

Petition for *Inter Partes* Review of U.S. Patent No. 10,219,661

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. IPR2024-01288

U.S. PATENT NO. 10,219,661

PETITION FOR *INTER PARTES* REVIEW

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LIST OF EXHIBITS

Exhibit No.	Description
Ex1001	U.S. Patent No. 10,219,661 (“’661Patent”)
Ex1002	Declaration of Robert Giachetti
Ex1003	<i>Curriculum Vitae</i> of Robert Giachetti
Ex1004	Excerpted File History of U.S. Patent No. 10,219,661 (App. No. 15/085,830)
Ex1005	PCT Publication No. 2007/084543 to Butler et al. (“Butler”)
Ex1006	Japanese Patent Publication No. JPS48107459U to Tsukuji (“TsukujiJP”)
Ex1007	Certified English translation of Japanese Patent Publication No. JPS48107459U to Tsukuji (“Tsukuji”)
Ex1008	French Patent No. 1,094,603 to Martelliere (“MartelliereFR”)
Ex1009	Certified English translation of French Patent No. 1,094,603 to Martelliere (“Martelliere”)
Ex1010	Complainants’ Exhibit 26, Infringement Claim Chart regarding the ’661Patent, <i>In the Matter of Certain Surface Cleaning Devices and Components Thereof; Inv. No. 337-TA-1404</i>
Ex1011	Spanish Patent No. ES43816 to Dayer SA (“DayerES”)
Ex1012	Certified English Translation of Spanish Patent No. ES43816 to Dayer SA (“Dayer”)
Ex1013	German Patent No. DE1691786 to Boehmler (“BoehmlerDE”)
Ex1014	Certified English Translation of German Patent No. DE1691786 to Boehmler (“Boehmler”)
Ex1015	German Patent Publication No. DE1680208 to Rebel (“RebelDE”)

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Ex1016	Certified English Translation of German Patent Publication No. DE1680208 to Rebel (“Rebel”)
Ex1017	Korean Patent Publication No. KR19980020751 to Moon (“MoonKR”)
Ex1018	Certified English Translation of Korean Patent Publication No. KR19980020751 to Moon (“Moon”)
Ex1019	PCT Publication No. 2013/117901 to Sunderland et al. (“Sunderland”)
Ex1020	International Publication No. WO 02/067753 to Vuijk (“Vuijk”)
Ex1021	U.S. Patent No. 7,175,682 to Nakai et al. (“Nakai”)
Ex1022	Chinese Patent Publication No. CN103784081A to Wenjie (“WenjieCN”)
Ex1023	Certified English Translation of Chinese Patent Publication No. CN103784081A to Wenjie (“Wenjie”)
Ex1024	German Patent Publication No. DE1213967B to Berg (“BergDE”)
Ex1025	Certified English Translation of German Patent Publication No. DE1213967B to Berg (“Berg”)
Ex1026	German Patent No. DE6942662U to Knipping (“KnippingDE”)
Ex1027	Certified English Translation of German Patent No. DE6942662U to Knipping (“Knipping”)
Ex1028	Japanese Patent No. JP2854263 to Ikki (“IkkiJP”)
Ex1029	Certified English Translation of Japanese Patent No. JP2854263 to Ikki (“Ikki”)

LIST OF CHALLENGED CLAIMS

Reference Number	Claim Limitation
Claim 1	
[1pre]	A hand vacuum cleaner having a front end having a dirty air inlet, a clean air outlet, an upper end and a lower end, the hand vacuum cleaner comprising:
[1a]	(a) a hand vacuum cleaner body comprising an upper end, a lower end, a front end, a rear end and a handle, the handle extending between a first handle end and a second handle end, the hand vacuum cleaner body including a suction motor and fan assembly, the suction motor and fan assembly having a suction motor axis of rotation; and,
[1b]	(b) a cyclone unit comprising a cyclone having a cyclone axis of rotation, a cyclone air inlet, a cyclone air outlet, a front end and a rear end,
[1c]	wherein when the hand vacuum cleaner is positioned with the upper end of the hand vacuum cleaner above the lower end of the hand vacuum cleaner and the lower end of the hand vacuum cleaner is on a horizontal surface, the cyclone axis of rotation is generally horizontal and extends between the front and rear ends of the cyclone, and
[1d]	wherein when the hand vacuum cleaner is positioned with the upper end of the hand vacuum cleaner above the lower end of the hand vacuum cleaner and the lower end of the hand vacuum cleaner is on a horizontal surface, the handle is inclined forwardly at an angle that is between 10 and 80 degrees from a vertical axis, and
[1e]	wherein the handle is provided on a sidewall at a rear portion of the hand vacuum cleaner body, and
[1f]	wherein the handle has a handle axis that intersects the suction motor.
Claim 2	
[2]	The hand vacuum cleaner of claim 1 wherein the handle has a handle axis that intersects the suction motor axis of rotation.
Claim 3	
[3]	The hand vacuum cleaner of claim 1 wherein the hand vacuum cleaner body comprises a suction motor and fan assembly housing and the handle extends away from the suction motor and fan assembly housing.

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Reference Number	Claim Limitation
Claim 4	
[4]	The hand vacuum cleaner of claim 1 wherein the handle has a hand grip portion that extends upwardly and forwardly when the hand vacuum cleaner is positioned with the lower end of the hand vacuum cleaner on a horizontal surface.
Claim 5	
[5]	The hand vacuum cleaner of claim 1 wherein when the hand vacuum cleaner is positioned with the lower end of the hand vacuum cleaner on a horizontal surface, the suction motor axis of rotation is generally horizontal.
Claim 6	
[6]	The hand vacuum cleaner of claim 1 wherein when the hand vacuum cleaner is positioned with the lower end of the hand vacuum cleaner on a horizontal surface, the suction motor axis of rotation is positioned below the cyclone axis of rotation.
Claim 7	
[7]	The hand vacuum cleaner of claim 1 wherein the cyclone has a front end wall having the cyclone air inlet.
Claim 8	
[8]	The hand vacuum cleaner of claim 1 wherein the cyclone axis of rotation is generally parallel to the suction motor axis of rotation.
Claim 9	
[9]	The hand vacuum cleaner of claim 1 wherein the cyclone unit is provided at the front end of the hand vacuum cleaner body.
Claim 10	
[10]	The hand vacuum cleaner of claim 1 wherein the dirty air inlet is provided at a front end of the cyclone unit.
Claim 11	
[11]	The hand vacuum cleaner of claim 1 wherein the dirty air inlet comprises an inlet passage that extends longitudinally between an inlet end and an outlet end and has a longitudinal passage axis that is coaxial with the cyclone axis and the outlet end communicates with the cyclone air inlet.
Claim 12	
[12]	The hand vacuum cleaner of claim 11 wherein the handle has a hand grip portion that extends upwardly and forwardly when the hand

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Reference Number	Claim Limitation
	vacuum cleaner body is positioned with the lower end of the hand vacuum cleaner on a horizontal surface.
Claim 13	
[13]	The hand vacuum cleaner of claim 11 wherein the suction motor axis of rotation is positioned below the cyclone axis of rotation when the hand vacuum cleaner body is positioned with the lower end of the hand vacuum cleaner on a horizontal surface.
Claim 14	
[14]	The hand vacuum cleaner of claim 11 wherein the suction motor axis of rotation is position below the passage axis when the hand vacuum cleaner body is positioned with the lower end of the hand vacuum cleaner on a horizontal surface.
Claim 15	
[15]	The hand vacuum cleaner of claim 1 wherein the handle is forward of a rear end of the hand vacuum cleaner body.
Claim 16	
[16]	The hand vacuum cleaner of claim 1 wherein a plane that is perpendicular to the motor axis extends through the handle from the first handle end to the second handle end.

I. INTRODUCTION

The '661Patent “relates to the field of surface cleaning apparatus[es]” and specifically to a hand/stick vacuum cleaner configuration. Ex1001, 1:15-16.

The '661Patent identifies “limited dirt collection capacity” as a problem with existing hand vacuums and purports to solve this with an “auxiliary dirt collection chamber” to provide “an enlarged dirt collection capacity,” such that “the surface cleaning apparatus may operate for longer intervals before...need[ing] to be emptied.” Ex1001, 1:31-34, 10:39-48. However, the '661Patent’s claims do not relate to dirt-collection capacity, but instead cobble together well-known configurations and features of vacuum cleaners (e.g., dirty air inlets, suction motors, cyclone units, and handles), the combination of which does not purport to provide any benefit. That is because Patent Owner (“PO”) wrote its claims not to solve a technical problem, but in a failed attempt to read on Petitioners’ accused products in co-pending litigation.

These configurations and features were well-known in the art, which anticipates and renders obvious each claim.

II. STANDING (§42.104(A))

Petitioners certify the '661Patent is available for IPR, and Petitioners are not barred/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 1-16 as follows¹:

Prior Art	Basis
PCT Publication No. 2007/084543 (“Butler”); published 07/26/2007	AIA 102(a)(1) and 102(a)(2)
Japanese Patent Publication No. JPS48107459U (“Tsukuji”); published 12/12/1973	
French Patent No. 1,094,603 (“Martelliere”); published 05/23/1955	
Chinese Patent Publication No. CN103784081A (“Wenjie”); published 05/14/2014	

Grounds	Claims	Basis
1	1–16	§102; Butler
2	1–16	§103; Butler
3	1–5, 7–12, 15–16	§103; Tsukuji and Martelliere
4	6, 13, 14	§103; Tsukuji, Martelliere, and Wenjie

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

IV. OVERVIEW OF THE '661PATENT

The '661Patent, titled “Surface Cleaning Apparatus,” issued from U.S. Application No. 15/085,830, filed 03/30/2016, and claims priority to Provisional Application No. 62/093,189, filed 12/17/2014.² Ex1001, Cover.

A. The Specification

The '661Patent identifies “limited dirt collection capacity” as a problem with existing hand vacuums, which it purports to solve with an “auxiliary dirt collection chamber” to provide “an enlarged dirt collection capacity,” such that “the surface cleaning apparatus may operate for longer intervals before...need[ing] to be emptied.” Ex1001, 1:31-32, 10:39-48. However, the '661Patent does not claim a supplemental bin or any other purported dirt-collection-capacity solution; it instead claims a mix-and-match of well-known, interchangeable features and configurations. *Id.*, Claims. These well-known features include “a dirty air inlet,” “a handle,” “a suction motor and fan assembly,” and “a cyclone unit”—the combination of which solves no purported problem. *Id.*

² Petitioners reserve the right to challenge any alleged priority date in co-pending litigation.

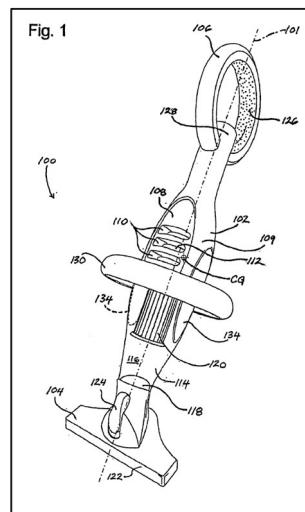
B. The Prosecution History

During prosecution, the Examiner allowed the '661 Patent's claims without any prior-art-based rejections. Ex1004. The Examiner's Reasons for Allowance stated that the "the prior art of record fails to teach or suggest [the full text of then-pending claim 1]." *Id.*, 520-21. After allowance, PO submitted an Amendment After Allowance to amend certain claims, and after issuance sought and received a Certificate of Correction for certain claims. *Id.*, 605, 623-26, 629-30.

V. OVERVIEW OF PRIOR ART

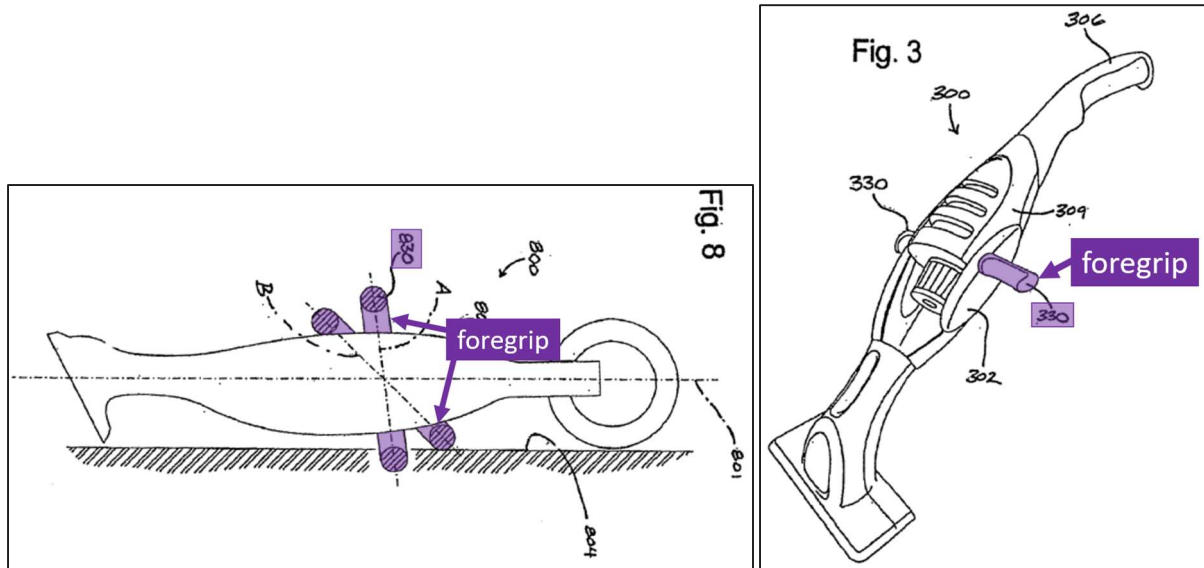
A. Butler

Butler is a 2007 PCT publication for "an improved vacuum cleaner for cleaning raised and vertical surfaces" including stairs:



Ex1005, 3:10-12, Fig. 1.

Butler is a single vacuum cleaner system that is reconfigurable and optimizable. Butler's various components, such as its dirt receptacle, "may be



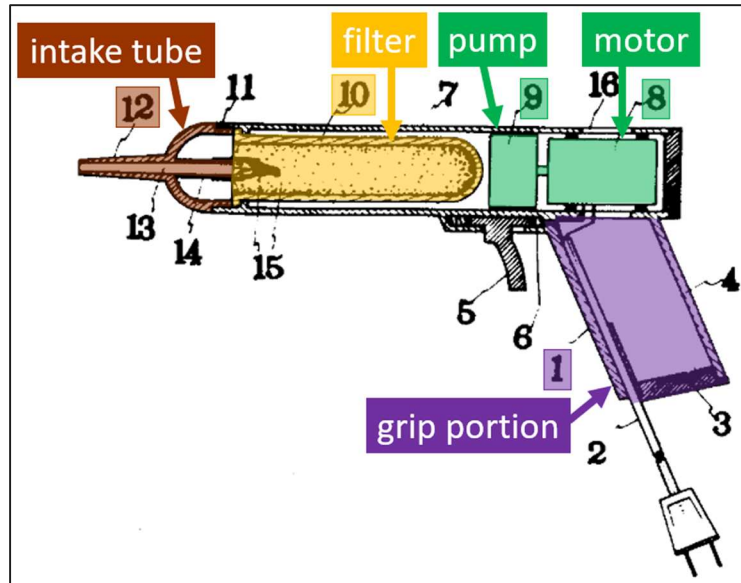
Ex1005, 3:20-28, 22:14-22, 22:26-28, Figs. 3, 5, 8³; Ex1002 ¶¶56-58.

B. Tsukuji⁴

Tsukuji is a 1972 Japanese Patent Publication for a “small electric vacuum cleaner.” Ex1007, 2. Tsukuji’s cleaner includes an “**intake tube 12**,” “**filter 10**,” “**motor 8**” that “rotate[s] the turbofan inside the **pump 9**,” and “**grip portion 1**” that “can be reliably grasped”:

³ All emphasis, and all coloring and annotations to figures, added unless otherwise noted. Where a figure has been otherwise altered to illustrate Petitioner’s argument, the citation to the figure is labeled as modified.

