler-Oh combination teaches claims 1 and 14 and teaches the additional limitations of these claims for the same reasons Butler does. Ground1,



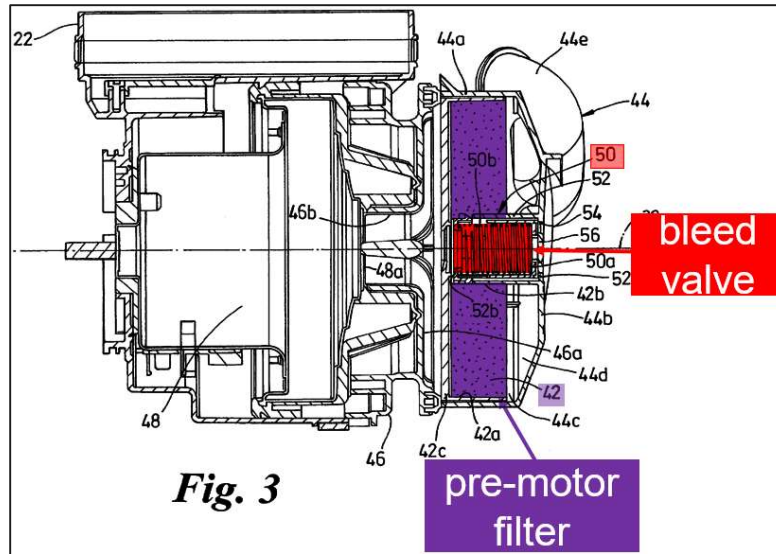
Ex1006, Figs. 3, 7; Ex1002 ¶303.

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. Ex1002 ¶304.

C. Ground 3: Butler And Oh And Organ Renders Claims 6 And 19 Obvious.

1. Motivation To Combine Butler, Oh, And Organ

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**":



Ex1007, Abstract, Fig. 3; Ex1002 ¶¶305-306. Organ's **bleed valve** remains closed when the **filter** is operational but opens when the **filter** is blocked. Ex1007, Abstract, 7, 8; Ex1002 ¶307.

A POSA would have been motivated to incorporate Organ’s pre-motor filter “**bleed valve**” with Butler as modified by Oh 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; Ex1002 ¶308. This modification would have involved using a known technique (a bleed valve) 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. Ex1002 ¶309. 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. Ex1002 ¶309.

1. [6]/[19]

The Butler-Oh combination renders claims 5 and 18 obvious and the Butler-Oh-Organ combination teaches the additional limitations of these claims. Ex1002 ¶¶310-314.

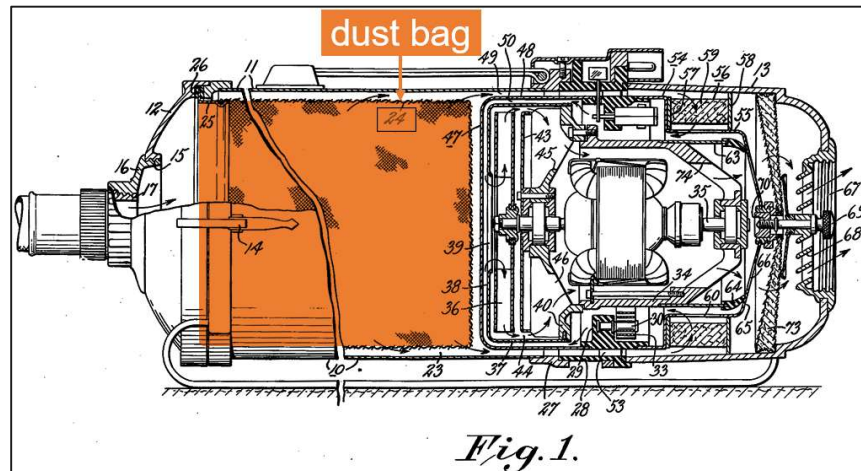
Organ teaches a “**bleed valve**,” which a POSA would have understood is a conduit because air passes through it. Ex1007, Abstract, Fig. 7; Ex1002 ¶¶312-313. In the Butler-Oh-Organ combination, the **bleed valve** extends through the pre-motor filter. Ex1002 ¶314.

A POSA would have understood 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 **air outlet guide path** to the **filter** and the **bleed valve**. Ex1002 ¶314. A POSA would have understood the **bleed valve** extends through the pre-motor **filter** because Organ teaches that the **bleed valve** “passes through the filter.” Ex1007, Abstract; Ex1002 ¶314.

D. Ground 4: Eriksson-Jons And Martelliere Renders Claims 1–25 Obvious

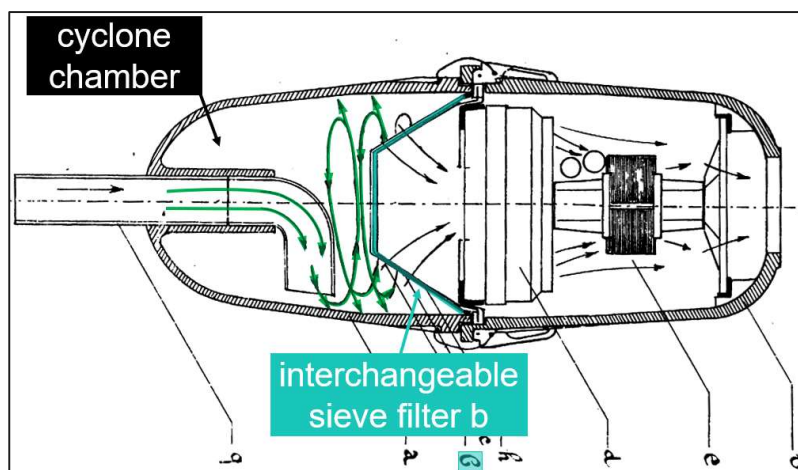
1. Motivation To Combine Eriksson-Jons And Martelliere

Eriksson-Jons teaches a compact vacuum with a “**dust bag 24** or other dust separating member” to separate dust from air:



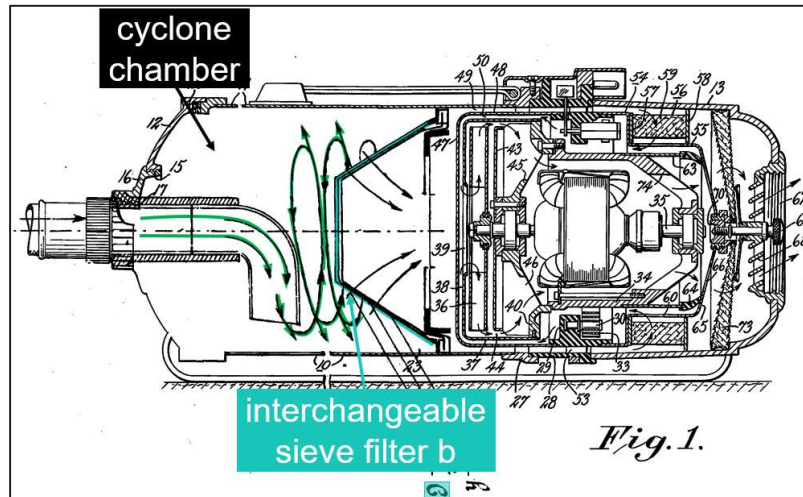
Ex1008, 1(right):19-30, Fig. 1; Ex1002 ¶¶315-316.

Martelliere teaches a compact vacuum with a cyclone chamber—which Martelliere describes as using “the ‘Whirlwind’ principle”—to separate dust from air, which is then further filtered by an “**interchangeable sieve filter b**”:



Ex1010, 1, Fig. 1; Ex1002 ¶317.

A POSA would have been motivated to combine Martelliere’s cyclonic-separation teachings with Eriksson-Jons:

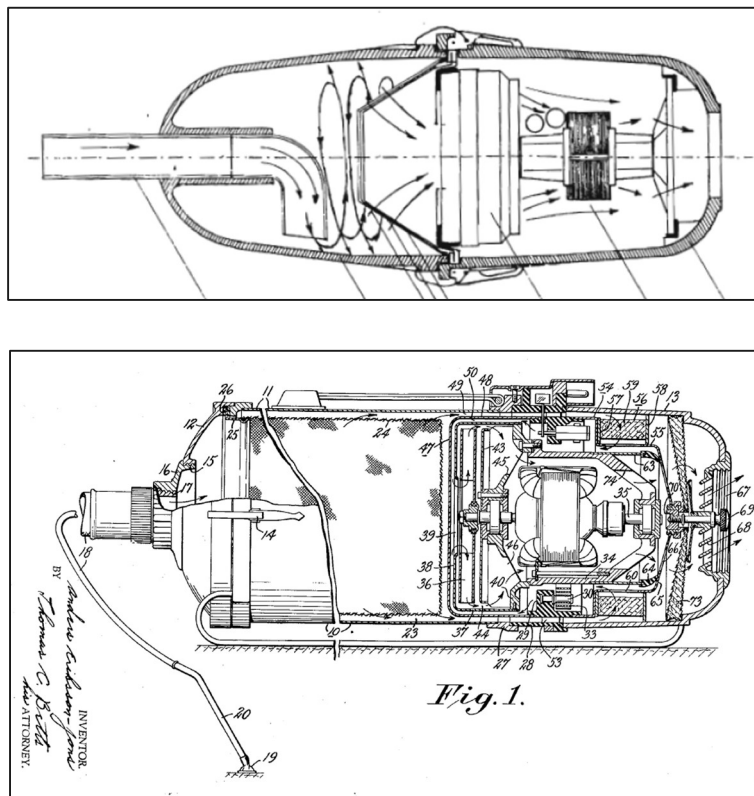


Ex1008, Fig. 1(modified); Ex1010, Fig. 1; Ex1002 ¶318.

A POSA reading Eriksson-Jons—including its teaching that a “**dust bag 24 or other dust separating member**” may be used as an air-filtration unit (Ex1008, 1(right):21-22)—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. Ex1002 ¶319. As Martelliere teaches, “[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. Martelliere and Eriksson-Jons are analogous art—each teach vacuum cleaners with similar layouts. Ex1002 ¶319.

A POSA would have been motivated to make this simple substitution of one known dust-separating element (a dust bag chamber) for another (a cyclone chamber with a filter) to obtain predictable results (dust separation). Ex1002 ¶320. 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:



Ex1010, Fig. 1; Ex1008, Fig. 1; Ex1002 ¶320. These similarities would have further motivated a POSA to combine them. Ex1002 ¶321.

A POSA would have found it obvious to at least try this combination. Ex1002 ¶322. 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. Ex1002 ¶322. It 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, Ex1002 ¶322.

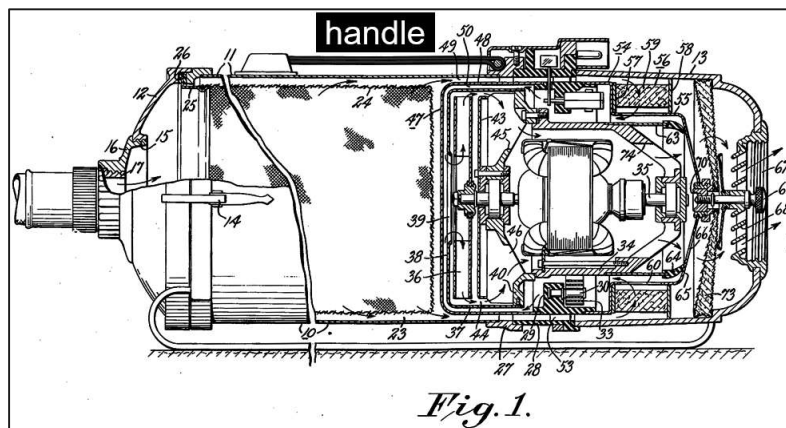
A POSA would have had a reasonable expectation of success incorporating Martelliere’s cyclonic-separator and filter teachings with Eriksson-Jons. Ex1002 ¶323. Eriksson-Jons teaches that its dust-separating unit can be a “dust bag 24 *or other dust separating member,*” and a POSA would have understood such “other dust separating member[s]” include Martelliere’s cyclonic chamber and filter unit. Ex1008, 1(right):21-22; Ex1002 ¶323. A POSA would have had a reasonable expectation of success in making this simple substitution. Ex1002 ¶323.