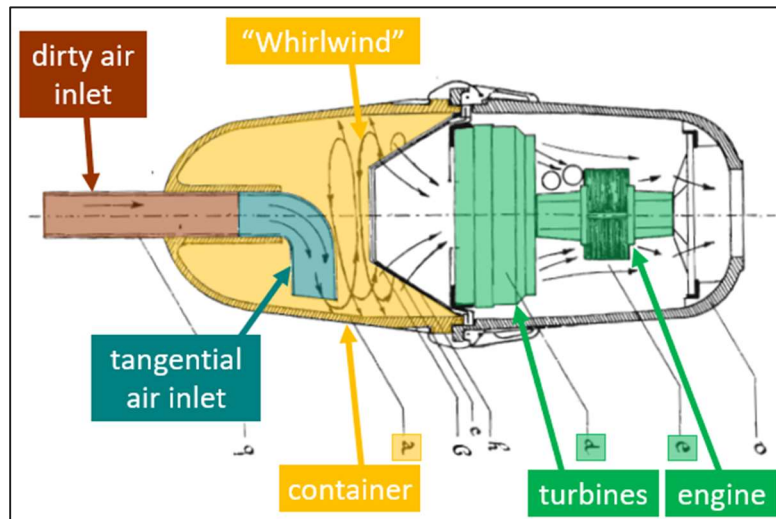
⁴ For the Tsukuji and Martelliére references, citations are by page, as the English translations do not include column or line numbers.



Id., 2, 4, Fig. 1; Ex1002 ¶59.

C. Martelliere

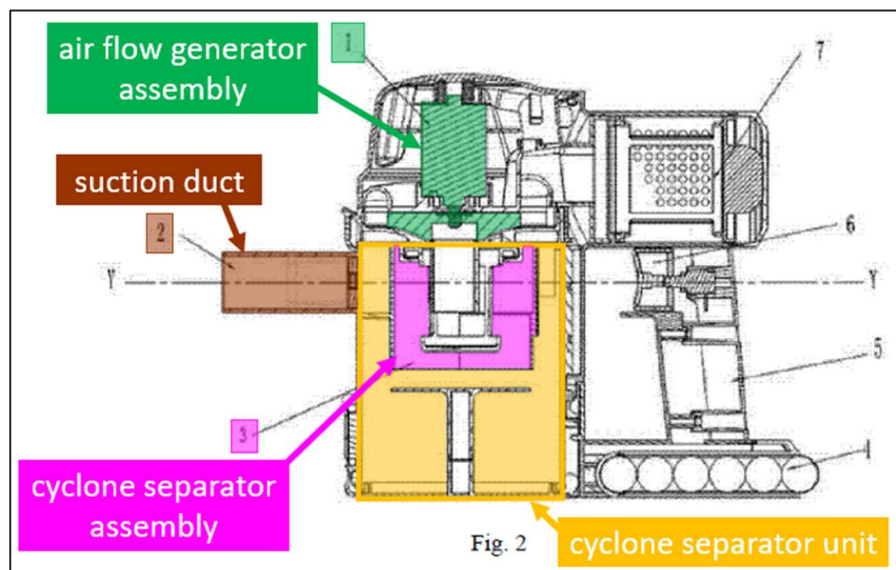
Martelliere is a 1955 French patent for a cyclonic hand vacuum cleaner. Ex1009, 1. Martelliere’s cleaner has a **dirty air inlet** connected to a “**tangential[]**” **air inlet**, which creates a “**Whirlwind**” (*i.e.*, a cyclone) within a “**container**” to separate dirt, and is powered by “**turbines d,**” and “**engine e**”:



Ex1009, 1, Fig. 1; Ex1002 ¶60.

D. Wenjie

Wenjie is a 2014 Chinese Patent Publication. Ex1023, Abstract. Wenjie teaches a “hand-held vacuum cleaner includ[ing] an **air flow generator assembly 1**, a **suction duct 2**,” and a **cyclone separator unit** comprising a “**cyclone separator assembly 3**”:



Ex1023 ¶21, Fig. 2; Ex1002 ¶61.

VI. LEVEL OF ORDINARY SKILL IN THE ART

A Person of Ordinary Skill in the Art (“POSA”) would have had a bachelor’s degree in mechanical engineering or a similar field and 2–3 years of experience in machine design, including machines that include fluid dynamics or fluid paths, such as vacuum cleaners. Additional education could offset less experience and vice

versa, and a POSA could have also obtained similar knowledge and experience through other means.

VII. CLAIM CONSTRUCTION

Petitioners are unaware of any “prior claim construction determination” related to the ’661 Patent. 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 quotes and citation omitted). Petitioners do not believe any claim construction is necessary to resolve the parties’ controversy in this Petition, and the claims should be given their plain and ordinary meaning for purposes of this IPR.⁵

VIII. THE CHALLENGED CLAIMS ARE UNPATENTABLE

A. Ground 1: Butler Anticipates Claims 1-16

1. [1]

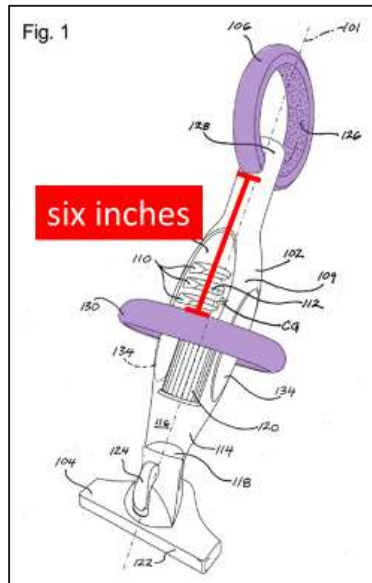
a. [1pre]

To the extent the preamble is limiting, Butler teaches it. Ex1002 ¶¶67-75.

Butler’s “vacuum cleaner” is designed to be used by hand and is a hand vacuum cleaner. Ex1005, Title, Fig. 1; Ex1002 ¶¶68-70. Butler’s cleaner includes

⁵ Petitioners reserve all rights to raise claim construction arguments and other arguments in litigation.

a “**rear grip**” and “one or more **foregrips**,” and Butler teaches a range of “compact” sizes, including a distance between the foregrip and the rear grip of **six inches**, and an overall vacuum length of eighteen inches:

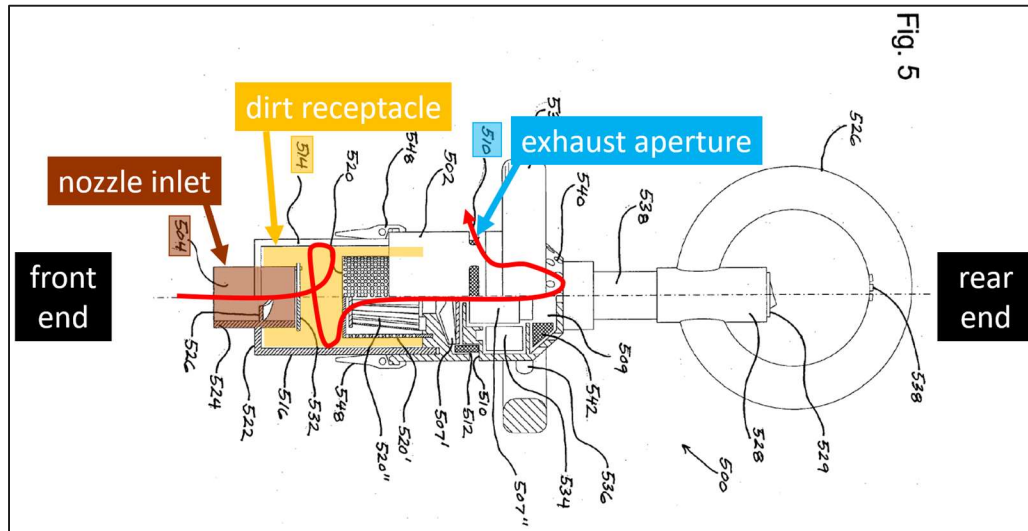


Ex1005, 15:5-6, 26:1-10, Fig. 1; Ex1002 ¶¶68-69.

Butler’s “compact” and “maneuver[able]” design is “adapted for cleaning...stairwells and other confined spaces,” and Butler teaches telescoping handgrip members and extension tubes to reach the floor. Ex1005, Abstract, 1:2-3, 26:1-5, 27:12-29. Moreover, Butler’s cleaner is designed with an optimal “center of gravity” and to “remov[e] excess weight,” Ex1005, 13:1-19, 15:12-18, which are considerations that a POSA would understand apply to hand vacuums. Ex1002 ¶70.

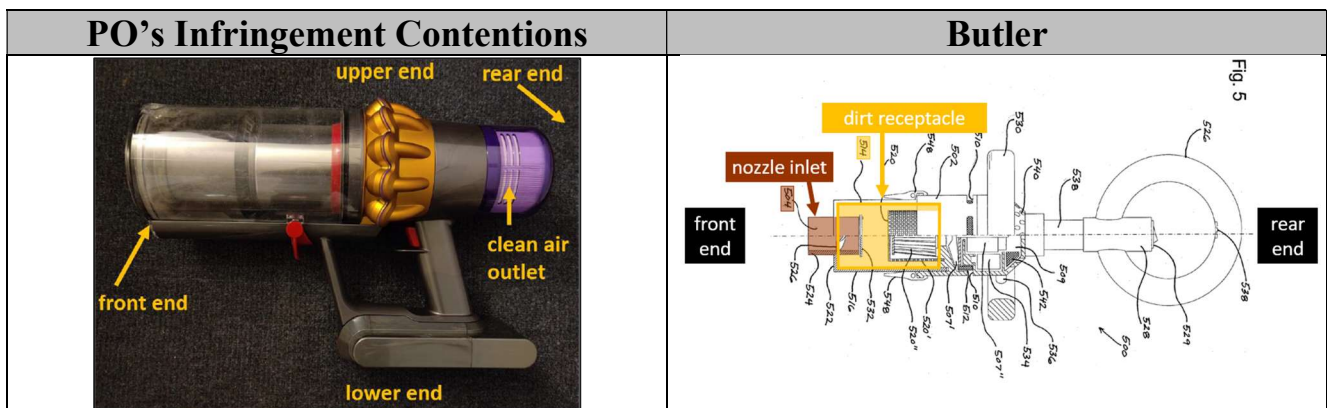
Butler teaches that its hand vacuum has a front end having a dirty air inlet, and a clean air outlet. Ex1002 ¶¶71-74. **Air** enters Butler’s hand vacuum cleaner

front end via “nozzle inlet 504,” is cleaned by “a cyclonic airflow pattern within the dirt receptacle 514,” and exits via “exhaust apertures 510”:



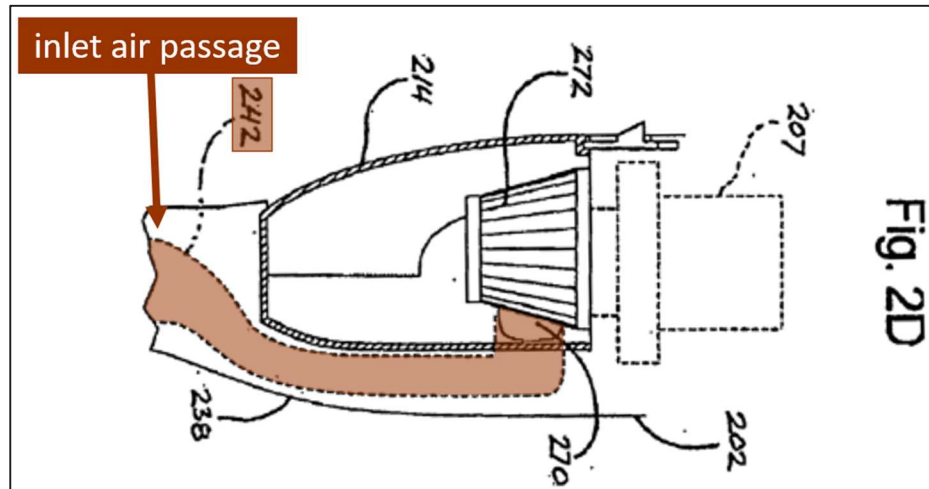
Ex1005, 22:5-6, 22:21-22, Fig. 5; *see also id.*, Figs. 2A, 3-4, 6-8, 16, 23; Ex1002 ¶71.

Butler’s “nozzle inlet 504” is a dirty air inlet at Butler’s front end, and “exhaust apertures 510” are clean air outlets. Ex1002 ¶72. With respect to the front and rear ends, this is at least as much disclosure of these limitations in Butler as PO has accused of infringement in the related litigation:



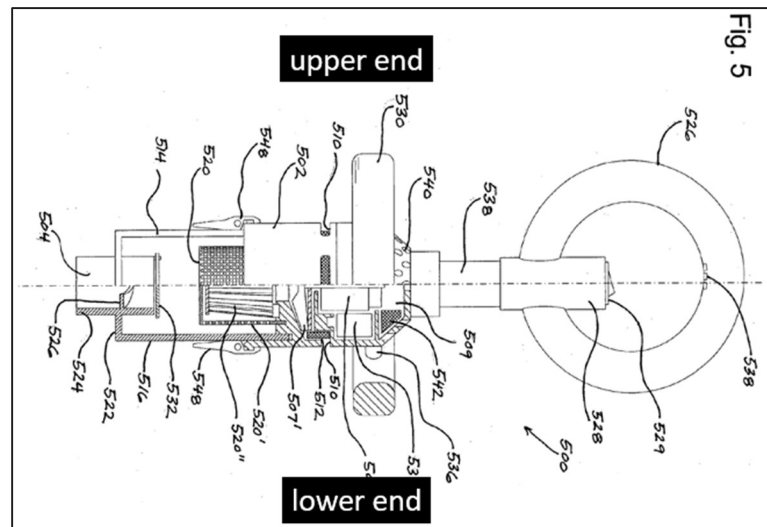
Ex1010, 3(PO's annotations); Ex1005, Fig. 5; Ex1002 ¶73.

Further, a POSA would have understood that Butler's **"inlet air passage 242"** is a dirty air inlet:



Ex1005, 16:9-13, 18:15-21, Fig. 2D; Ex1002 ¶74.