2. [1]/[14]

a. [1pre]/[14pre]

To the extent the preambles are limiting, the Eriksson-Jons-Martelliere combination teaches them and renders them obvious. Ex1002 ¶¶324-329.

Eriksson-Jons, titled “Vacuum Cleaner,” teaches a hand vacuum having a **handle** by which the entire vacuum may be carried:



Ex1008, Title, Fig. 1; Ex1002 ¶326. Martelliere likewise teaches a hand vacuum: a compact-sized “vacuum cleaner” that is “held vertically or slightly inclined.” Ex1010, 1, Fig. 1. So, too, for their combination. Ex1002 ¶327.

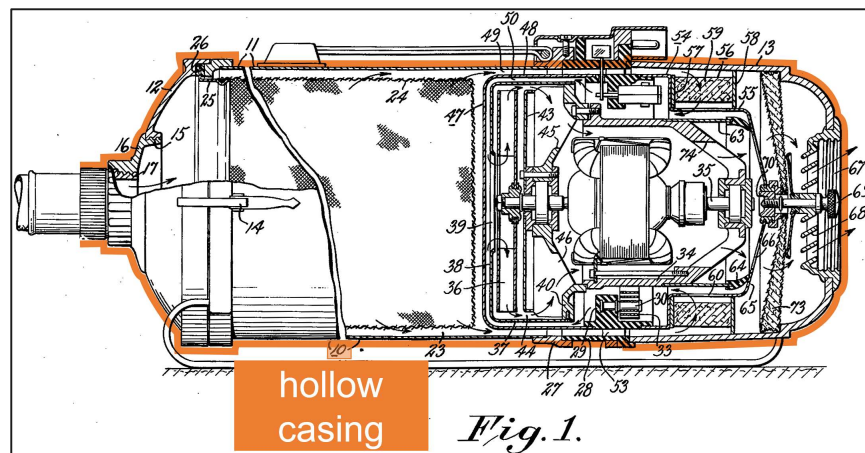
Eriksson-Jons, Martelliere, and their combination also renders a hand vacuum obvious. Ex1002 ¶328. While Eriksson-Jons and Martelliere do not specify particular dimensions, to the extent PO argues they are not hand vacuums, it would have been obvious to decrease their size to increase maneuverability and decrease weight to make them more compact and portable. Ex1002 ¶328.

Eriksson-Jons, Martelliere, and their combination each teach a front end at the air inlet end, and rear end at the air outlet end. Ex1008, Fig. 1; Ex1016, 2-3. Ex1002 ¶¶325-329.

b. [1a]/[14a]

The Eriksson-Jons-Martelliere combination teaches this limitation. Ex1002 ¶¶330-333.

Eriksson-Jons's “**hollow casing [10]**” is a main housing:



Ex1008, 1(right):5-18, Fig. 1; Ex1002 ¶¶331-333.

c. [1b]/[14b]

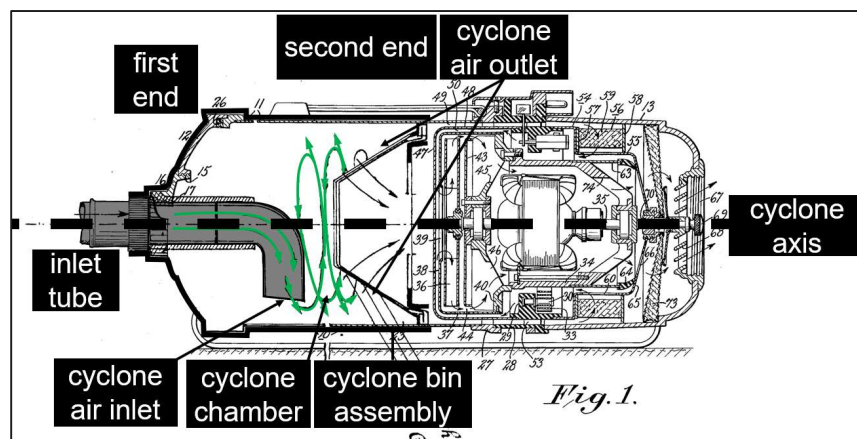
The Eriksson-Jons-Martelliere combination teaches these limitations. Ex1002 ¶¶334-337.

Eriksson-Jons teaches an “inlet opening” in which dirty air flows into the cleaner. Ex1008, 2(left):53-59, Claim 1; Ex1002 ¶¶335-337.

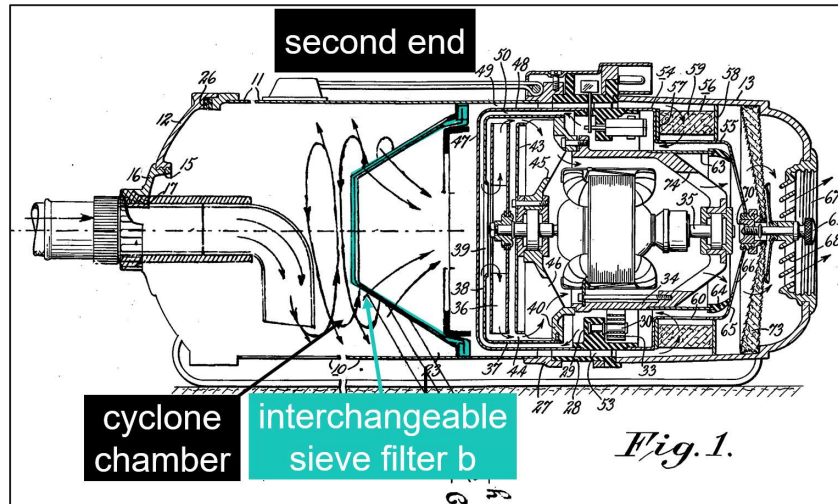
d. [1c]/[14c]

The Eriksson-Jons-Martelliere combination teaches these limitations.
Ex1002 ¶¶338-341.

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:



Ex1008, Fig. 1(modified); Ex1010, 1, Fig. 1; Ex1002 ¶340. A POSA would have understood air leaves the **cyclone chamber** at a **second end** through the “interchangeable sieve filter b:”

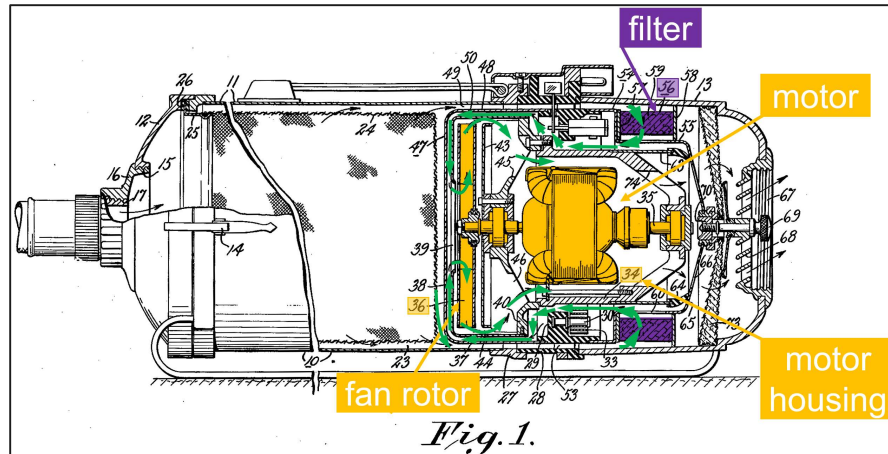


Ex1010, 1 (“after” dust and dirt have been “separated from the air,” the air “passes through the filter screen”), Fig. 1; Ex1002 ¶341.

e. [1d1]/[14d1]

The Eriksson-Jons-Martelliere combination teaches these limitations. Ex1002 ¶¶342-346.

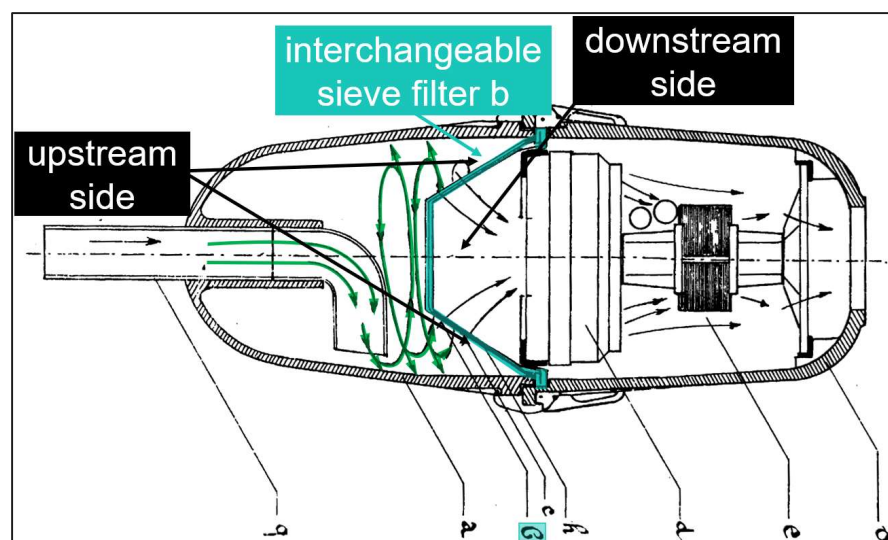
Eriksson-Jons teaches a pre-motor filter: “filter 56” is upstream of “fan rotor 36” and the “motor.” Ex1008, 2(left):63-2(right):7 (“air [] flows through...filter 56...to the inlet 39 of the fan. The fan rotor 36 acts upon this air...air thus passes within the motor housing [34]...and is discharged through...the motor housing.”); Ex1002 ¶343. Air passes through “filter 56” before it passes through the “motor”:



Ex1008, Fig. 1; Ex1002 ¶343.

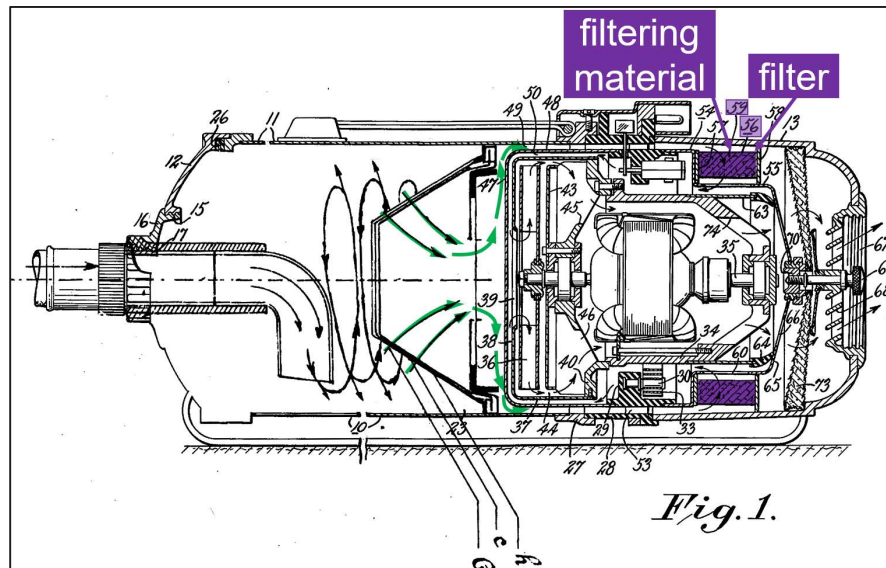
“**Filter 56**” is three-dimensional and thus has an **upstream side** and **downstream side**. Ex1008, 2(left):63-75 (describing airflow along **annular passage 49** through **filter 56**); Ex1002 ¶344.