A POSA would have understood that Butler's hand vacuum has an **upper end** and a **lower end**:

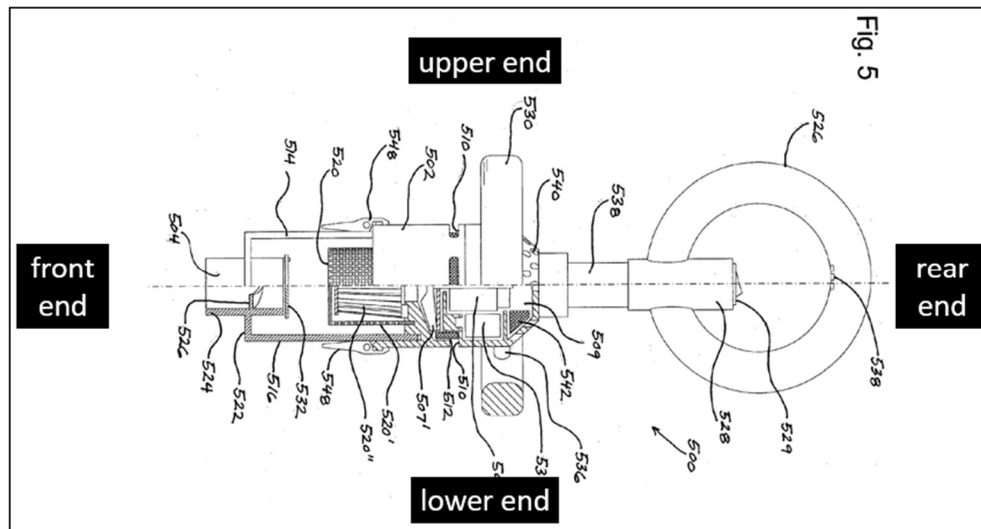


Ex1005, Fig. 5; *see also id.*, Figs. 2A, 3-4, 6-8, 16, 23; Ex1002 ¶75.

b. [1a]

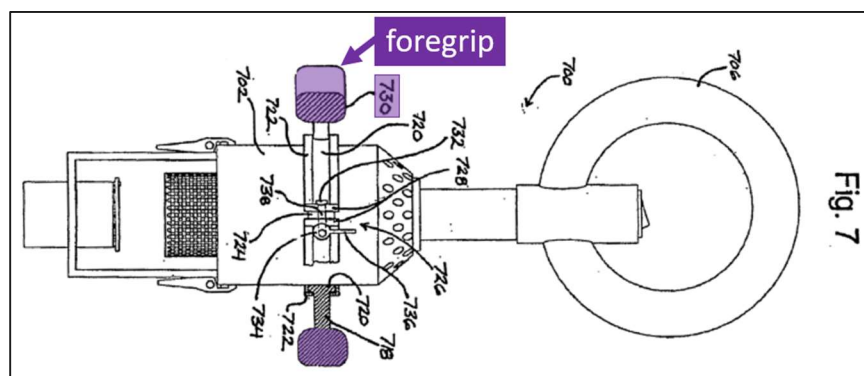
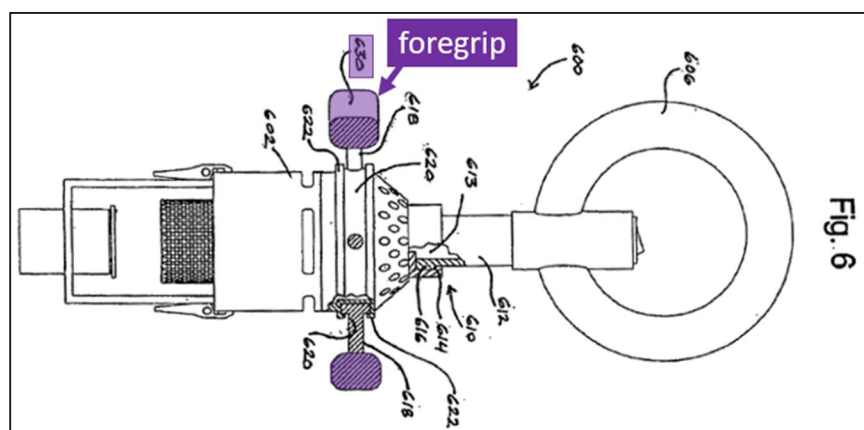
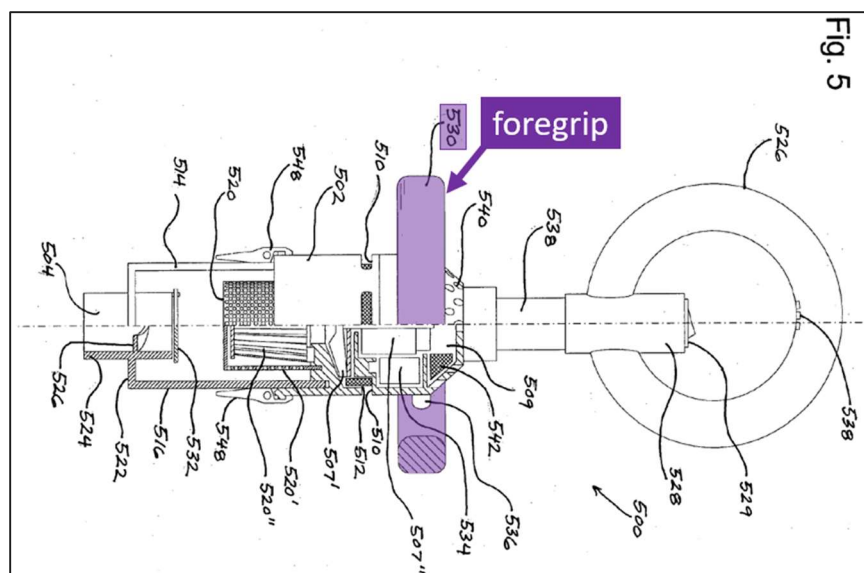
Butler teaches this limitation. Ex1002 ¶¶76-87.

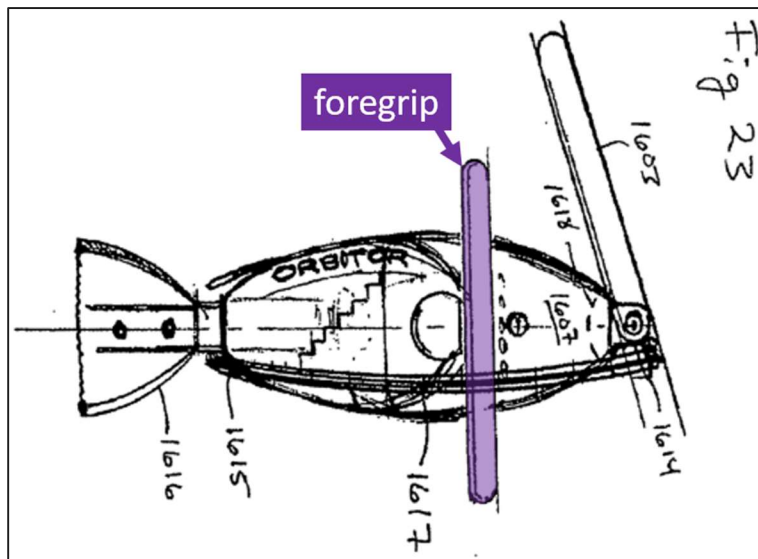
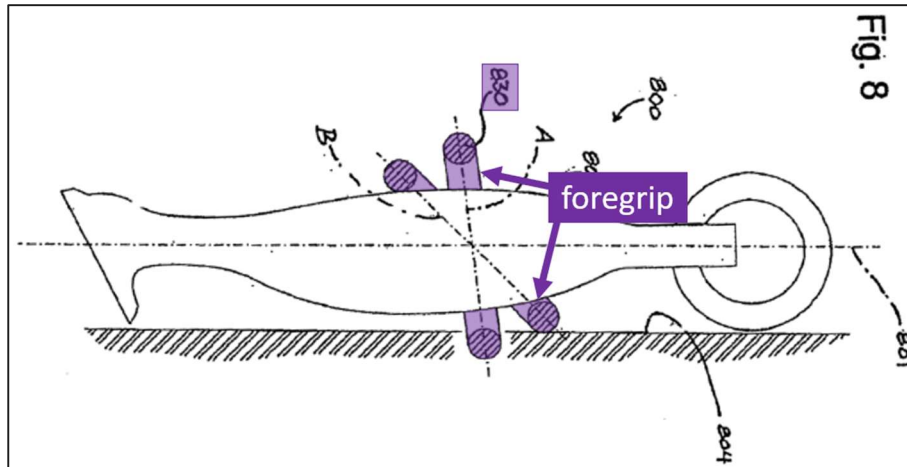
Butler's hand vacuum cleaner has a hand vacuum cleaner body comprising an **upper end**, a **lower end**, a **front end**, and a **rear end**:



Ex1005, Fig. 5; *see also id.*, Figs. 2A, 3-4, 6-8, 16, 23; Ex1002 ¶¶77; Ground 1, [1pre].

Butler teaches that the hand vacuum cleaner body comprises a handle. Ex1002 ¶¶78-81. Butler's cleaner body includes “a circular or looped **foregrip**” that is used to “ergonomically maneuver the device and rotate it into different positions for cleaning horizontal and inclined surfaces”:

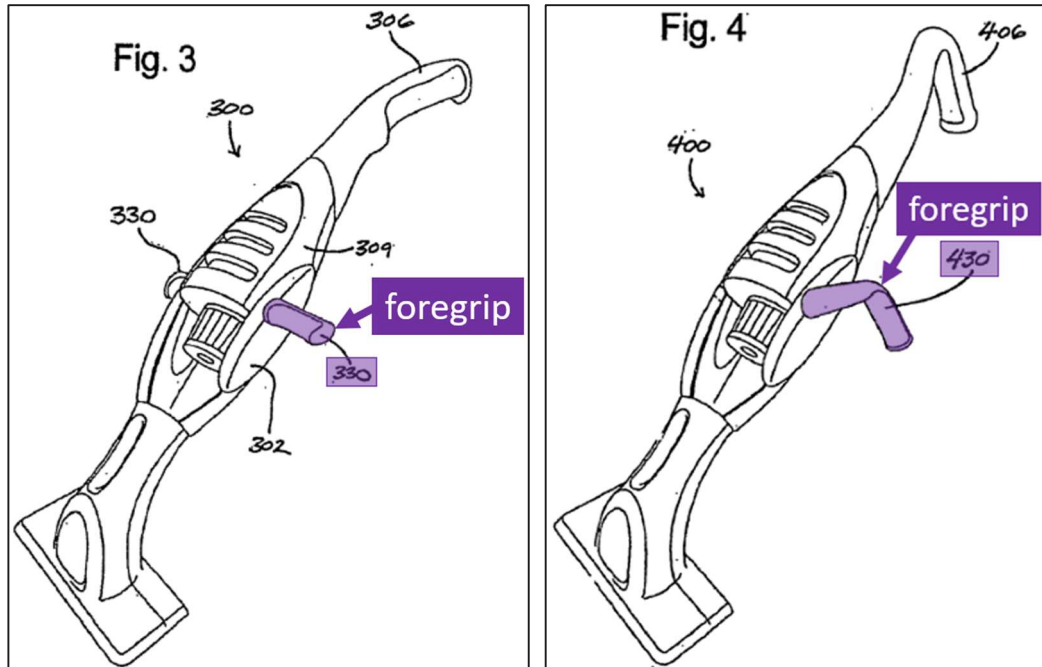




Ex1005, 19:9-12, 20:3-6, 24:3-11, 24:26-30, Figs. 5-8, 23; *see also id.*, Figs. 2A, 16; Ex1002 ¶78.

Butler's "circular or looped foregrip" is a handle. Ex1002 ¶79.

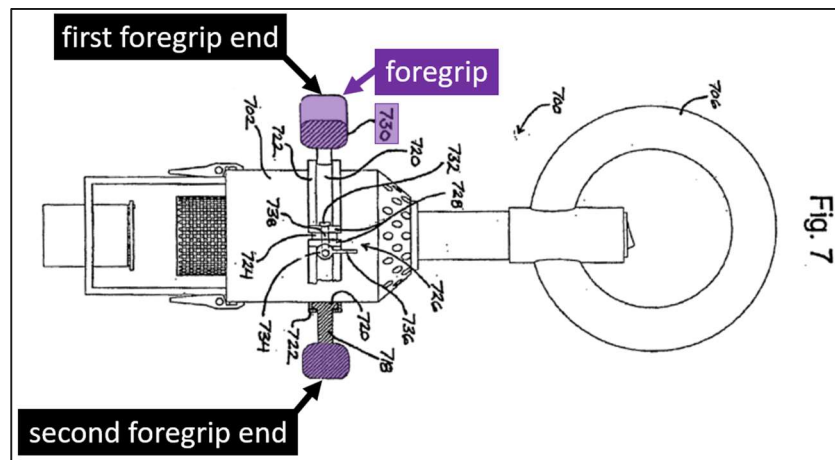
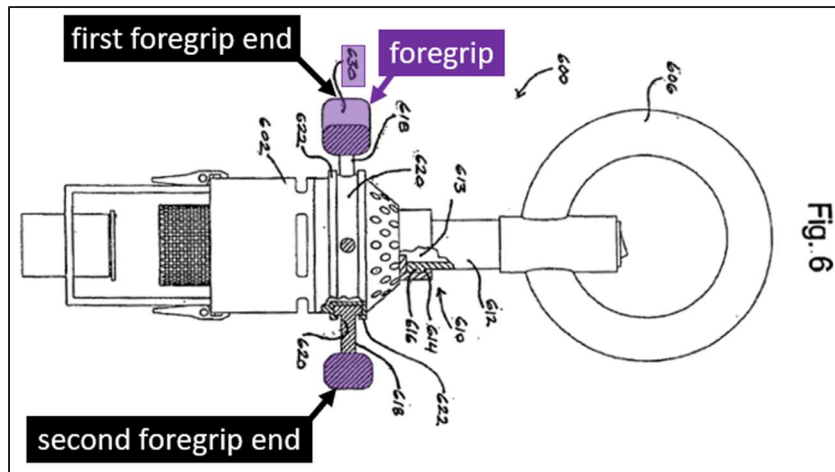
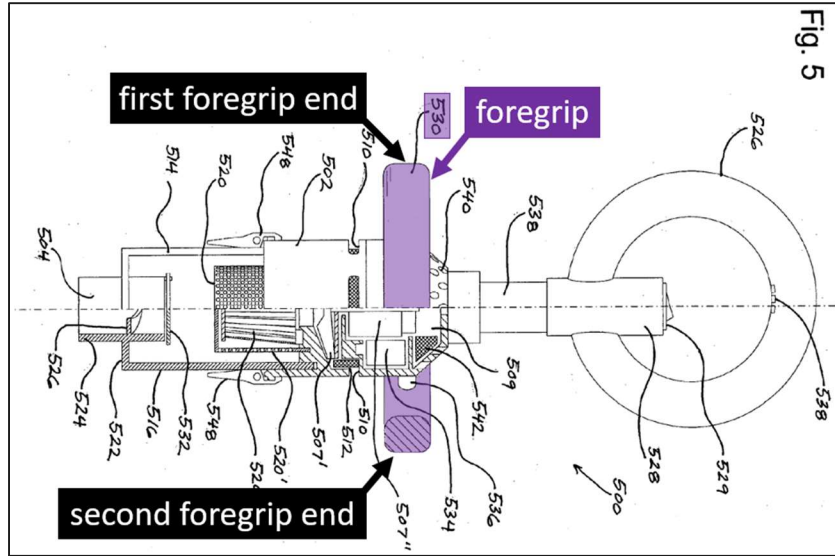
Butler further teaches "**foregrips 330, 430**" which a POSA would have also understood are handles:

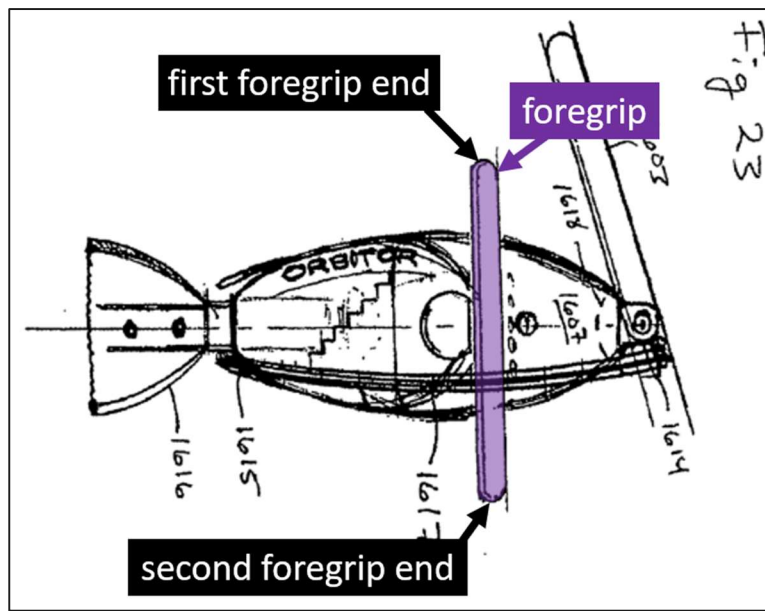
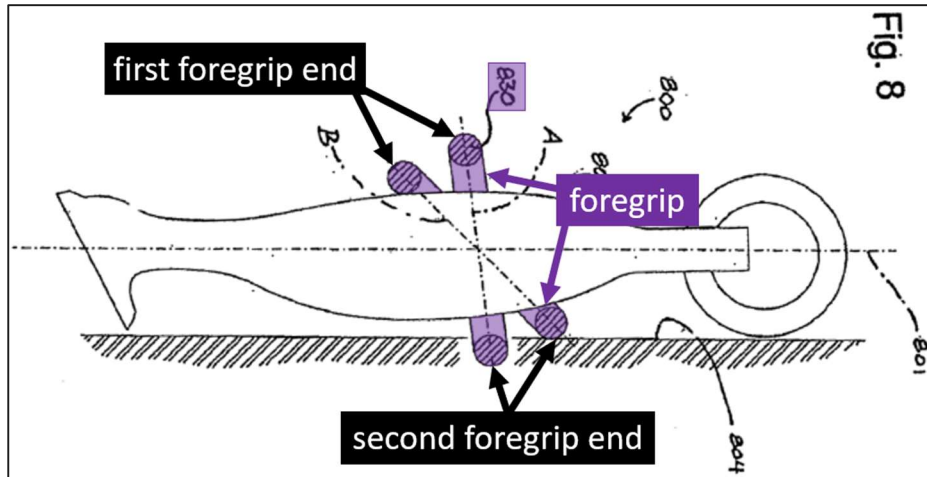


Ex1005, 19:24-26, Figs. 3-4; Ex1002 ¶80.