Martelliere teaches a pre-motor filter (“**interchangeable sieve filter b**”) comprising an **upstream side** and a **downstream side**:



Ex1010, 1, Fig. 1; Ex1002 ¶345.

The Eriksson-Jons-Martelliere combination teaches these limitations:



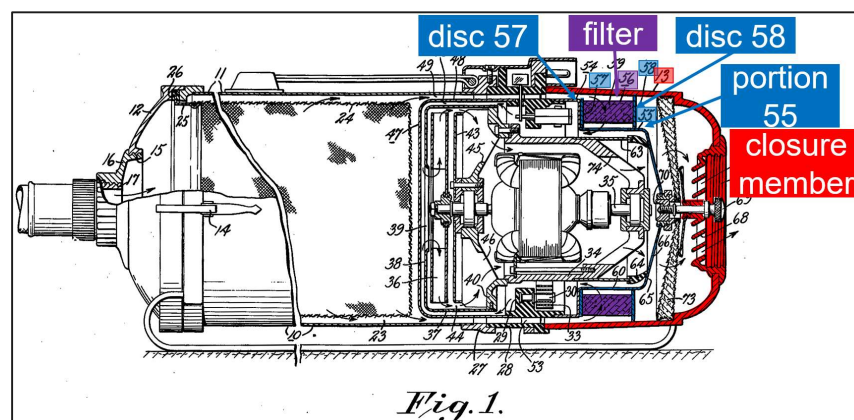
Ex1008, Fig. 1(modified); Ex1010, Fig. 1; Ex1002 ¶346.

f. [1d2]/[14d2]

The Eriksson-Jons-Martelliere combination teaches these limitations.

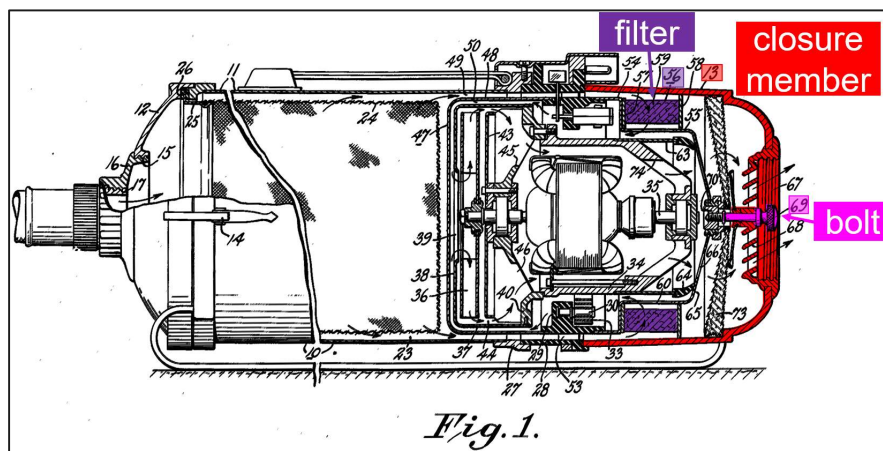
Ex1002 ¶¶347-350.

Eriksson-Jons’s “**filter 56**” is housed by “[t]he inner circumference of **discs 57** and **58**,” the “**portion 55 of reduced diameter**,” and “**closure member 13**”:



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**.”); Ex1002 ¶348.

“[T]o remove **filter 56**[,]...unscrew **bolt 69** and remove **closure member 13**”:

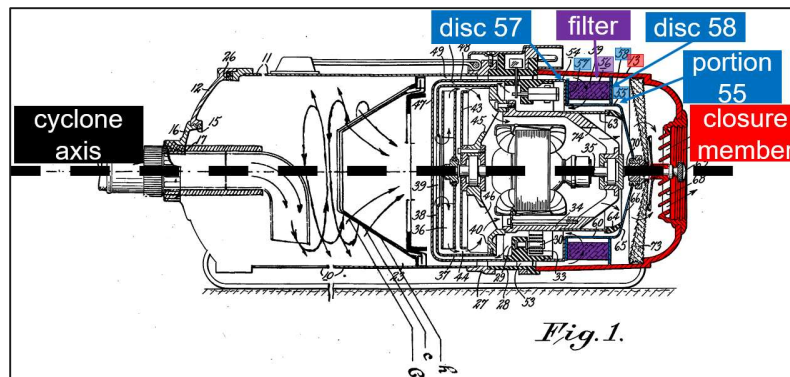


Ex1008, 2(right):16-19, Fig. 1; Ex1002 ¶349.

A POSA would have understood “**closure member 13**” is an openable cover of the pre-motor filter housing (**discs 57** and **58**, **portion 55**, and **closure member 13**). Ex1002 ¶350.

g. [1d3]

The Eriksson-Jons-Martelliere combination teaches these limitations. Ex1002 ¶¶351-353. In the Eriksson-Jons-Martelliere combination, the **cyclone axis** extends through the pre-motor filter housing (**discs 57** and **58**, **portion 55**, and **closure member 13**), and intersects “**closure member 13**”:



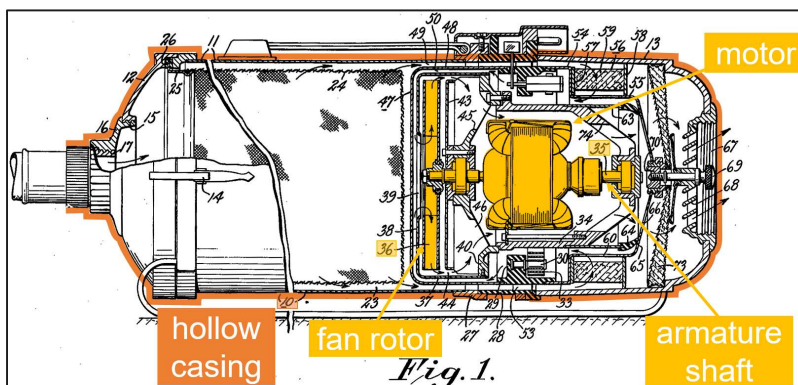
Ex1008, Fig. 1(modified); Ex1010, Fig. 1; Ex1002 ¶¶352-353.

h. [1e]/[14e]

The Eriksson-Jons-Martelliere combination teaches these limitations.

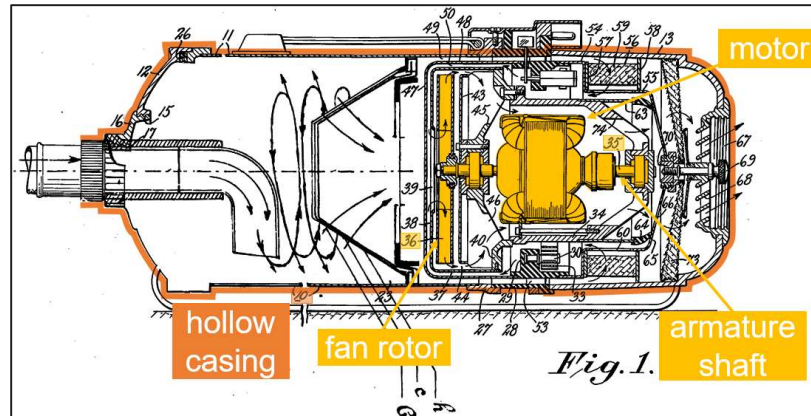
Ex1002 ¶¶354-358.

Eriksson-Jons teaches a suction motor: a “**motor**” and “**armature shaft 35** to one end of which is secured a **fan rotor 36**”:



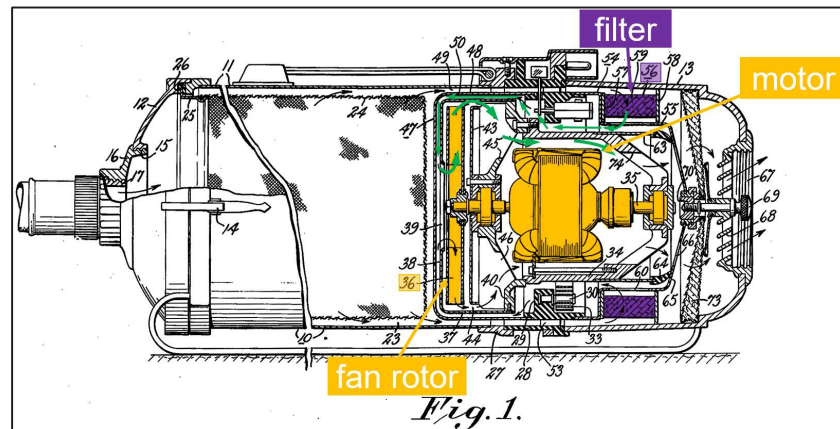
Ex1008, Fig. 1, 1(right):43-45; Ex1002 ¶355.

In the Eriksson-Jons-Martelliere combination, the suction motor is positioned within the main housing (**hollow casing 10**):



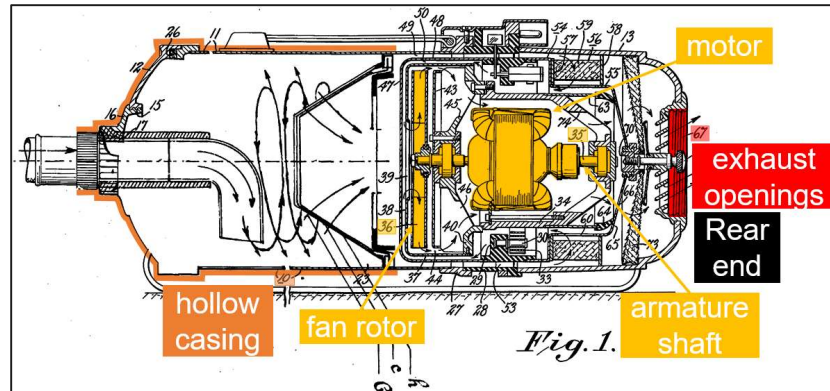
Ex1008, Fig. 1(modified); Ex1010, Fig. 1; Ex1002 ¶356.

Eriksson-Jons’s suction motor is located downstream of the pre-motor filter (filter 56):



Ex1008, Fig. 1; Ex1002 ¶357.

In the Eriksson-Jons-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), because it is located downstream of it and closer to the vacuum cleaner’s rear end—the end with “exhaust openings 67”:



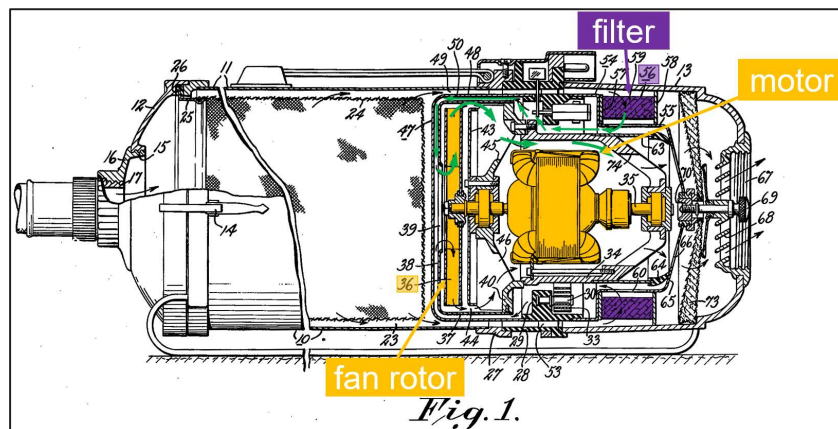
Ex1008, Fig. 1(modified); Ex1010, Fig. 1; Ex1002 ¶358.

i. [1f]/[14f]

The Eriksson-Jons-Martelliere combination teaches these limitations.

Ex1002 ¶¶359-360.

In Eriksson-Jons, an **airflow path** extends from the pre-motor filter (**filter 56**) to the suction motor (**motor**, **armature shaft 35**, and **fan rotor 36**):



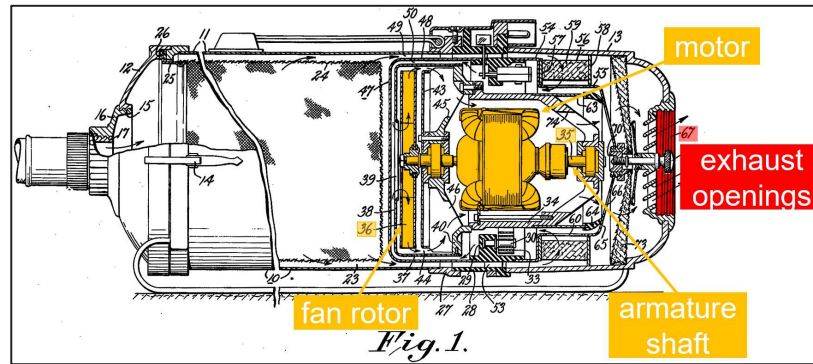
Ex1008, Fig. 1, 2(left):63-2(right):7; Ex1002 ¶360.

j. [1g]/[14g]

The Eriksson-Jons-Martelliere combination teaches these limitations.

Ex1002 ¶¶361-363.

In Eriksson-Jons, air discharged from the suction motor (**motor**, **armature shaft 35**, and **fan rotor 36**) passes downstream through a clean air outlet, “**exhaust opening 67**”:

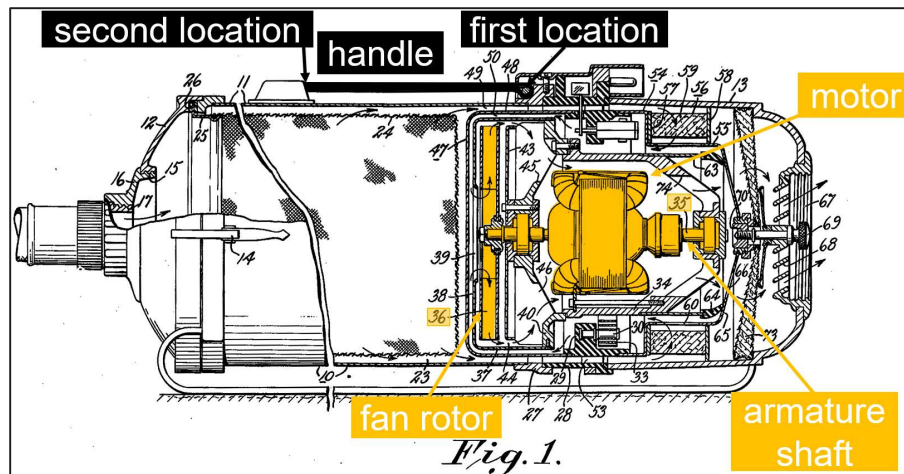


Ex1008, 2(right):1-9, Fig. 1; Ex1002 ¶¶362. A POSA would have understood air discharged from “**exhaust opening 67**” is clean air because the air has passed through “**filter 56**,” which cleans the air by separating dust and in the Eriksson-Jons-Martelliere combination, before exiting from “**exhaust opening 67**,” the air has passed through the **cyclone chamber**, “**interchangeable sieve filter b**,” and “**filter 56**,” each of which cleans the air by separating dust. Ex1002 ¶363.

k. [1h1]/[14h1]

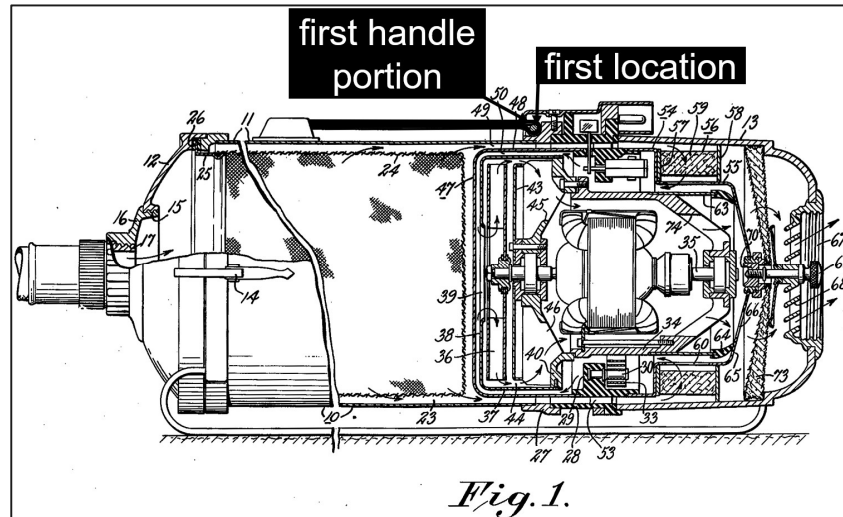
The Eriksson-Jons-Martelliere combination these limitations. Ex1002 ¶¶364-368.

Eriksson-Jons’s hand vacuum includes a **handle** connected to the hand vacuum at **first** and **second locations**:



Ex1008, Fig. 1; Ex1002 ¶366. As shown above, the **first location** is at a position of the suction motor (**motor**, **armature shaft 35**, and **fan rotor 36**) in the main housing (**hollow casing 10**). Ex1002 ¶367.

A **first handle portion** is connected at the **first location**:

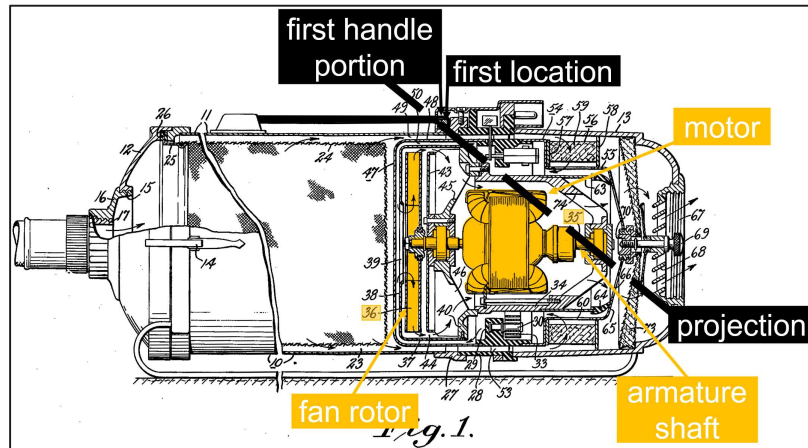


Ex1008, Fig. 1; Ex1002 ¶368.

I. [1h2]/[14h2]

The Eriksson-Jons-Martelliere combination teaches and renders obvious these limitations. Ex1002 ¶¶369-375.

A **projection** of Eriksson-Jons's **first handle portion** extends through the suction motor (**motor**, **armature shaft 35**, and **fan rotor 36**):



Ex1008, Fig. 1; Ex1002 ¶370.

While Eriksson-Jons does not expressly state whether its handle is rigid or flexible, a POSA would have understood the handle is flexible. Ex1002 ¶371. For example, Electrolux—the company assigned Eriksson-Jons, Ex1008, 1—created vacuum models similar to Eriksson-Jons with flexible handles both before, during, and after Eriksson-Jons was patented:





Ex1017; Ex1002 ¶371.

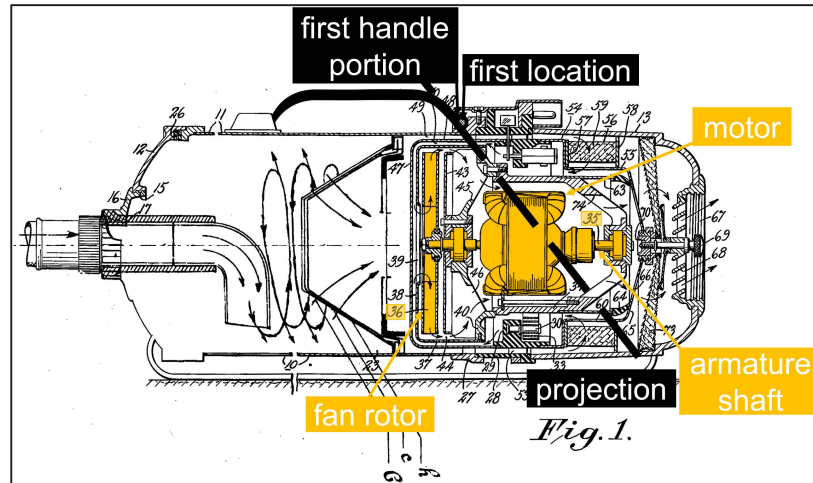
Other companies manufactured similar vacuums with leather handles in the 1930s:



Ex1018; Ex1002 ¶372.

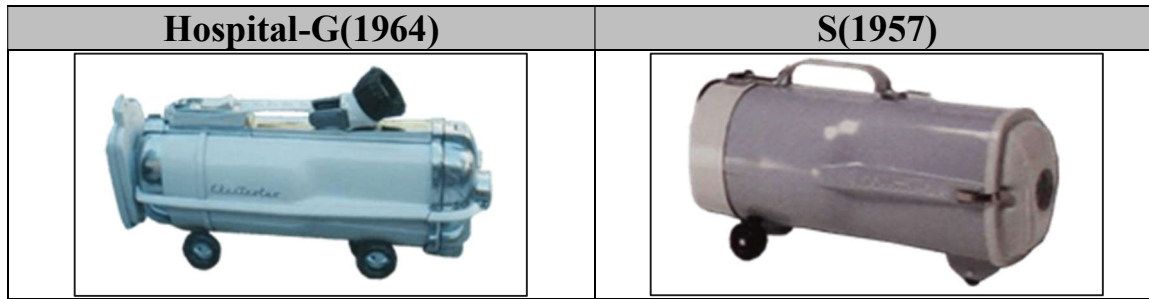
It would have been obvious to use a flexible handle with Eriksson-Jons to increase useability, mobility, and user comfort, as flexible handles were well known in the art as providing those benefits. Ex1002 ¶373. Such a modification

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 because it would have been a simple substitution that would not otherwise affect device operation. Ex1002 ¶373. When a flexible handle is used with Eriksson-Jons, a **projection of the first handle portion** extends through the suction motor:



Ex1008, Fig. 1(modified); Ex1002 ¶373.

It would have been obvious to use a rigid arched handle with Eriksson-Jons. Ex1002 ¶374. For example, Electrolux created vacuums similar to Eriksson-Jons with rigid arched handles after Eriksson-Jons was issued but well before the '472's claimed priority date:

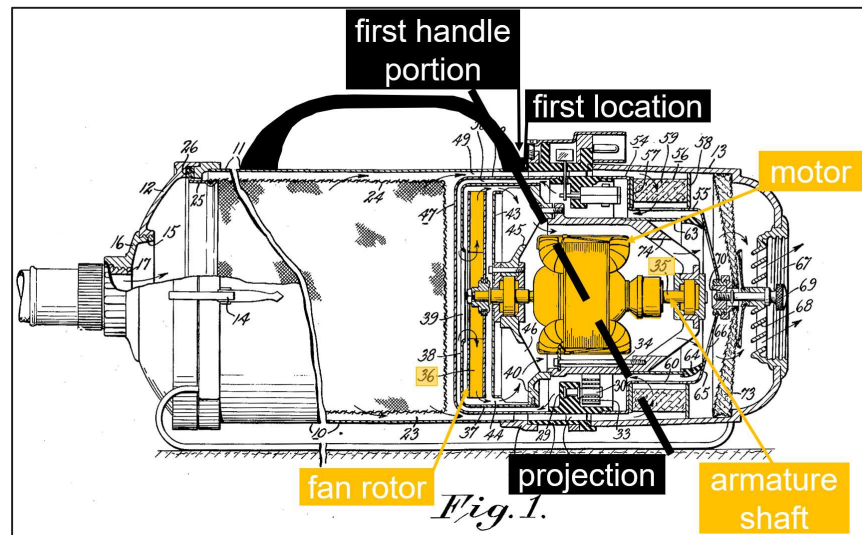


Ex1017; Ex1002 ¶374.