Butler's foregrips are interchangeable: "the loop-shaped grips may be replaced by any combination of rear grip and foregrip that provide the user with hand positions to ergonomically maneuver the device." Ex1005, 19:9-12.

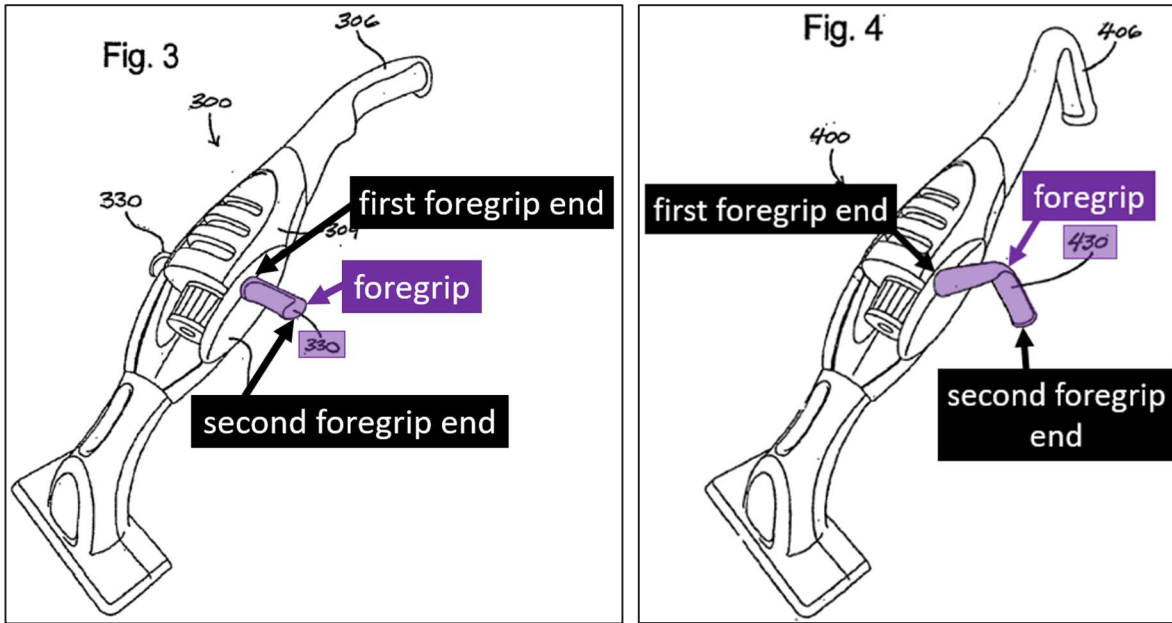
Butler teaches that the handle extends between a first handle end and a second handle end. Ex1002 ¶¶82-83. Butler's "circular or looped **foregrip**" extends between a **first foregrip end** and a **second foregrip end**:





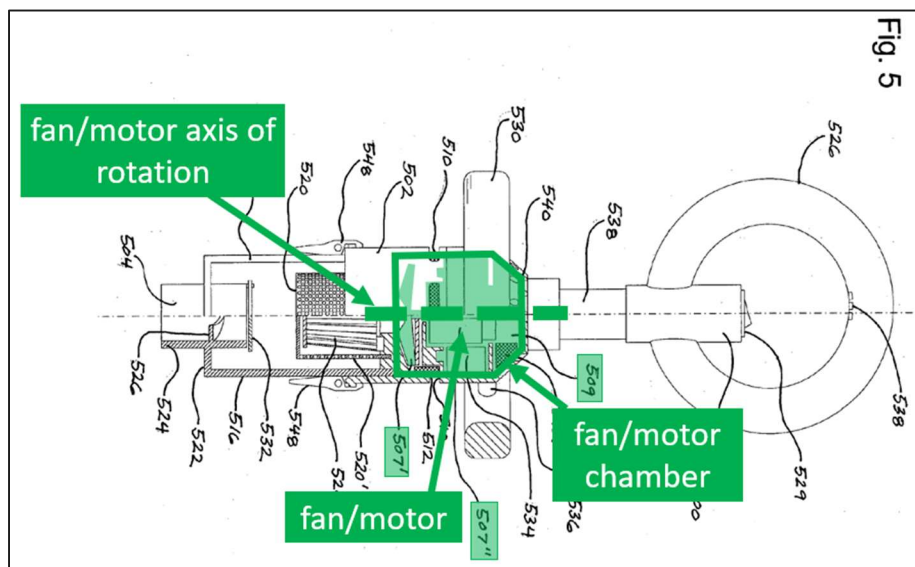
Ex1005, Figs. 5-8, 23; *see also id.*, Figs. 2A, 16; Ex1002 ¶82.

Likewise, Butler's “**foregrips 330, 430**” extend between a **first foregrip end** and a **second foregrip end**:



Ex1005, Figs. 3-4; Ex1002 ¶83.

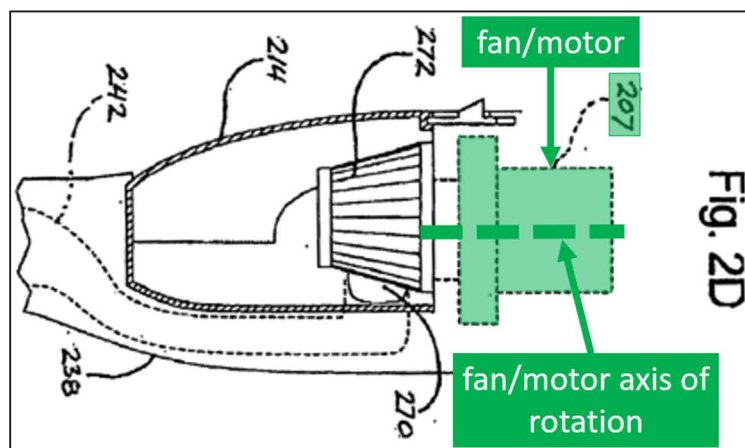
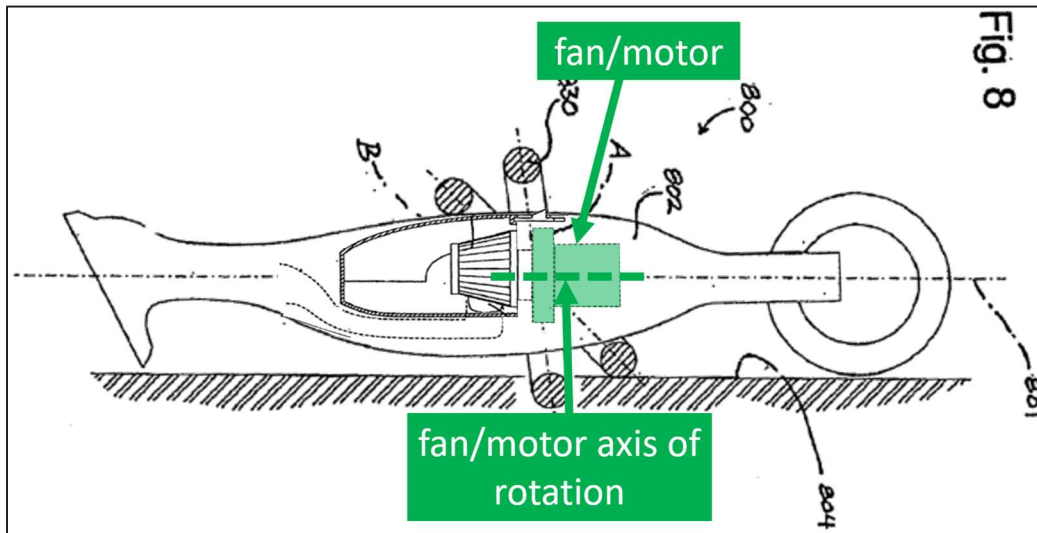
Butler teaches that the hand vacuum cleaner body includes a suction motor and fan assembly having a suction motor axis of rotation. Ex1002 ¶¶84-87. Butler's vacuum body has a “fan/motor chamber 509 in which the fan/motor 507 is located,” and has a fan/motor axis of rotation:



Ex1005, 20:12-14, Fig. 5; *see also id.*, Figs. 6-7, 16, 23; Ex1002 ¶84.

Butler's "fan/motor 507" is a suction motor and fan assembly with a suction motor axis of rotation. Ex1002 ¶85.

Further, Butler teaches a "fan/motor 207" with a fan/motor axis of rotation:



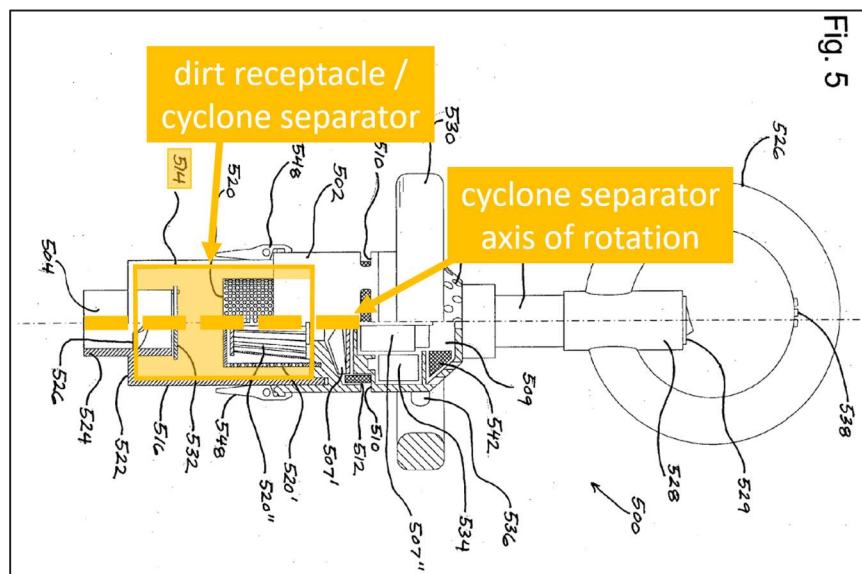
Ex1005, 18:3-12, Figs. 2D, 8(modified); *see also id.*, Figs. 2A, 3-4; Ex1002 ¶86.

Butler's "fan/motor 207" is also a suction motor and fan assembly with a suction motor axis of rotation. Ex1002 ¶87.

c. [1b]

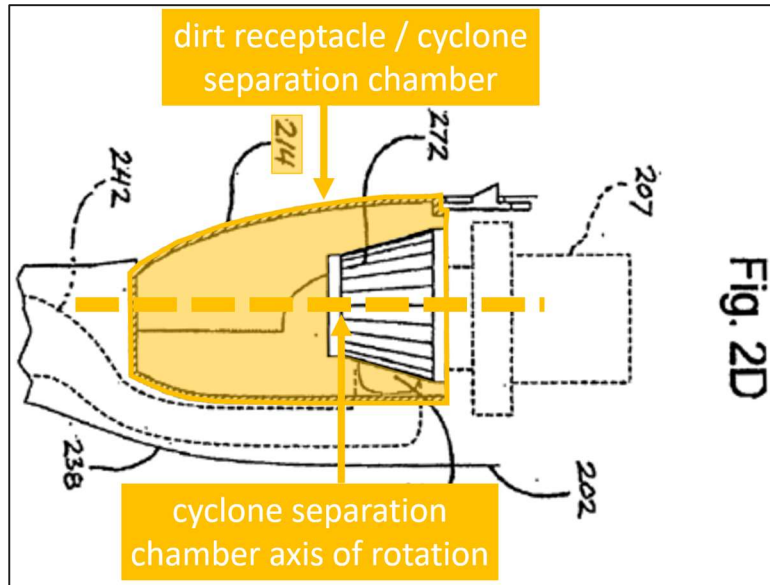
Butler teaches this limitation. Ex1002 ¶¶88-98.

Butler teaches a cyclone unit comprising a cyclone having a cyclone axis of rotation. Ex1002 ¶¶89-92. Butler's “**dirt receptacle** comprises a **cyclone separator**,” which a POSA would have understood is a cyclone unit including a cyclone with a **cyclone separator axis of rotation**:



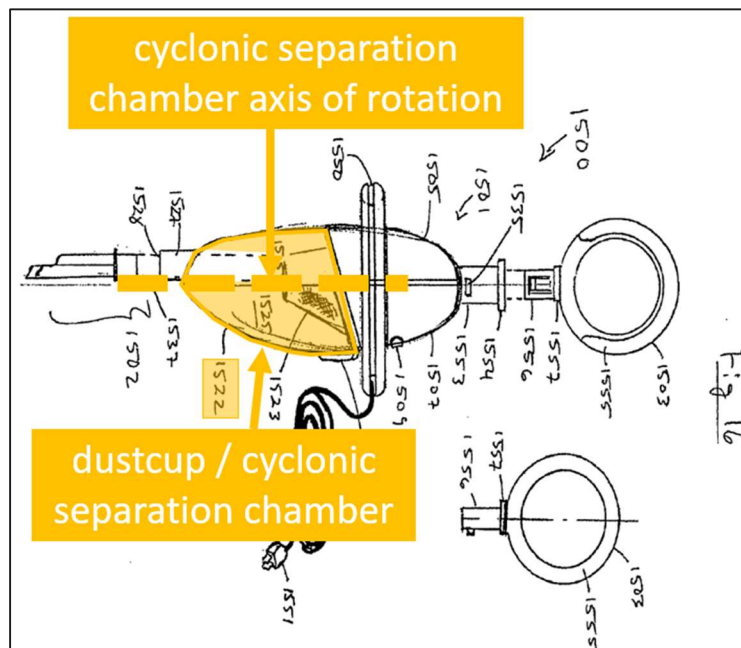
Ex1005, Claim 11, Fig. 5; Ex1002 ¶89; *see also* Ex1005, 22:20-22, Figs. 6-7, 23.