It would have been obvious to use a rigid arched handle with Eriksson-Jons to increase 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 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. Ex1002 ¶375.

When a rigid arched handle is used with Eriksson-Jons, a **projection** of the **first handle portion** extends through the suction motor:

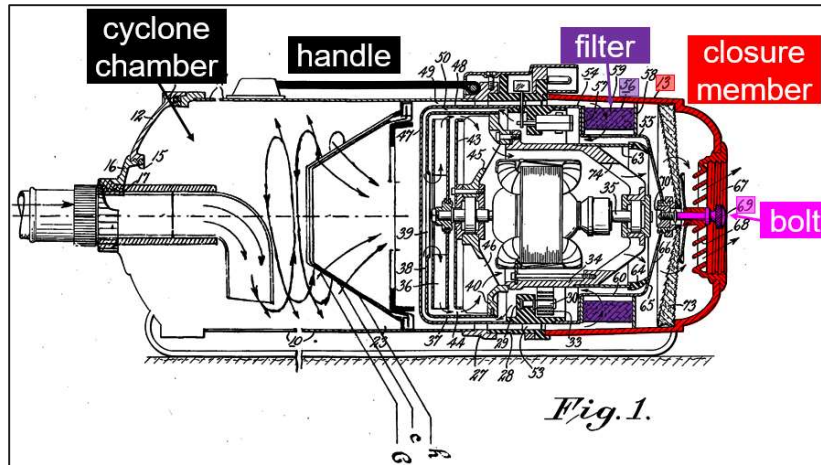


Ex1008, Fig. 1(modified); Ex1002 ¶375.

m. [1h3]/[14h3]

The Eriksson-Jons-Martelliere combination teaches these limitations.
Ex1002 ¶¶376-377.

In the Eriksson-Jons-Martelliere combination, the pre-motor filter housing (discs 57 and 58, portion 55, and closure member 13) is openable without moving the **handle** with respect to the **cyclone chamber**: 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**:

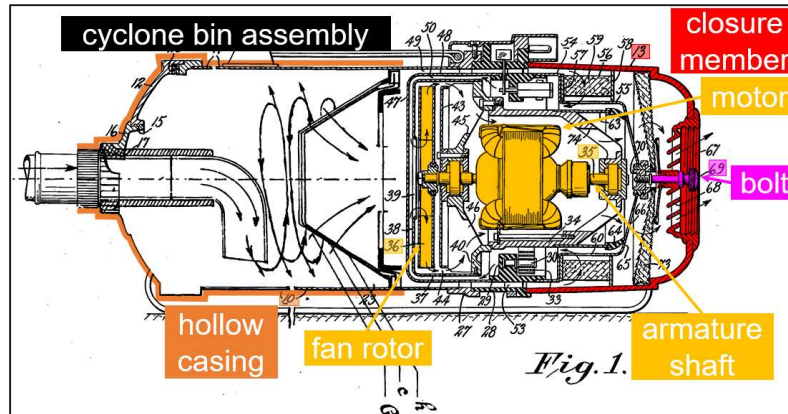


Ex1008, Fig. 1(modified); Ex1010, Fig. 1; Ex1002 ¶377.

n. [1h4]/[14h4]

The Eriksson-Jons-Martelliere combination teaches these limitations.
Ex1002 ¶¶378-381.

In the Eriksson-Jons-Martelliere combination, Eriksson-Jons's pre-motor filter housing cover (**closure member 13**) is openable while the cyclone bin assembly (the front half of **hollow casing 10**, the **cyclone chamber**, and the **interchangeable sieve filter b**) is in fluid flow communication with the suction motor (**motor**, **armature shaft 35**, and **fan rotor 36**), 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:



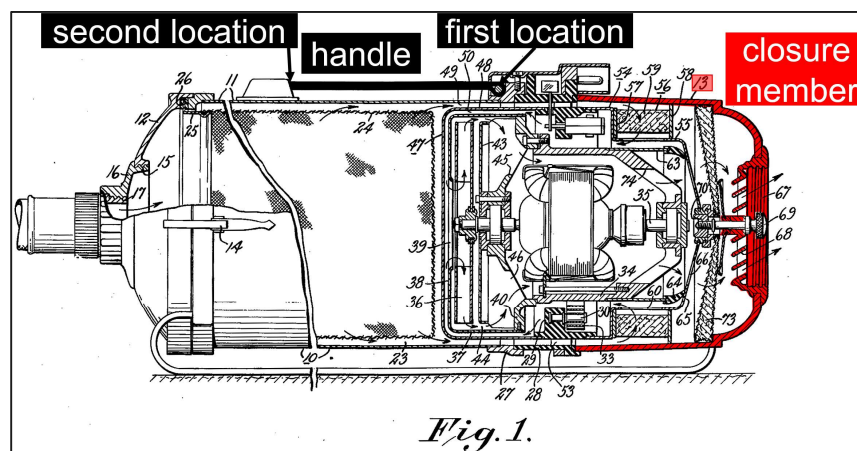
Ex1008, Fig. 1(modified); Ex1010, Fig. 1; Ex1002 ¶380.

Because the cyclone chamber is contained within the cyclone bin assembly, a POSA would have understood the cyclone chamber is in fluid flow communication with the suction motor for the same reasons. Ex1002 ¶381.

o. [14h5]

The Eriksson-Jons-Martelliere combination teaches these limitations. Ex1002 ¶¶382-383.

In Eriksson-Jons, the **first** and **second locations** are provided other than on the openable pre-motor filter housing cover (**closure member 13**):



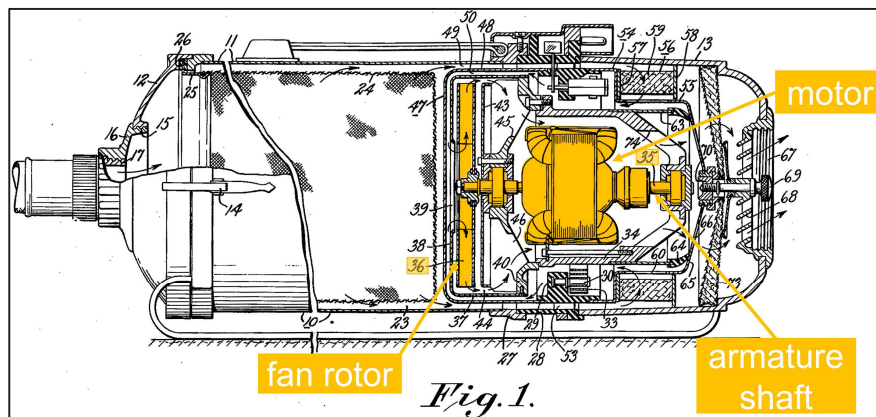
Ex1008, Fig. 1; Ex1002 ¶383.

3. [2]/[15]

The Eriksson-Jons-Martelliere combination teaches and renders obvious claims 1 and 14 and teaches the additional limitations of these claims. Ex1002 ¶¶384-391.

a. [2a]/[15a]

The Eriksson-Jons-Martelliere combination teaches these limitations. Ex1002 ¶¶385-388. In Eriksson-Jons, the suction motor (**motor**, **armature shaft 35**, and **fan rotor 36**) comprises a fan (**fan rotor 36**) and a motor (**motor**):



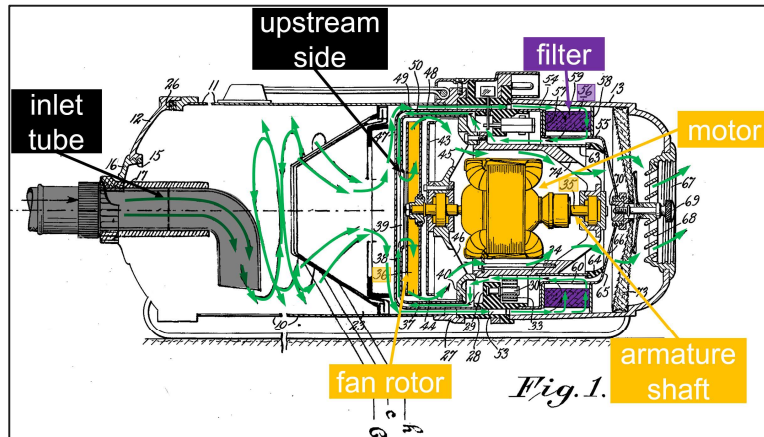
Ex1008, 1(right):43-45, Fig. 1; Ex1002 ¶388.

b. [2b]/[15b]

The Eriksson-Jons-Martelliere combination teaches these limitations. Ex1002 ¶¶389-391.

In the combined teachings of Eriksson-Jons and Martelliere, an upstream side of the fan (**fan rotor 36**) is positioned proximate the cyclone inlet (**inlet tube**)

because **air flows** from the pre-motor filter (**filter 56**) to “**fan rotor 36**” such that its **upstream side** faces and is positioned proximate the **inlet tube**:

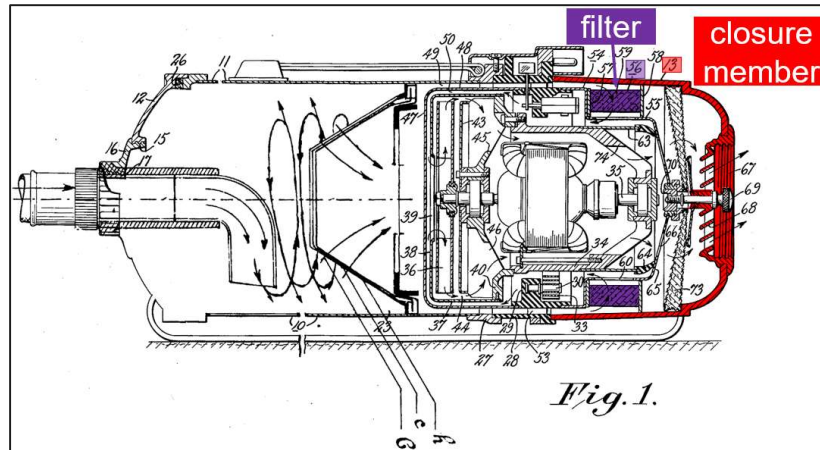


Ex1008, Fig. 1(modified), 2(left):67-2(right):3; Ex1010, Fig. 1; Ex1002 ¶391.

4. [3]/[16]

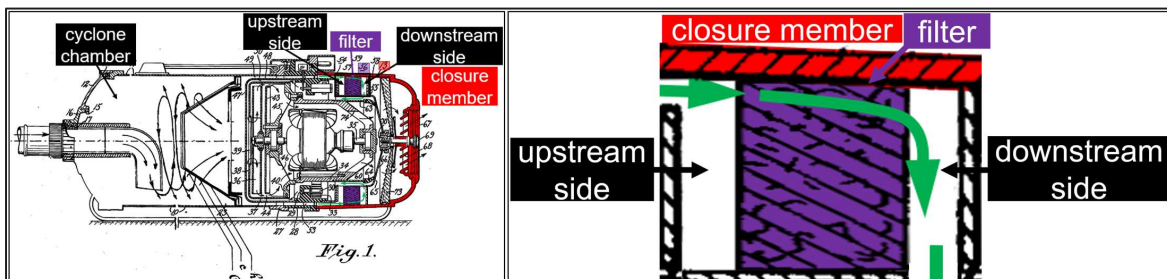
The Eriksson-Jons-Martelliere combination teaches and renders obvious claims 1 and 14 obvious and renders obvious the remaining limitations of these claims. Ex1002 ¶¶392-399.

In the combined teachings of Eriksson-Jons and Martelliere, the pre-motor filter (**filter 56**) has an upstream side and downstream side. Ex1002 ¶395. 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**”:



Ex1008, 1(left):39-43, claim 4, Fig. 1(modified); Ex1010, Fig. 1; Ex1002 ¶395.

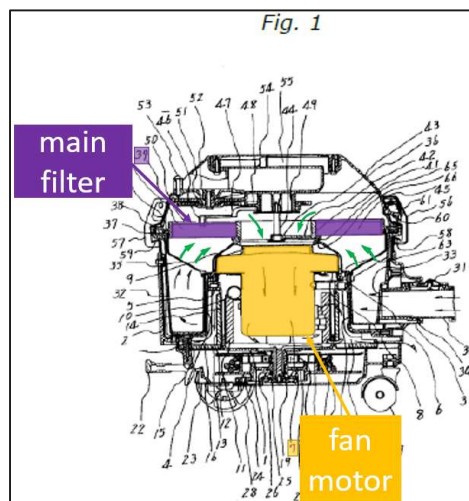
A POSA would have understood that, to achieve Eriksson-Jons's goal of a "readily accessible" pre-motor filter, the precise air path to and from Eriksson-Jons's pre-motor filter can be changed, while still achieving pre-motor air filtration, to facilitate the pre-motor filter's removal when **closure member 13** is removed. Ex1002 ¶396. 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. Ex1002 ¶396. 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 illustrated below:



Ex1008, Fig. 1(modified); Ex1010, Fig. 1; Ex1002 ¶396. In this modified airflow configuration, the **downstream side** of the pre-motor filter is spaced further from the **cyclone chamber** than the **upstream side** of the pre-motor filter, as shown above. Ex1002 ¶397.

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, Ex1008, 1(left):39-43, by allowing a user to more-hygienically grasp the **filter 56**'s non-airflow sides during removal. Ex1002 ¶398. 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. Ex1002 ¶398. 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. Ex1002 ¶398. 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. Ex1002 ¶398.

Pre-motor filters with this orientation and airflow path were known as functional, which would have given a POSA a reasonable expectation of success. Ex1002 ¶399. For example, Japanese Patent No. S5350580 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:



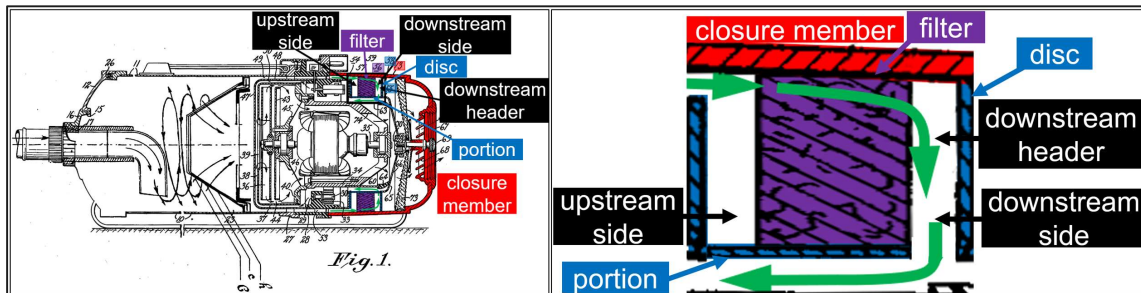
Ex1012, 383, Fig. 1; Ex1002 ¶399.

5. [4]/[17]

The Eriksson-Jons-Martelliere combination renders obvious claims 3 and 14 obvious and renders obvious the remaining limitations of these claims. Ex1002 ¶¶400-404.

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**) and the downstream header is opened when the

openable cover (**closure member 13**) is opened. Ex1002 ¶403. A POSA would have understood 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:



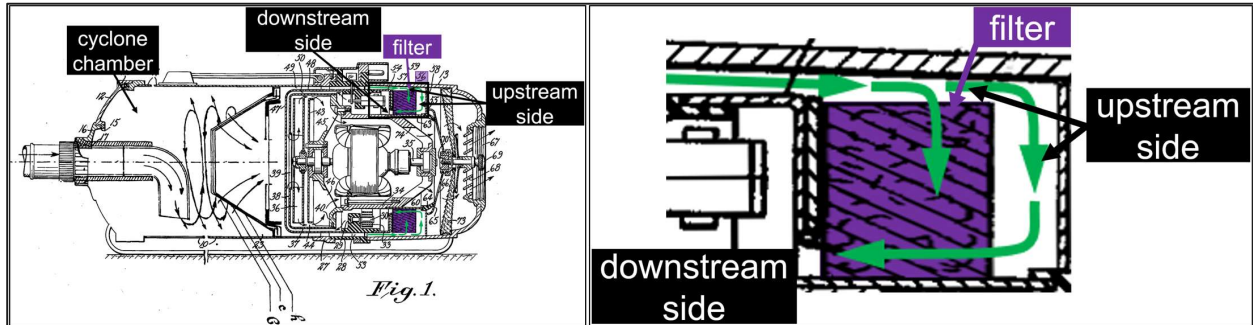
Ex1008, Fig. 1(modified); Ex1010, Fig. 1; Ex1002 ¶403. A POSA would have also understood that the **downstream header** is opened when the openable cover (**closure member 13**) is opened, as the channel between **filter 56's downstream side** and **disc 58** opens when **closure member 13** is removed. Ex1002 ¶404.

6. [5]/[18]

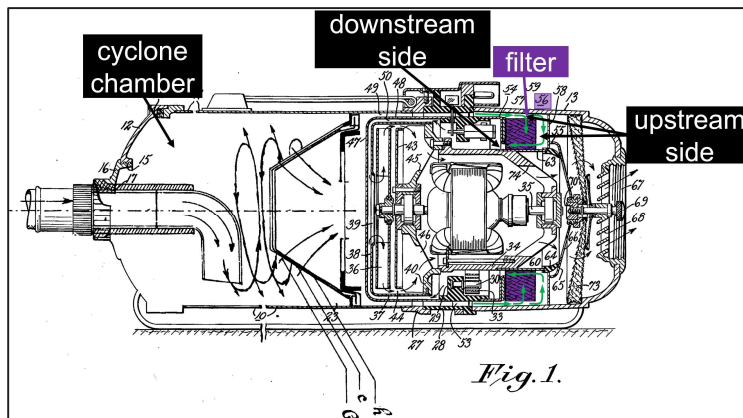
The Eriksson-Jons-Martelliere combination renders claims 1 and 14 obvious and renders obvious the remaining limitations of these claims. Ex1002 ¶¶405-411.

The Eriksson-Jons- Martelliere combination renders obvious alternate airflow configurations that facilitate **filter** removal. Ground4, [3]/[16]. One such configuration was to modify the “means for guiding the air” to allow air to pass

through the pre-motor filter (**filter 56**) from two sides—the out-most side and the rear-most side:
rear-most side:



Ex1008, Fig. 1(modified); Ex1010, Fig. 1; Ex1002 ¶408. 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** than the **downstream side** of the pre-motor filter (the front-most side):

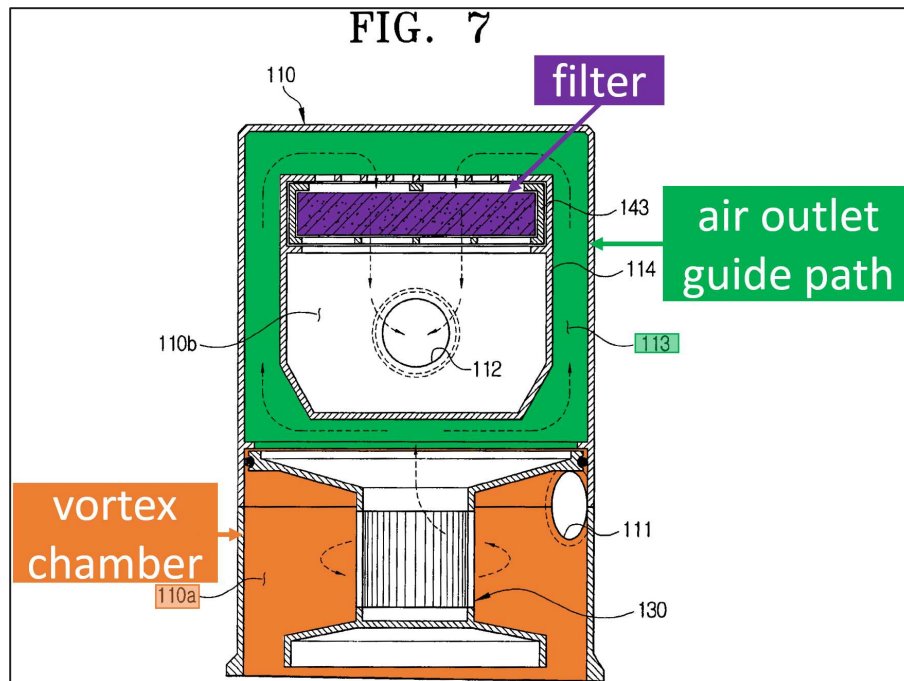


Ex1008, Fig. 1(modified); Ex1010, Fig. 1; Ex1002 ¶409.

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. Ex1002 ¶410. This modification would further Eriksson-

Jons's goal of facilitating removal of **filter 56**, Ex1008, 1(left):39-43, because it would expose two filter sides, either or both of which could be grabbed by a user for removal. Ex1002 ¶410. This modification was 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. Ex1002 ¶410. 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. Ex1002 ¶410.

Pre-motor filters with this orientation and airflow path were known as functional, which would have given a POSA a reasonable expectation of success. Ex1002 ¶411. For example, Oh 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**”:

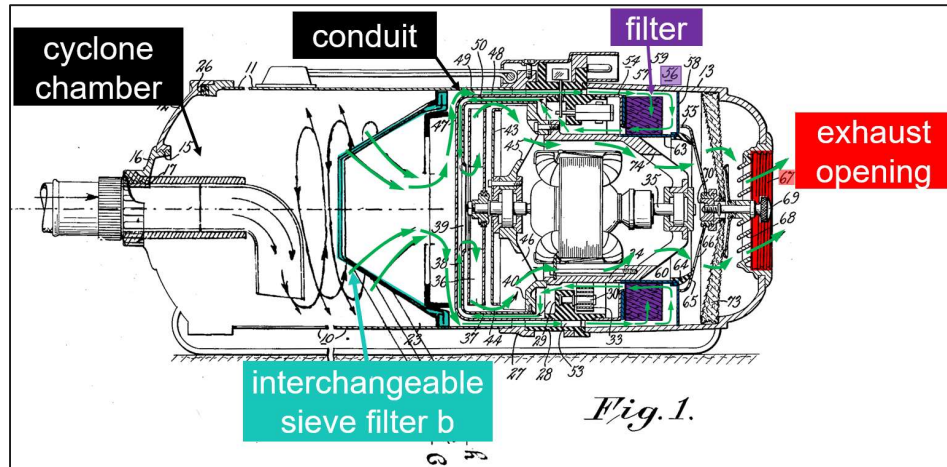


Ex1006, Abstract, 6:32-7:6, Fig. 7; Ex1002 ¶411.