Further, Butler teaches a “**dirt receptacle 214** compris[ing] a **cyclone separation chamber**” which a POSA would understand is also a cyclone unit including a cyclone with a **cyclone separation chamber axis of rotation**:



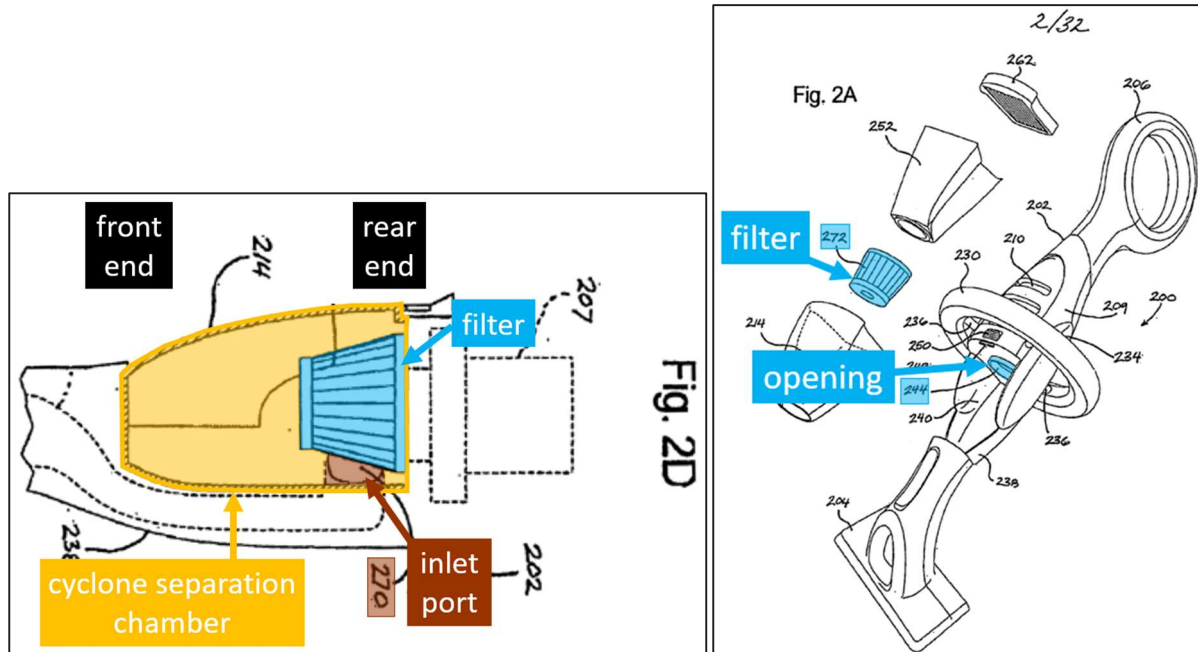
Ex1005, 18:3-5, Fig. 2D; *see also id.*, Figs. 2A, 3-4, 8; Ex1002 ¶90.

Butler also teaches a “**dustcup assembly 1508** compris[ing] a **dustcup 1522**” that “may comprise...a **cyclonic separation chamber**,” which a POSA would have understood is a cyclone unit including a cyclone with a **cyclonic separation chamber axis of rotation**:



airflow pattern.” Ex1005, 22:20-22; Ex1002 ¶94. Butler’s “filter 520 compris[ing]...fine filter 520” is a cyclone air outlet because air passes through it, and cyclonic separation ends, as it exits Butler’s “cyclone separator.” Ex1002 ¶94.

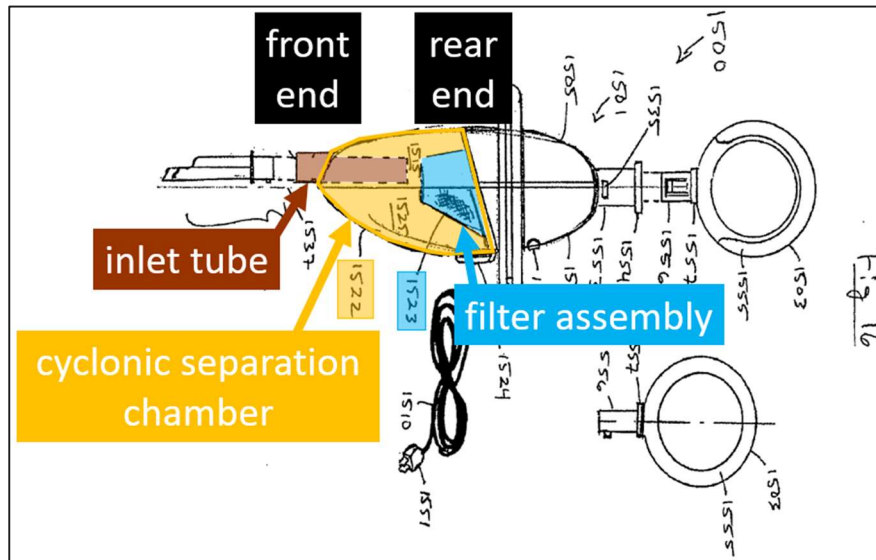
Further, Butler’s “cyclone separation chamber” comprising a cyclone has a **front end**, and a **rear end** (including where air enters through “inlet port 270” and exits through “frusto-conical filter 272...located over the fan/motor inlet opening 244”):



Ex1005, 18:3-14, Figs. 2A, 2D; *see also id.*, Figs. 3-4, 8; Ex1002 ¶95.

Butler’s “inlet port 270” is a cyclone air inlet, and “filter 272” and “opening 244” are, individually and collectively, a cyclone air outlet because air passes through them, and cyclonic separation ends, as it exits Butler’s “cyclone separator”/“cyclone separation chamber.” Ex1002 ¶96.

Butler's “**cyclonic separation chamber**” comprising a cyclone also has a **front end** (including where air enters through “**inlet tube 1514**”) and a **rear end** (including where air exits through “**filter assembly 1523** compris[ing] a filter 1529”):



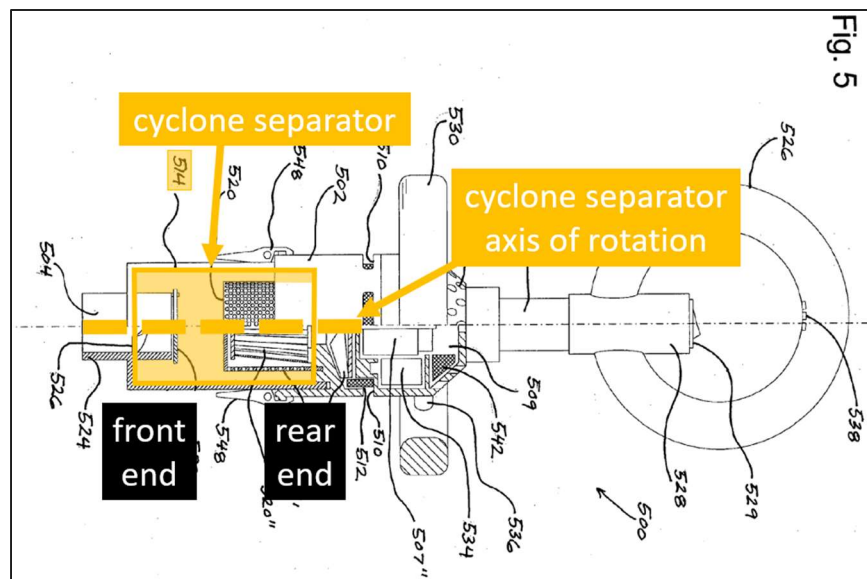
Ex1005, 35:22-24, Fig. 16; Ex1002 ¶¶97.

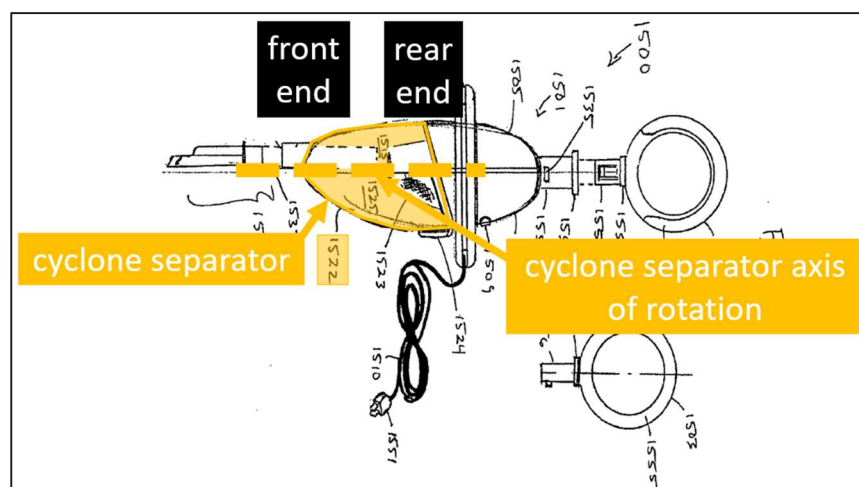
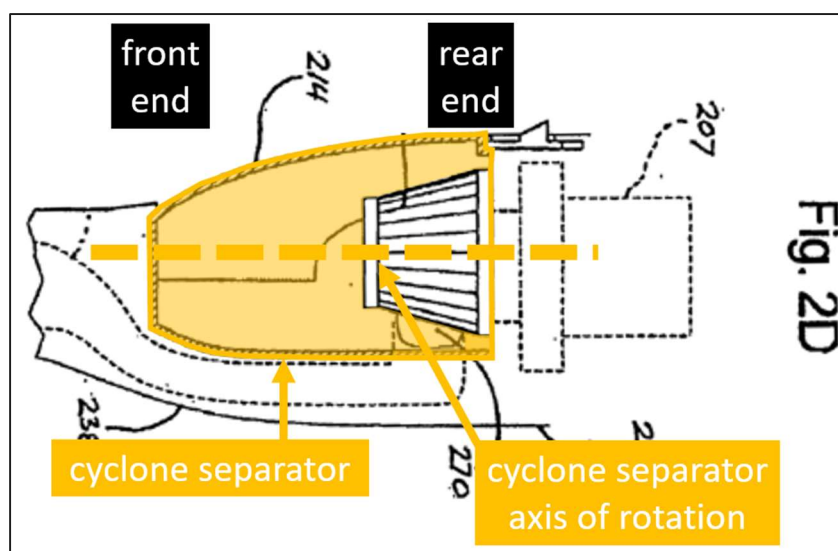
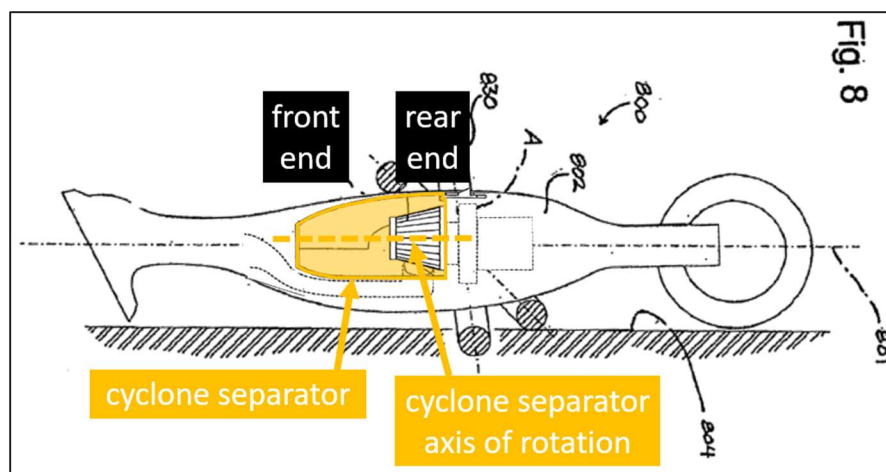
The “end” at which Butler’s “**inlet tube 1514**” terminates is a cyclone air inlet, because it is the inlet through which dirty air enters Butler’s cyclone; and “filter assembly 1523” is a cyclone air outlet because air passes through it, and cyclonic separation ends, as it exits Butler’s “cyclonic separation chamber.” Ex1005, 35:14-16, 35:22-24; Ex1002 ¶¶98.

d. [1c]

Butler teaches this limitation. Ex1002 ¶¶99-100.

Butler teaches that when the hand vacuum cleaner is positioned with the upper end of the hand vacuum cleaner above the lower end of the hand vacuum cleaner and the lower end of the hand vacuum cleaner is on a horizontal surface, the cyclone axis of rotation is generally horizontal and extends between the front and rear ends of the cyclone. Ex1002 ¶100. When Butler's hand vacuum is positioned as claimed, the “cyclone separator” axis of rotation, “cyclone separation chamber” axis of rotation, and “cyclonic separation chamber” axis of rotation (collectively cyclone separator and cyclone separator axis of rotation) extends between the front and rear ends of the cyclone:



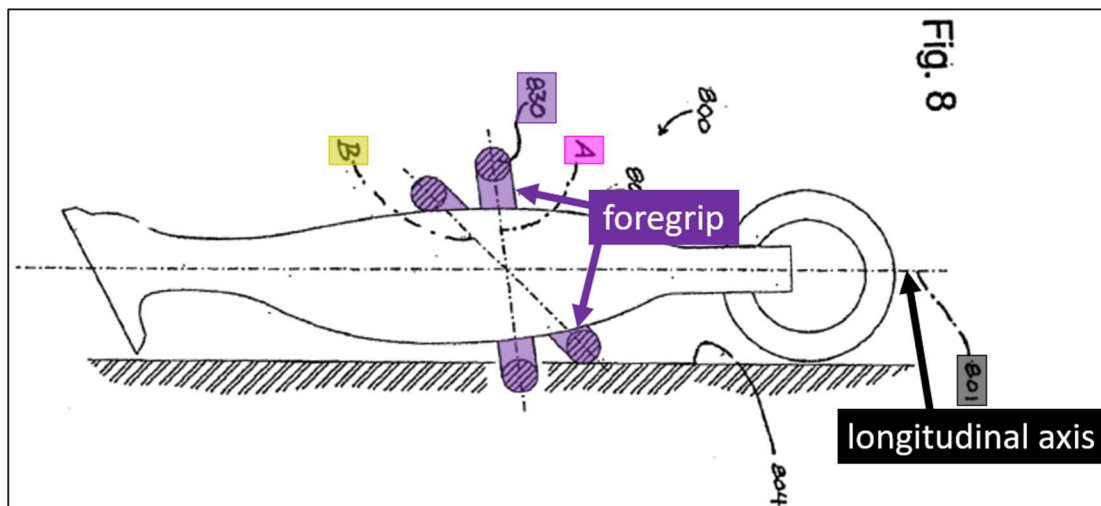


Ex1005, Figs. 2D, 5, 8(modified), 16; *see also id.*, Figs. 2A, 3-4, 6-7, 23; Ex1002 ¶100.

e. [1d]

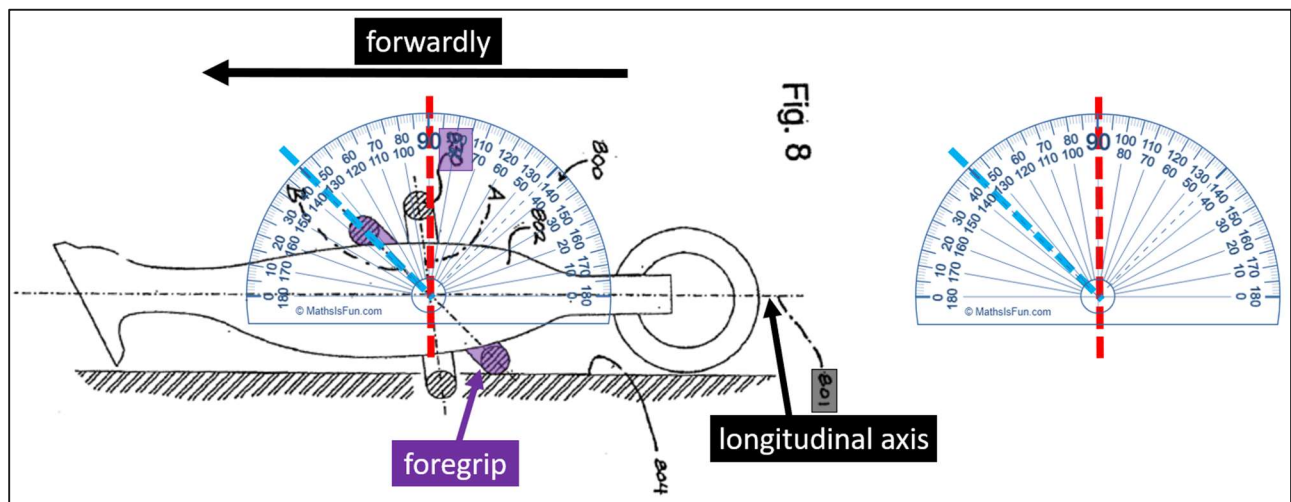
Butler teaches this limitation. Ex1002 ¶¶101-05.

Butler teaches that when the hand vacuum cleaner is positioned with the upper end of the hand vacuum cleaner above the lower end of the hand vacuum cleaner and the lower end of the hand vacuum cleaner is on a horizontal surface, the handle is inclined forwardly at an angle that is between 10 and 80 degrees from a vertical axis. Ex1002 ¶¶102-05. Butler's "foregrip[s]" may be pivotable or otherwise articulated to provide even greater ergonomic flexibility and control of the device." Ex1005, 22:26-28. For example, Butler's "**foregrip 830**...is pivotable about an axis generally perpendicular to the **longitudinal axis 801** of the vacuum":



Ex1005, 24:26-30, Fig. 8; Ex1002 ¶102.