7. [6]/[19]

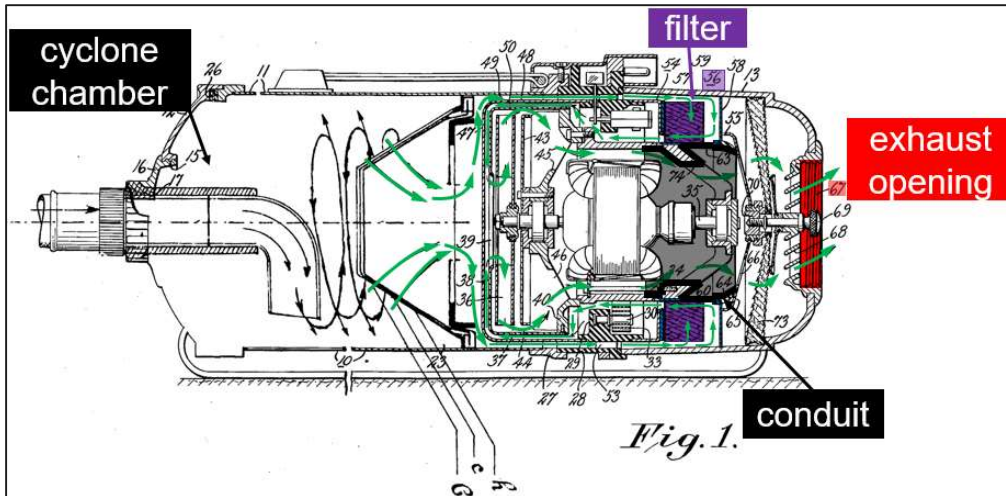
The Eriksson-Jons-Martelliere combination renders obvious claims 5 and 18 obvious and renders obvious the remaining limitations of these claims. Ex1002 ¶¶412-417.

The Eriksson-Jons-Martelliere combination, 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**”) and extends through the pre-motor filter (**filter 56**), the conduit being the **airflow path** shown below:



Ex1008, 2(left):53-2(right):9, Fig. 1(modified); Ex1010, Fig. 1; Ex1002 ¶¶414-415. A POSA would have understood this airflow path is such a conduit because air flows along it from the **cyclone chamber** air outlet 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**”); *id.*, 2(left):53-2(right):9 (describing airflow); Ex1002 ¶416.

This **conduit** extends through the open center of **filter 56**:

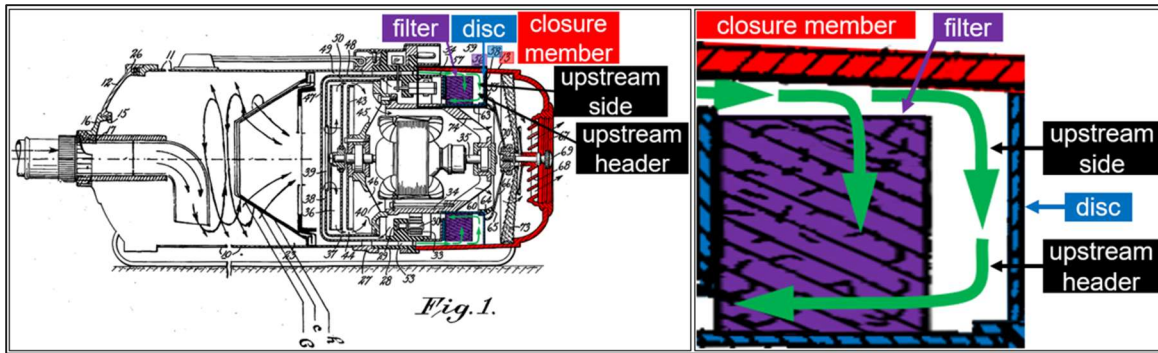


Ex1008, Fig. 1(modified); Ex1010, Fig. 1; Ex1002 ¶417.

8. [7]/[20]

The Eriksson-Jons-Martelliere combination renders obvious claims 5 and 18 obvious and renders obvious the remaining limitations of these claims. Ex1002 ¶¶418-422.

The Eriksson-Jons-Martelliere combination, when modified as described for Claims 5/18, teach an **upstream header** on the **upstream side** of the pre-motor filter (**filter 56**) and the **upstream header** is opened when the openable cover (**closure member 13**) is opened. Ex1002 ¶¶420-421. A POSA would have understood 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:



Ex1008, Fig. 1(modified); Ex1010, Fig. 1; Ex1002 ¶421. 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. Ex1002 ¶422.

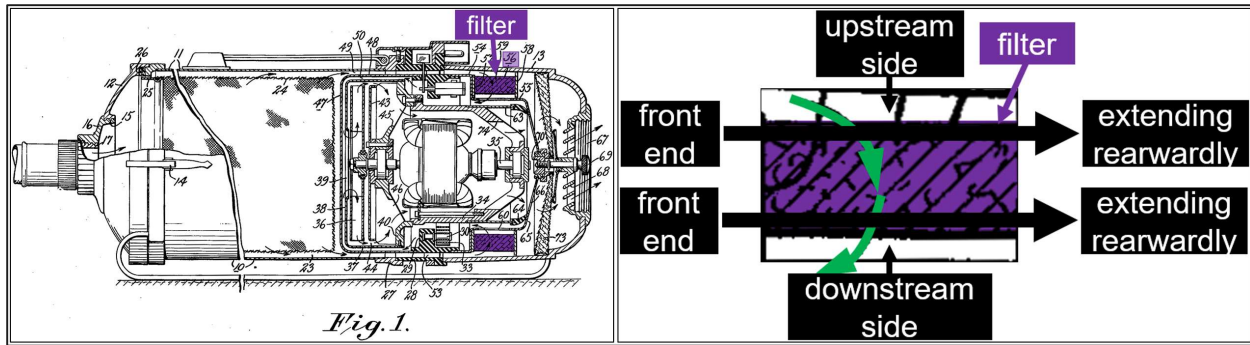
9. [8]/[21]

The Eriksson-Jons-Martelliere combination teaches and renders obvious claims 1 and 14 and teaches the additional limitations of these claims. Ex1002 ¶¶423-434.

a. [8a]/[21a]

The Eriksson-Jons-Martelliere combination teaches these limitations. Ex1002 ¶¶424-428.

In Eriksson-Jons, each of the **upstream** and **downstream sides** of the pre-motor filter (**filter 56**) has a **front end** positioned proximate the **front end** and extending rearwardly:

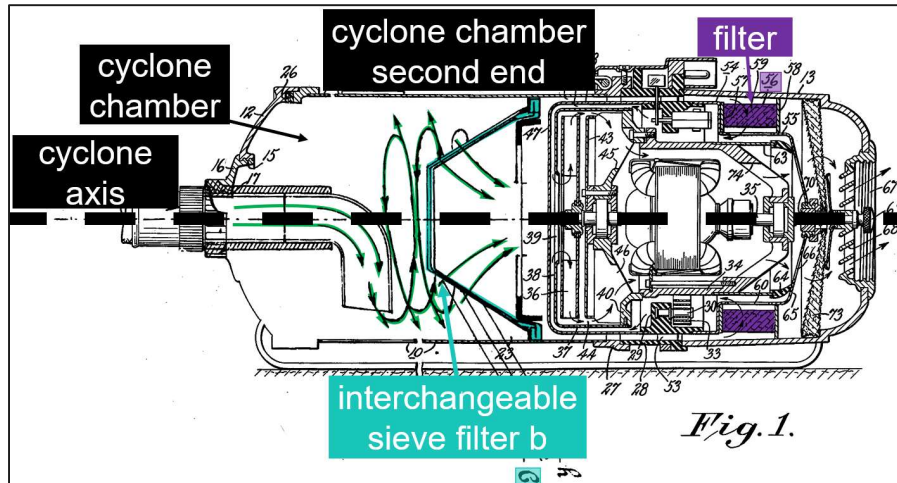


Ex1008, Fig. 1; Ex1002 ¶¶426-427. A POSA would have understood **filter 56** has a **front end** and a rear end because it is a three-dimensional object, and would have understood that **filter 56**'s front end is positioned proximate to the hand vacuum's **front end**, as depicted above, including because **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. Ex1002 ¶428.

b. [8b]/[21b]

The Eriksson-Jons-Martelliere combination teaches these limitations. Ex1002 ¶¶429-431.

In the Eriksson-Jons-Martelliere combination, the pre-motor filter (**filter 56**) is positioned axially outwardly from the **second end** of the **cyclone chamber** (located at the “**interchangeable sieve filter b**”) and downstream of the **cyclone chamber**:

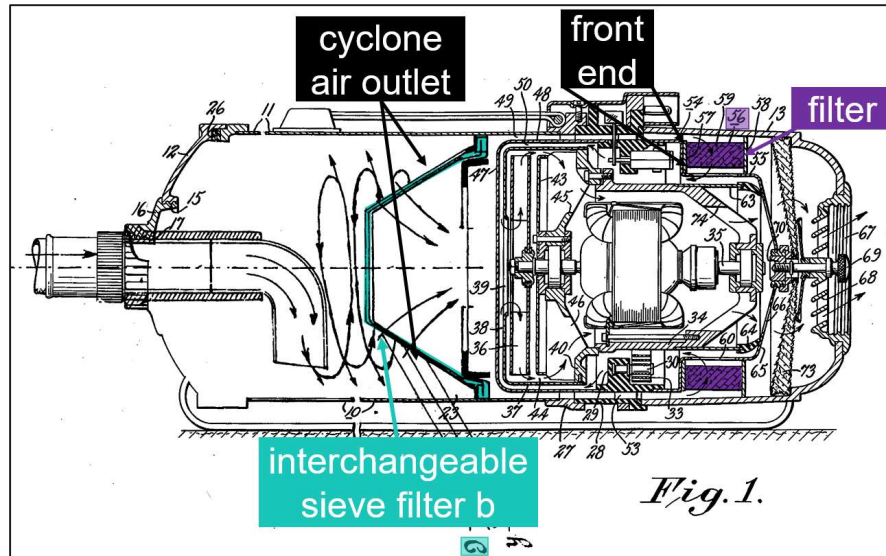


Ex1008, Fig. 1(modified); Ex1010, Fig. 1; Ex1002 ¶430. A POSA would have understood **filter 56** is positioned axially outwardly of the **cyclone chamber's second end** because **filter 56** is positioned rearwardly away from the **cyclone chamber's second end** along the **cyclone axis**. Ex1002 ¶431. A POSA would have understood **filter 56** is downstream of the **cyclone chamber** because air flows from the **cyclone chamber** to **filter 56**, as depicted above. Ex1002 ¶431.

c. [8c]/[21c]

The Eriksson-Jons-Martelliere combination teaches these limitations. Ex1002 ¶¶432-434.

In the Eriksson-Jons-Martelliere combination, the **cyclone air outlet** (the interface of the “**interchangeable sieve filter b**”) is positioned at a location spaced from the **front end** of the pre-motor filter (**filter 56**) because there is distance between them:

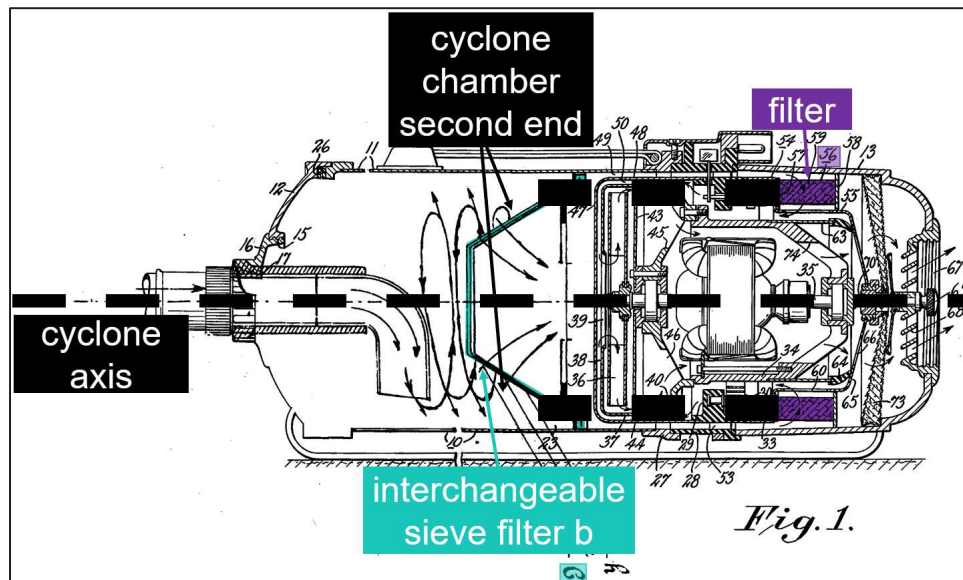


Ex1008, Fig. 1(modified); Ex1010, Fig. 1; Ex1002 ¶433. A POSA would have understood the **filter 56**'s **front end** is the end closest to the hand vacuum's **front end**. Ex1002 ¶434.