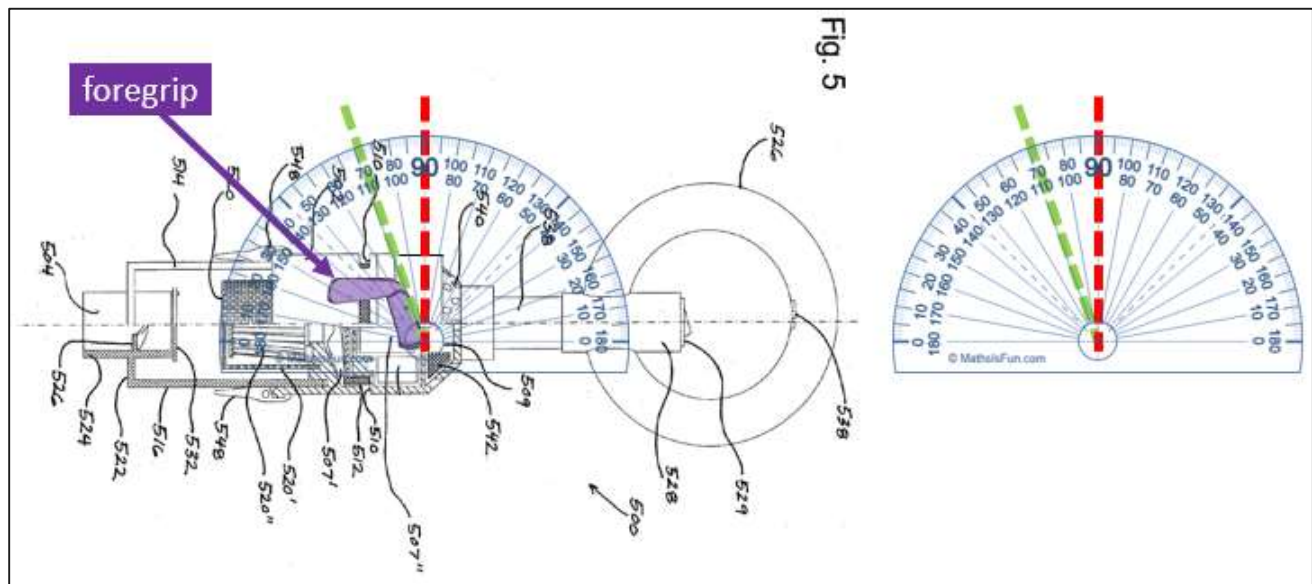
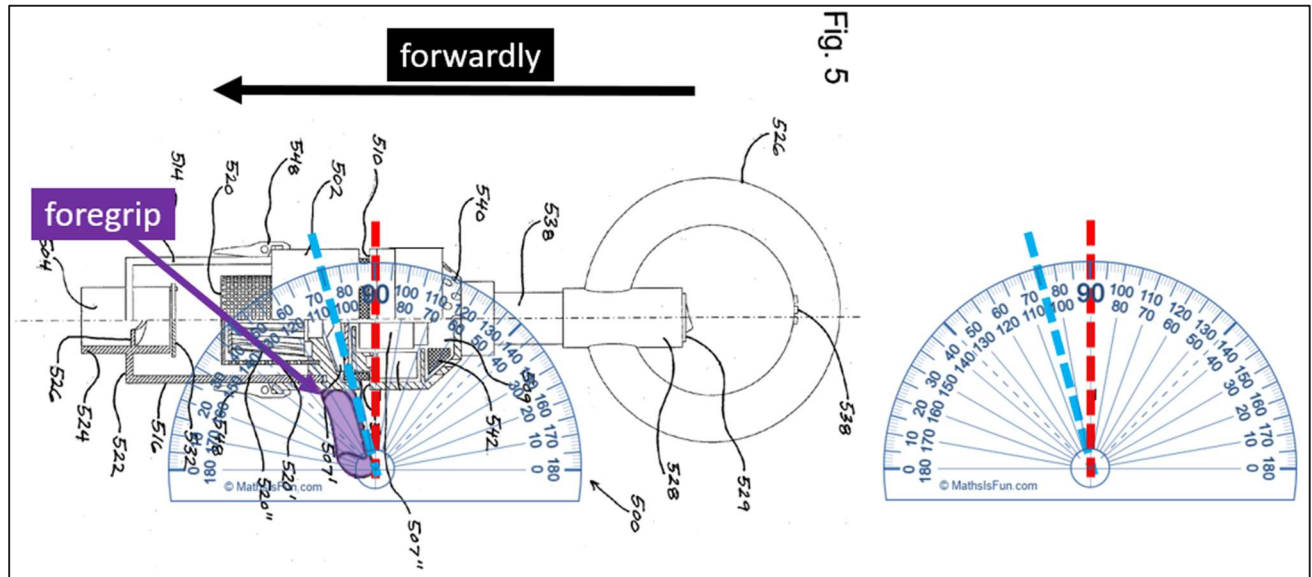
“The foregrip 830 is movable between two positions: an operating position, designated by reference numeral **A**, and a collapsed position, designated by reference numeral **B**.” Ex1005, 25:1-3. “Of course, intermediate or other positions may also be provided.” *Id.*, 25:4. A POSA would have understood that Butler teaches several “intermediate or other positions” between “numeral A” and “numeral B” where the “foregrip” is inclined forwardly at an angle that is between 10 and 80 degrees from “an **axis** generally perpendicular to the **longitudinal axis 801**,” i.e., a **vertical axis**, when the hand vacuum cleaner is oriented as claimed. Ex1002 ¶103. For example, in Figure 8, Butler’s “foregrip 830” is inclined **forwardly** at **45 degrees** from a **vertical axis**:



Ex1005, Fig. 8; *see also id.*, Figs. 2A, 5-7, 16, 23; Ex1002 ¶103.

Likewise, Butler’s “foregrips 330, 430...may be provided with joints or pivots to allow them to be articulated into more desirable positions,” which a POSA would understand includes when Butler’s “foregrips 330, 430” are inclined

forwardly at an angle that is between 10 and 80 degrees, e.g., **15 degrees** and **19 degrees**, from a **vertical axis**:



Ex1005, 19:26-28, Figs. 3(modified), 4(modified), 5(modified); Ex1002 ¶104.

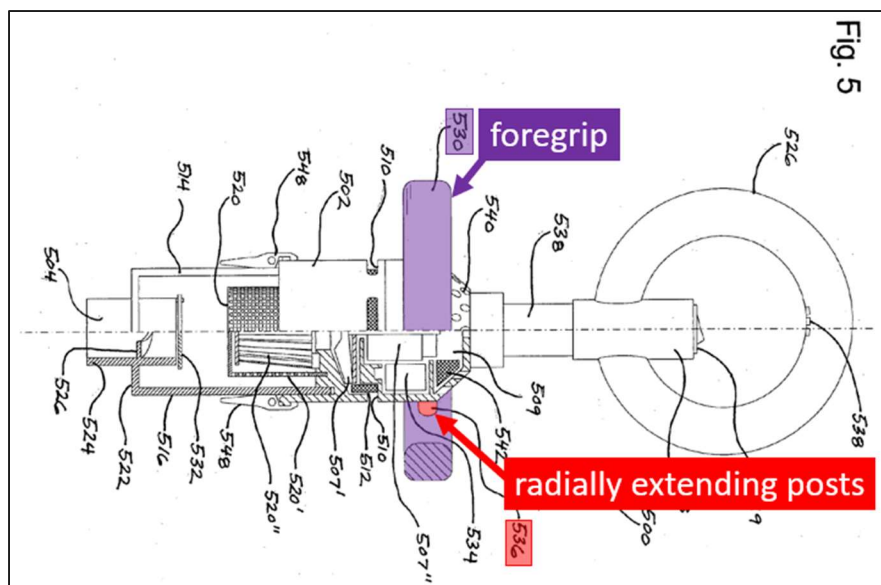
As explained for [1e], Butler teaches that its “foregrips” may be provided on any location of Butler’s vacuum cleaner “housing” by “rotat[ing],” “slid[ing],” and

being “removed and inserted in various different locations,” including the “locations” shown above. Ex1002 ¶105; Ground 1, [1e].

f. [1e]

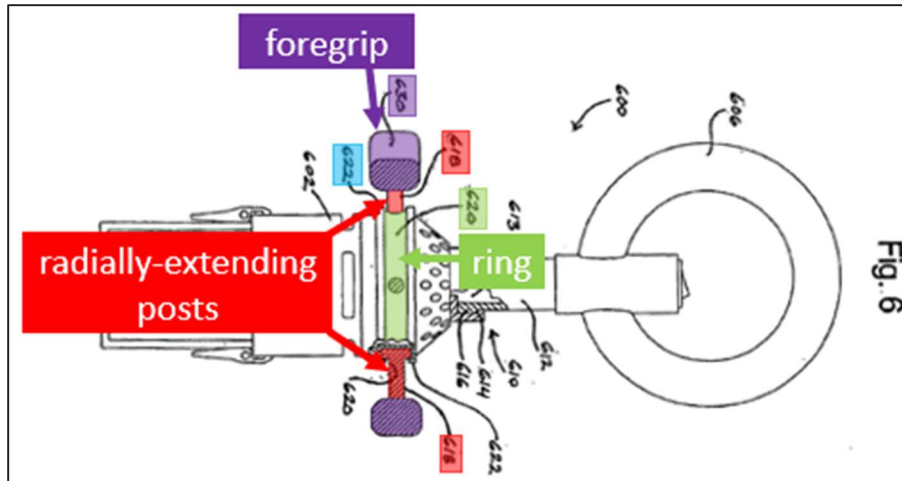
Butler teaches this limitation. Ex1002 ¶¶106-22.

Butler teaches that the handle is provided on a sidewall of the hand vacuum cleaner body. Ex1002 ¶¶106-14. Butler’s “cylindrical housing 502 [has] a...circular or looped **foregrip 530**,” which “is attached to the housing 502 by a number of **radially-extending posts 536**”:



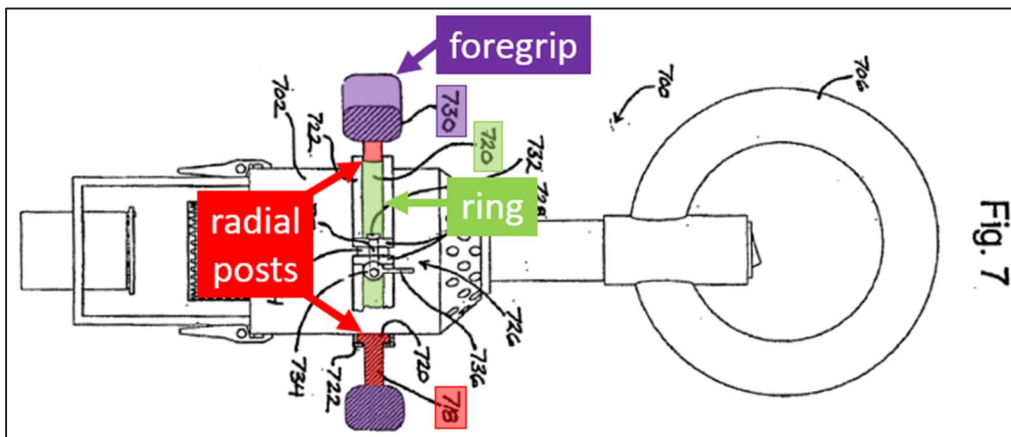
Ex1005, 20:4-6, 20:10-11, Fig. 5; *see also id.*, Figs. 16, 23; Ex1002 ¶107.

Butler’s “**foregrip [630]** is attached to the housing 602 by a number of **radially-extending posts 618**, which terminate at...a **ring 620**”:



Ex1005, 23:12-15, Fig. 6; Ex1002 ¶108.

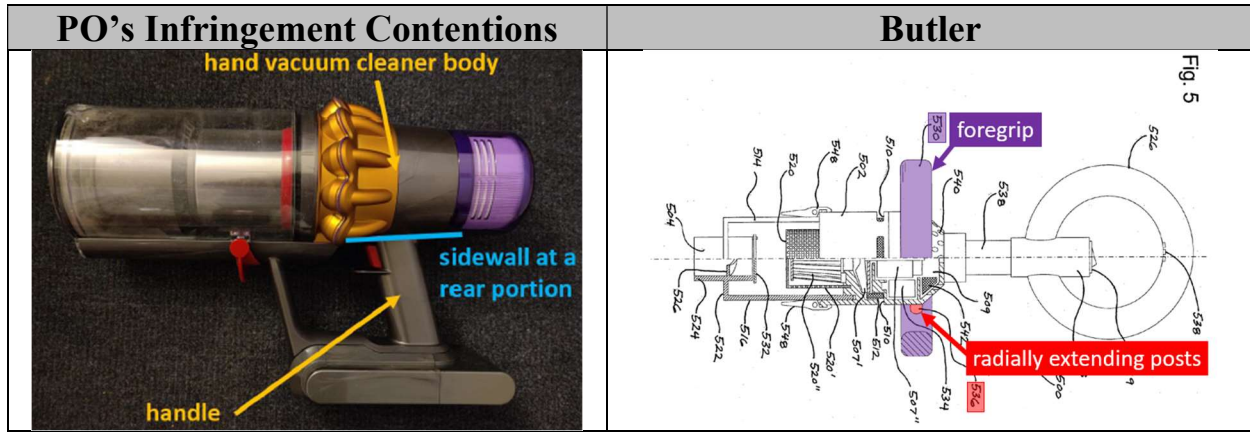
Likewise, Butler’s “**foregrip 730** is attached to a **ring 720**” (located on “housing 702”) “by a number of **radial posts 718**”:



Ex1005, 24:6-8, Fig. 7; Ex1002 ¶109.

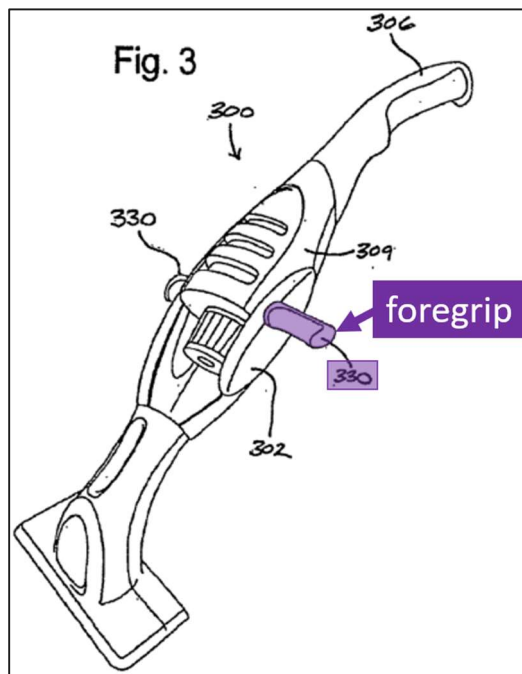
Further, “foregrip 830...is attached to the housing 802 of a vacuum cleaner 800, much like in the embodiments of Figures 1 and 2,” i.e., by “radial posts.” Ex1005, 24:27-29, Figs. 2A, 8; *see also id.*, 15:29-16:1. A POSA would understand that one or more of these radial posts is located on a sidewall of the hand vacuum

cleaner body. Ex1002 ¶110. Further, this is at least as much disclosure of these limitations in Butler as PO has accused of infringement in the related litigation:



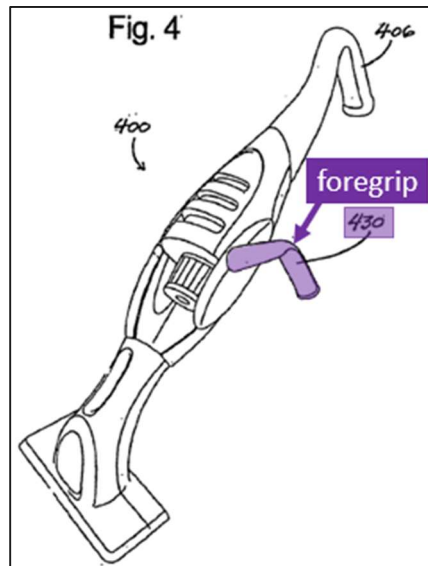
Ex1010, 11(PO's annotations); Ex1005, Fig. 5; Ex1002 ¶111.

Butler's “foregrip[] 330” “extend[s] generally radially from the vacuum cleaner housing”:



Ex1005, 19:18-26, Fig. 3; Ex1002 ¶112.

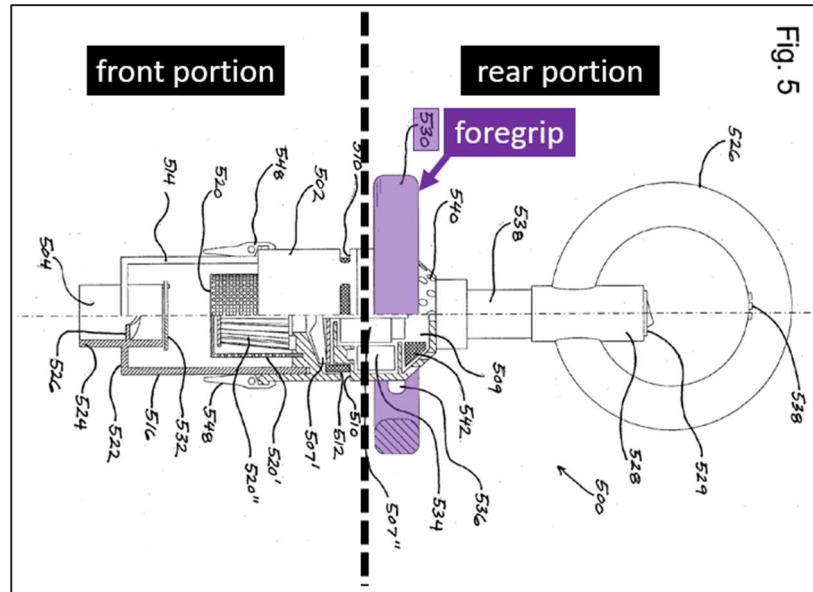
Butler's “foregrip[] 430” is also attached to the vacuum cleaner housing:



Ex1005, 19:22-24, Fig. 4; Ex1002 ¶113.

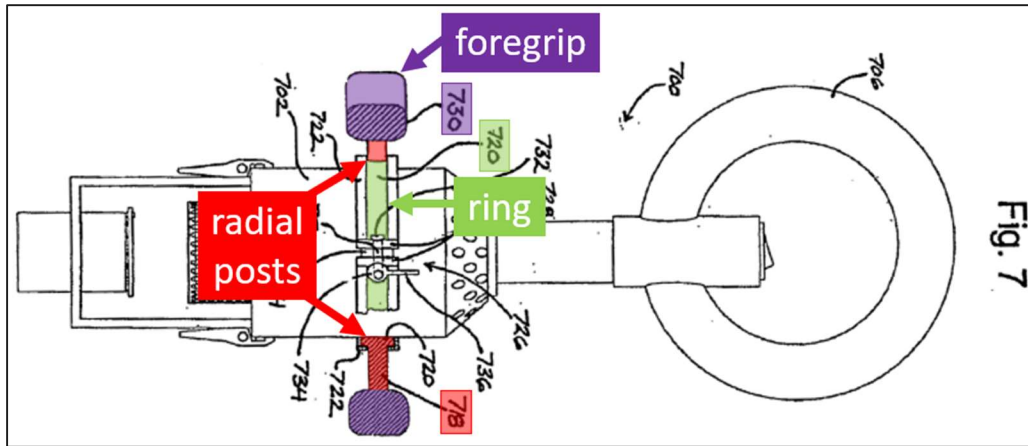
Butler's “housing” includes a sidewall of the hand vacuum cleaner body, and Butler's “foregrips” are handles provided on a sidewall of the hand vacuum cleaner body. Ex1002 ¶¶107-14.

Butler teaches that the handle is provided on a sidewall at a rear portion of the hand vacuum cleaner body. Ex1002 ¶¶115-22. Butler's “foregrip 530” is provided on a sidewall of “cylindrical housing 502” at a **rear portion** of Butler's hand vacuum cleaner body:



Ex1005, Fig. 5; Ex1002 ¶115.

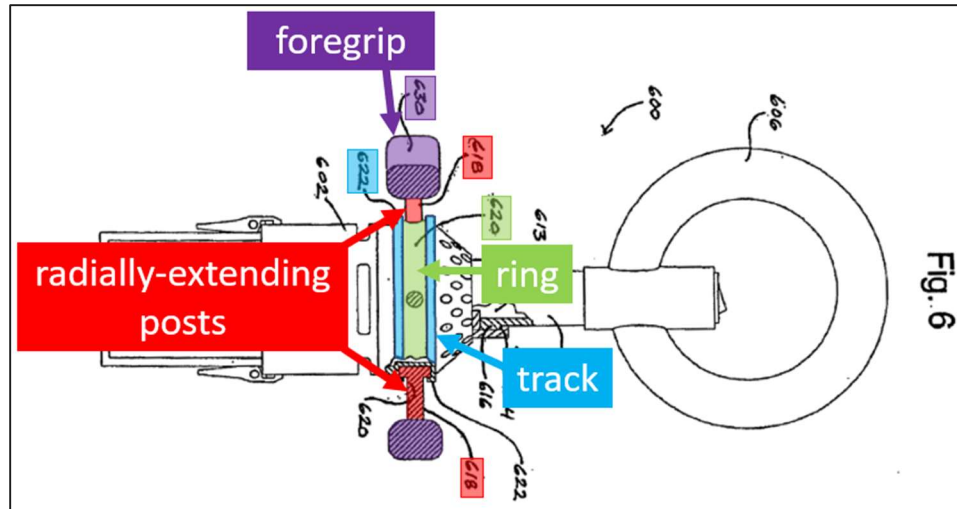
Further, Butler teaches that each of its foregrips can be provided on any portion of the vacuum cleaner housing, including the rear portion: “the rear grip and/or foregrip may be pivotable or otherwise articulated to provide even greater ergonomic flexibility and control of the device.” Ex1005, 22:26-28. For example, Butler’s “foregrip 730 is attached to a ring 720,” “and the ring 720 is sized such that it can slide along the length of the housing,” “allow[ing] the user to adjust the distance between the rear grip and the foregrip”:



Ex1005, 24:3-11; Fig. 7; *see also id.*, Figs. 2A, 3-6, 8, 16, 23; Ex1002 ¶116.

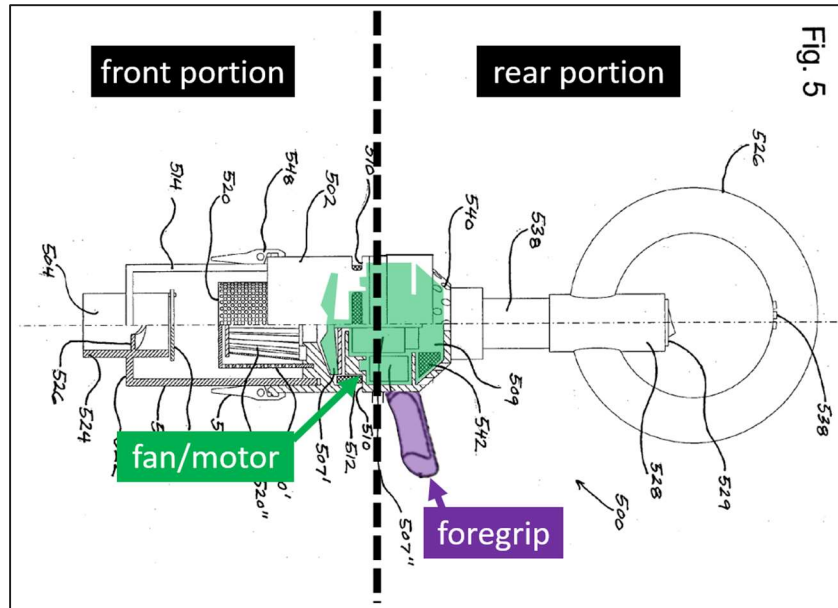
A POSA would have understood that, when “ring 720” “slide[s]” rearwardly “along the length of the housing,” Butler’s “foregrip” is also provided on a sidewall at a rear portion of the hand vacuum cleaner body. Ex1002 ¶117.

Butler further teaches that “[t]he foregrip...is also rotatable about the vacuum cleaner housing.” Ex1005, 23:12-13. “[T]he **foregrip** is attached to the housing 602 by a number of **radially-extending posts 618**, which terminate...at a **ring 620**,” “captured within a **track 622** in the housing 602, in which it is free to rotate,” and “a lock may be provided to prevent excessive rotation or selectively prevent any rotation”:



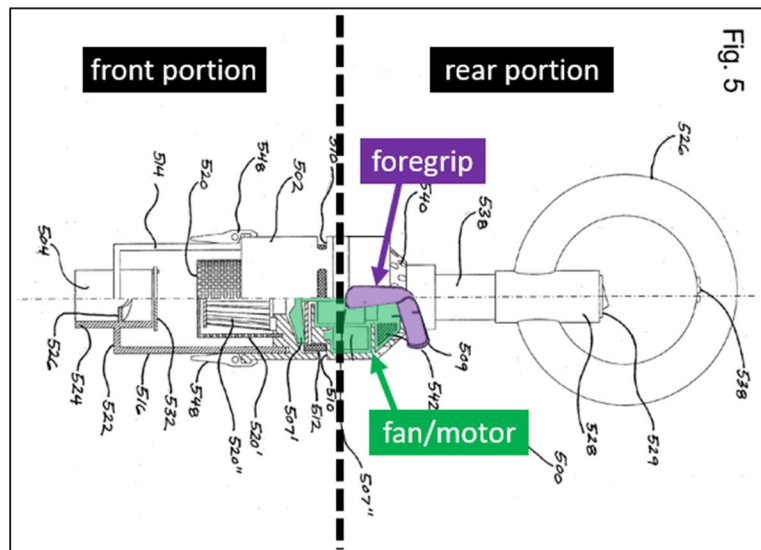
Id., 23:14-17, Fig. 6; *see also id.*, Figs. 2A, 3-5, 7-8, 16, 23; Ex1002 ¶118.

Butler explains that “the loop-shaped grips may be replaced by any combination of rear grip and foregrip,” e.g., “foregrips 330, 430,” which Butler teaches “can be removed and inserted in various different locations on the housing.” Ex1005, 19:9-12, 19:24-26. Thus, a POSA would have understood that each of Butler’s “foregrips” (including the “circular or looped foregrip[s]” and “foregrips 330, 430”) can be provided on any location of Butler’s “housing” (including the rear portion) by “rotat[ing],” “slid[ing],” and being “removed and inserted in various different locations.” Ex1002 ¶119. For example, a POSA would have understood that, because Butler’s “**foregrip[] 330**” is rotatable around the circumference of Butler’s body, and slidable forward and rearward on Butler’s body, one of the positions it would take would be a **rear portion** of Butler’s “housing” (replacing “foregrip 530”), underneath the “**fan/motor**”:



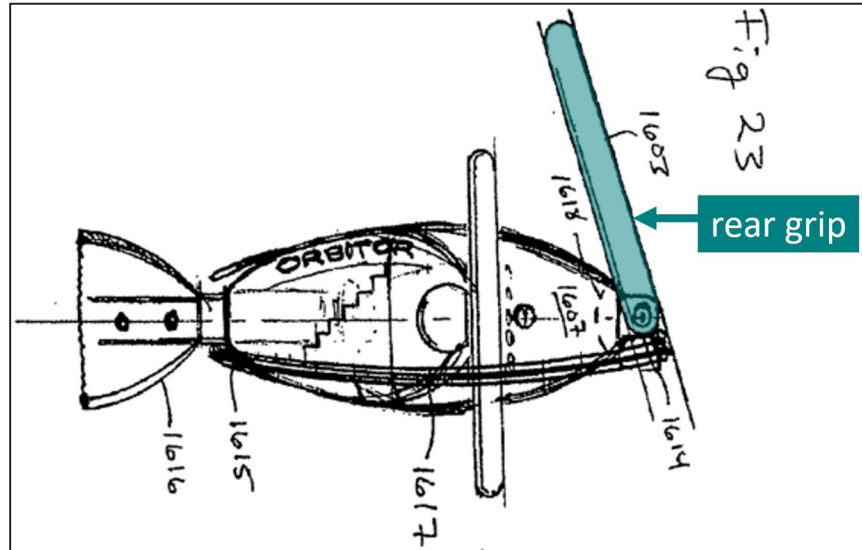
Ex1005, Figs. 3(modified), 5(modified); Ex1002 ¶119.

Likewise, because Butler’s “foregrip[] 430” is rotatable around the circumference of Butler’s body, and slidable forwardly and rearwardly on Butler’s body, one of the positions it would take would be on a rear portion of Butler’s “housing” (replacing “foregrip 530”), adjacent the “fan/motor”:



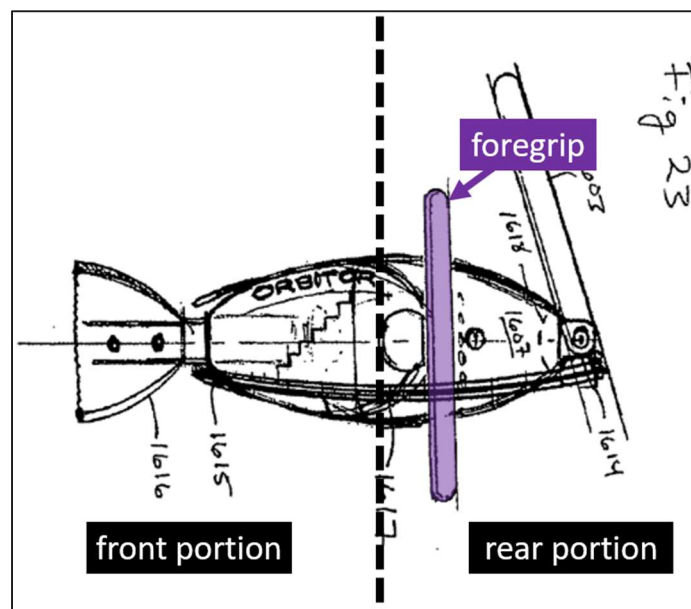
Ex1005, Figs. 4(modified), 5(modified); Ex1002 ¶120.