10. [9]

The Eriksson-Jons-Martelliere combination teaches and renders obvious claims 1 and 14 and teaches the additional limitations of these claims. Ex1002 ¶¶435-438.

In the Eriksson-Jons-Martelliere combination, the pre-motor filter is positioned axially outwardly from the second end of the cyclone chamber and downstream of the cyclone chamber. Ground4, [8b]/[21b]. The pre-motor filter (**filter 56**) overlies at least a portion of the **second end** of the **cyclone chamber** (located at the “**interchangeable sieve filter b**”):

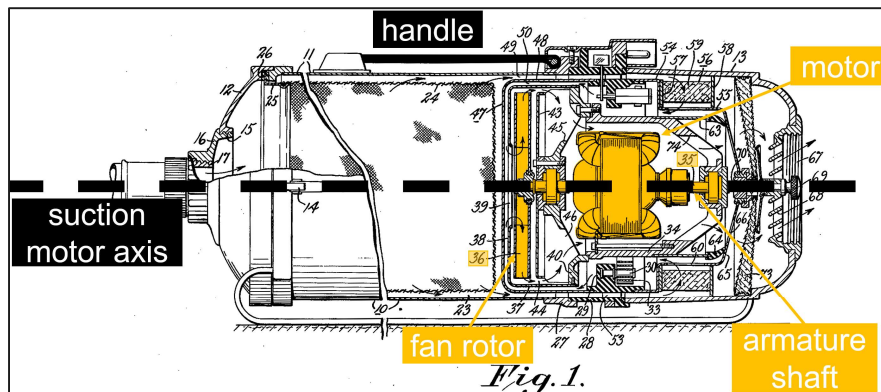


Ex1008, Fig. 1(modified); Ex1010, Fig. 1; Ex1002 ¶¶436-437. A POSA would have understood **filter 56** overlies at least a portion of “**interchangeable sieve filter b**” because **filter 56** is proximate to, larger than, and radially outward of “**interchangeable sieve filter b.**” Ex1002 ¶¶437-438.

11. [10]/[22]

The Eriksson-Jons-Martelliere combination teaches and renders obvious claims 1 and 14 and Eriksson-Jons teaches the additional limitations of these claims. Ex1002 ¶¶439-442.

Eriksson-Jons’s suction motor (**motor**, **armature shaft 35**, and **fan rotor 36**) has a **suction motor axis** and when the hand vacuum is carried by the **handle**, which extends generally horizontally:



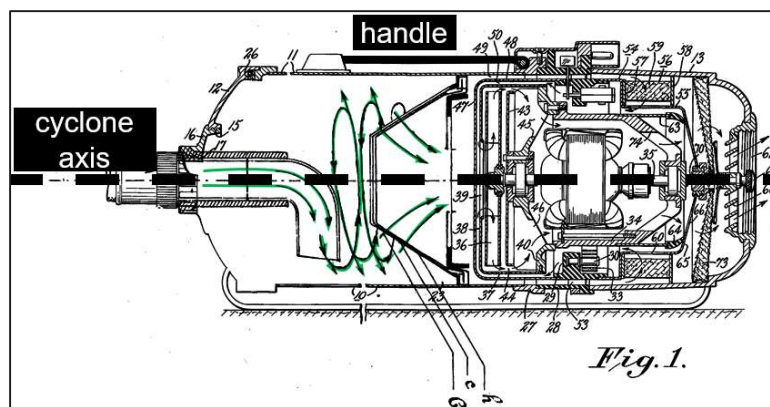
Ex1008, Fig. 1; Ex1002 ¶¶441-442.

12. [11]/[12]/[23]/[24]

The Eriksson-Jons-Martelliere combination teaches and renders obvious claims 1, 10, 14, and 22 and teaches the additional limitations of these claims.

Ex1002 ¶¶443-448.

In the Eriksson-Jons-Martelliere combination, when the hand vacuum is carried by the **handle**, the **cyclone axis** extends generally horizontally:



Ex1008, Fig. 1; Ex1010, Fig. 1; Ex1002 ¶¶447-448.

13. [13]/[25]

The Eriksson-Jons-Martelliere combination renders claims 1 and 14 obvious and Eriksson-Jons teaches the additional limitations of these claims. Ex1002 ¶¶449-452.

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

IX. DISCRETIONARY FACTORS FAVOR INSTITUTION

A. §314(a)

Fintiv should not be followed because it exceeds the Director’s authority, is arbitrary and capricious, was adopted without notice-and-comment rulemaking, violates the APA and AIA, and because “the PTAB will not rely on the *Fintiv* factors to discretionarily deny institution in view of parallel district court litigation where a petition presents compelling evidence of unpatentability,” and this petition presents such compelling evidence. USPTO Interim Procedure For Discretionary Denials In AIA Post-Grant Proceedings With Parallel District Court Litigation, 06/21/2022, 2, 4-5 (the “Guidance”).

Nevertheless, *Fintiv* favors institution because each factor favors or is neutral for institution. *Apple Inc. v. Fintiv, Inc.*, IPR2020-00019, Paper 11.

Factor 1 is neutral: there is no evidence that the court will or will not grant a stay if IPR is instituted, and because no such stay motion has yet been filed, this

factor is neutral. *TSMC Ltd. v. Alidouble, Inc.*, IPR2023-00372, Paper 7 at 10 (PTAB July 13, 2023).

Factor 2 favor institution: while the scheduled Litigation trial date is 07/21/2025—approximately 14 months away—any comparison of a projected FWD date against the scheduled trial date is speculative. *Dish Network v. Broadband iTV*, IPR2020-01280, Paper 17 at 16 (PTAB Feb. 4, 2021) (“We cannot ignore the fact that the currently scheduled trial date is more than nine months away and much can change during this time”); Guidance at 8 (“Stakeholders correctly noted that scheduled trial dates are unreliable and often change[,]” and a “scheduled trial date...is not by itself a good indicator of [when] the district court trial will occur.”). Instead, “when considering the proximity of the district court’s trial date to the date when the PTAB final written decision will be due, the PTAB will consider the median time from filing to disposition of the civil trial for the district in which the parallel litigation resides.” *Id.* at 3. The median time to trial in the District of Massachusetts is 35.6 months according to Federal Court Management Statistics (12/31/2023). Ex1019. The district court litigation was filed on 08/15/2023, when the ’472Patent was added to an Amended Complaint in Case No. 23-cv-11277, which indicates an expected trial date of approximately 08/01/2026, approximately 8 months after a FWD. Because the expected trial date is after the FWD deadline, this factor weighs in favor of institution. *Samsung*

Electronics Co., Ltd. et al v. Staton Techiya, LLC, IPR2022-00302, Paper 13 at 10-12.

Factor 3 favors institution. “If, at the time of the institution decision, the district court has not issued orders related to the patent at issue in the petition, this fact weighs against exercising discretion to deny institution...” *Apple Inc., v. Fintiv, Inc.*, IPR2020-00019, Paper 11 at 10 (PTAB Mar. 20, 2020) (precedential). No such substantive orders have issued with respect to the ’472Patent, and none are expected prior to institution. A *Markman* hearing is scheduled for 07/16/2024, and a *Markman* order is not expected until several months after the hearing. *E.g., iRobot Corp. v. SharkNinja Operating LLC et al.*, 19-cv-12125 (D. Mass.) (holding a *Markman* hearing on 08/06/2020 and issuing a *Markman* order on 01/14/2021). The parties’ investments in co-pending litigation have been low and will remain low at the time of institution. In the co-pending litigation, PO added the ’472Patent to an Amended Complaint on 08/15/2023 in Case No. 23-cv-11277, which the Court severed on 10/13/2023 as Case No. 23-cv-12372. On 10/10/2023, Dyson filed a motion to dismiss, which remains pending, and Dyson filed an Answer to the Complaint on 05/10/2024. Litigation, Dkts. 76, 103-04, 123. Fact discovery began on 10/10/2023 and no depositions have been taken. Litigation, Dkts. 103–04. PO served its infringement contentions on 12/15/2023, and Petitioners filed this petition within six months of those contentions. Ex1020.

Factor 4 favors institution because there is little overlap between the two proceedings. This Petition challenges 17 claims not at-issue in the Litigation, Ex1013 at 2; and Petitioners stipulate that, unless the Board denies or later vacates institution of this Petition, Petitioners will not seek resolution of invalidity in the co-pending litigation based on the specific grounds asserted in this Petition. Ex1014.

Factor 5 favors institution because although Petitioners and PO are also parties to the parallel litigations, the expected timing of the trial date favors institution. *Fusion Orthopedics, LLC v. Extremity Medical, LLC*, IPR2023-00894, Paper 15 at 32 (PTAB Nov. 17, 2023).

The *General Plastics* factors favor institution because this is the only petition against the '472Patent. *General Plastics Indus. Co., Ltd. v. Canon Kabushiki Kaisha*, IPR2016-01357, Paper 19 at 9-10.

B. §325(d)

The §325(d) factors favor institution as the relied upon references, other than Organ, which was not substantively discussed during prosecution, were not previously before the Office, nor are they cumulative. *Advanced Bionics, LLC v. Med-El Elektromedizinische Geräte GmbH*, IPR2019-01469, Paper 6 at 8 (PTAB Feb. 13, 2020) (precedential). The Examiner neither applied Organ against the

claims, nor discussed it, nor addressed the Butler-Oh-Organ combination presented.

X. SECONDARY CONSIDERATIONS

Petitioners are unaware of any secondary considerations of non-obviousness.

XI. MANDATORY NOTICES UNDER 37 C.F.R. §42.8

A. Real Parties-in-Interest

Petitioners identify themselves as the real parties-in-interest.

B. Related Matters

To the best of Petitioners' knowledge, apart from the above-mentioned litigation, *SharkNinja Operating LLC v. Dyson, Inc.*, No. 1:23-cv-12372 (D. Mass.), the '472Patent has not been involved in any litigation, *inter partes* or post-grant review prior to this proceeding.

C. Lead and Backup Counsel, Service, and Power of Attorney

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Petitioners concurrently submit a Power of Attorney, 37 C.F.R. § 42.10(b), and consent to electronic service at DysonIPR@kirkland.com.

XII. PAYMENT OF FEES UNDER 37 C.F.R. §42.103

Petitioners concurrently electronically submit the required fees for this Petition. The Board is authorized to charge Deposit Account No. 506092 for any fee deficiency.

Petition for *Inter Partes* Review of U.S. Patent No. 10,080,472

Date: May 21, 2024

Respectfully submitted,

/s/ Christian Huehns

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CERTIFICATE OF COMPLIANCE

This Petition complies with the type-volume limitations as mandated in 37 C.F.R. § 42.24, totaling 13,865 words. Counsel has relied upon the word count feature provided by Microsoft Word.

/s/ Christian Huehns

CERTIFICATE OF SERVICE

Pursuant to 37 C.F.R. §§ 42.6(e)(4)(i) *et seq.* and 42.105(b), the undersigned certifies that a copy of the foregoing document with the accompanying Exhibits listed in Petitioner's Exhibit List was caused to be served by Federal Express, costs prepaid, to Patent Owner at the following address of record:

1059 – Bereskin & Parr LLP / S.E.N.C.R.L., srl.
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A copy was also served via electronic mail and FTP on the attorneys of record in the following related matter, SharkNinja Operating LLC et al. v. Dyson, Inc. et al., 1:23-cv-12372-ADB (D. Mass.):

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