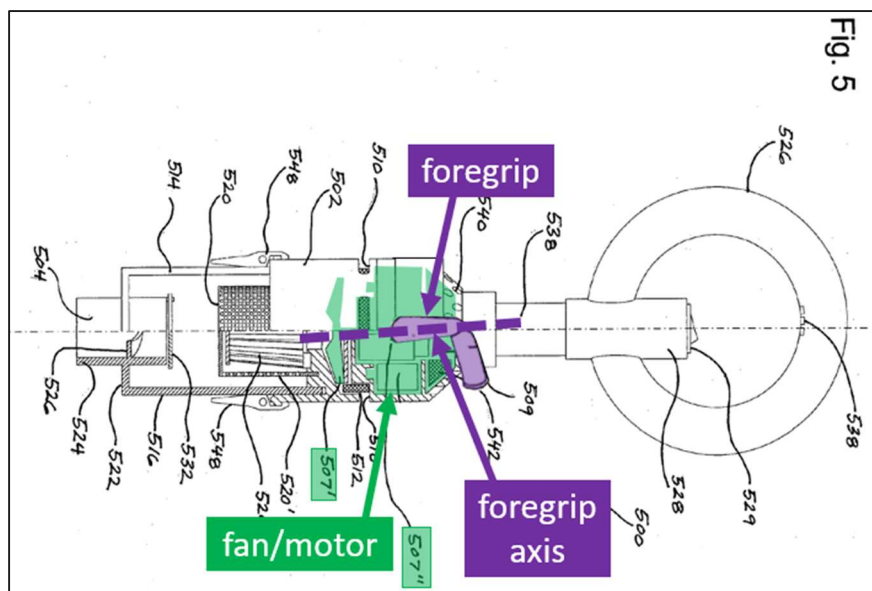
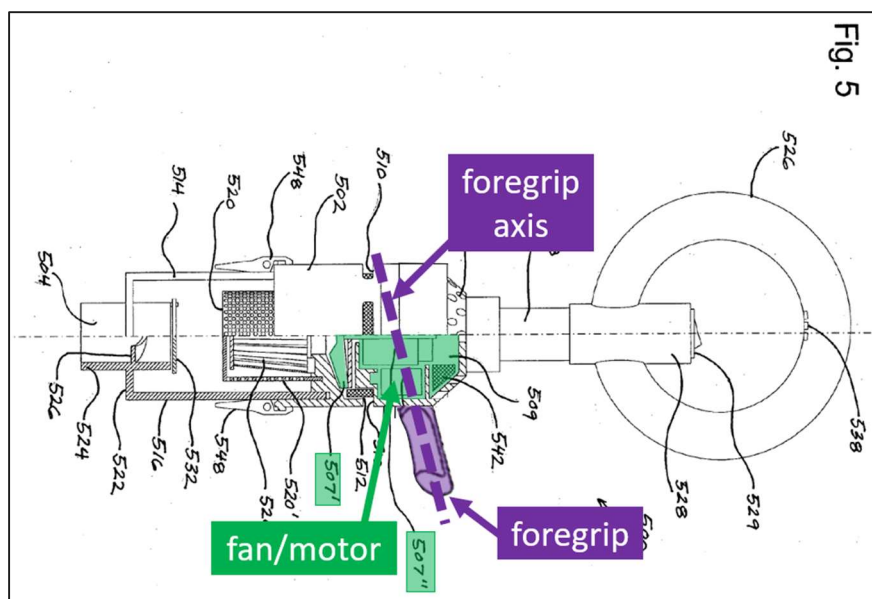
Butler further teaches “a pivoting **rear grip 1601**” “capable of being locked in” “a storage position”:

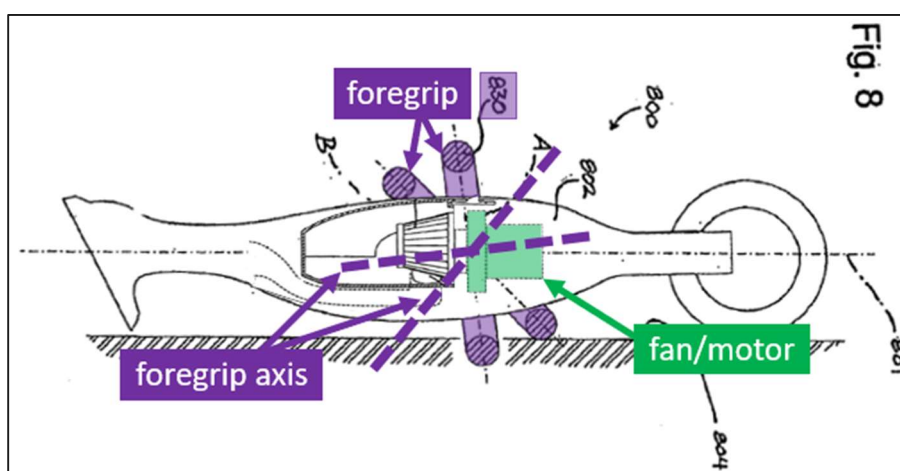
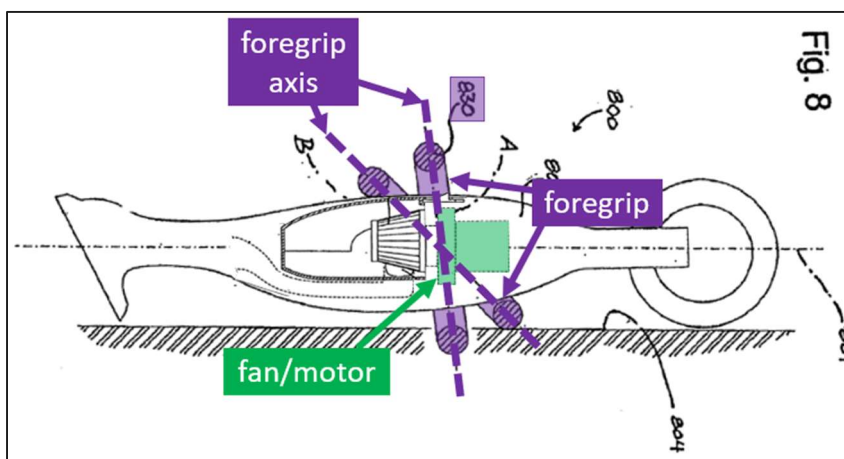
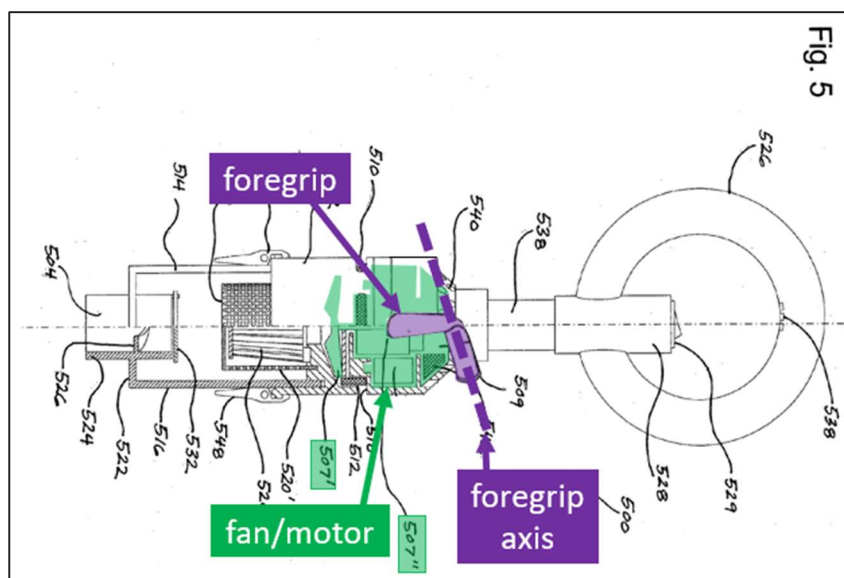


Ex1005, 39:14-22, Fig. 23; Ex1002 ¶121.

A POSA would have understood that each of Butler’s “**foregrips**” are also provided on a sidewall at a rear portion of the hand vacuum cleaner body when the “rear grip” is “pivot[ed]”:







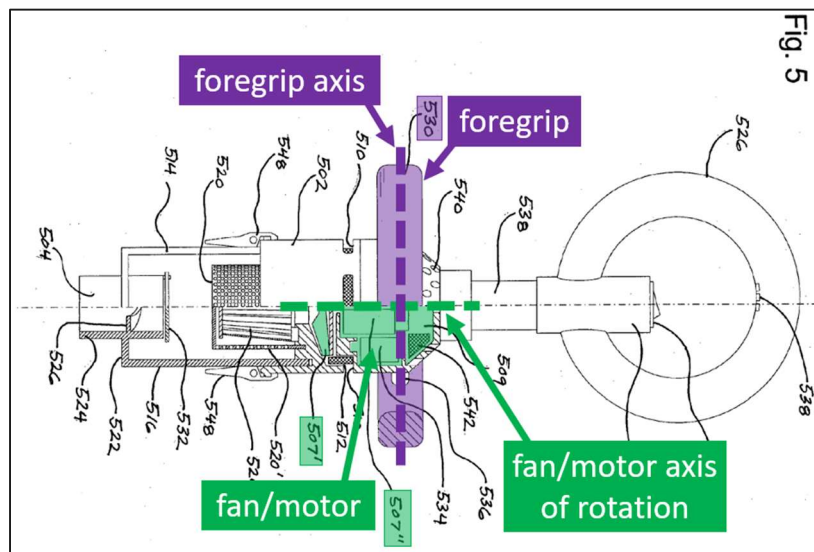
Ex1005, Figs. 2D(modified), 3(modified), 4(modified), 5(modified), 8(modified); *see also id.*, Figs. 2A, 6-7, 16, 23; Ex1002 ¶124.

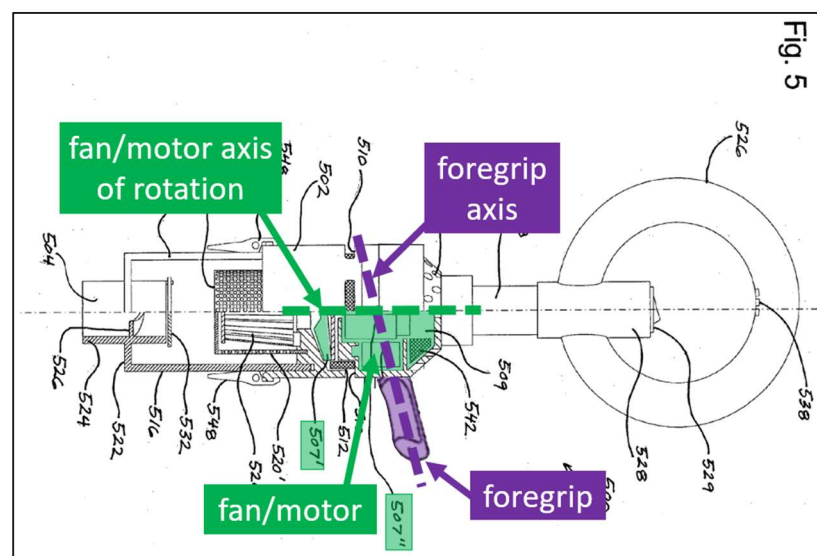
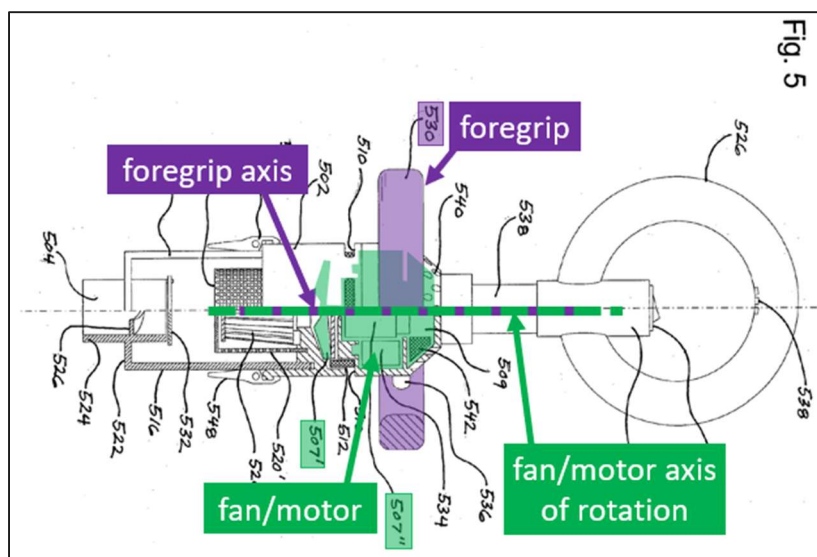
A POSA would have understood that Butler's "foregrips" have multiple **foregrip axes**, including an axis between any two points on the circumference of Butler's circulate foregrip, and another **foregrip axis** running through its radial center, each of which intersects the "fan/motor." Ex1002 ¶125.

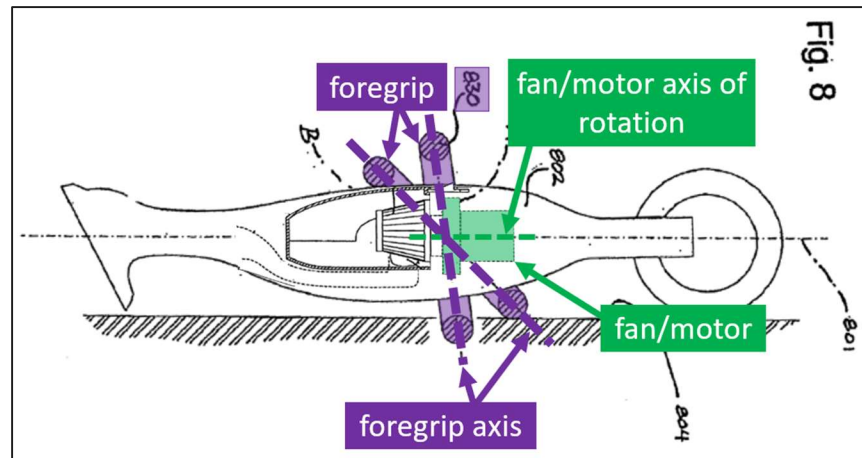
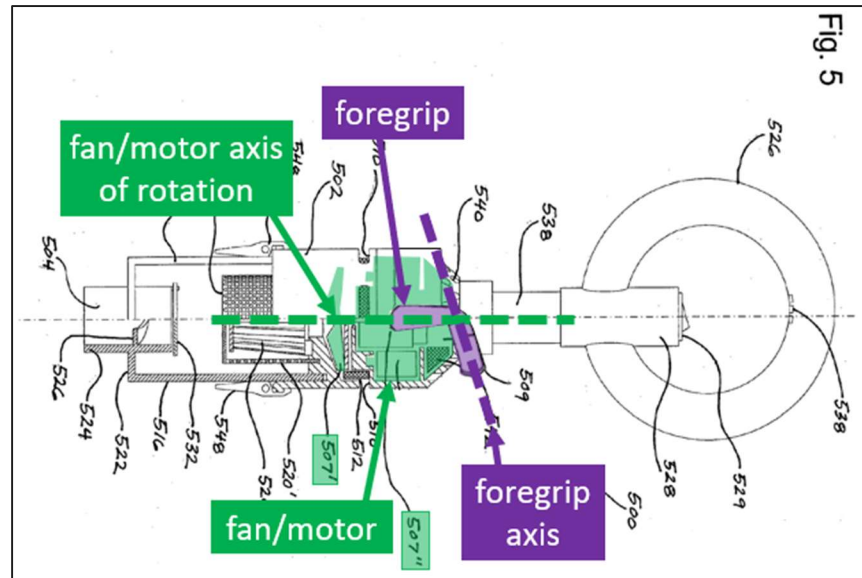
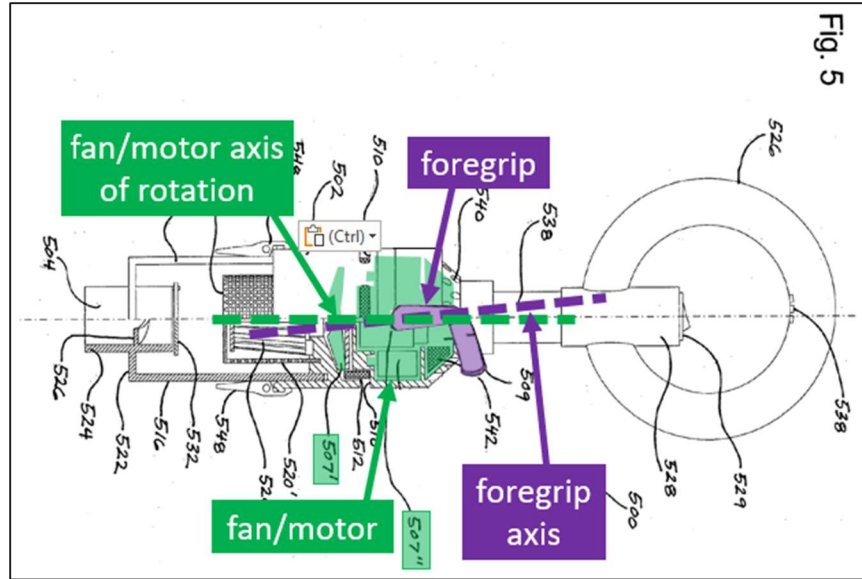
2. [2]

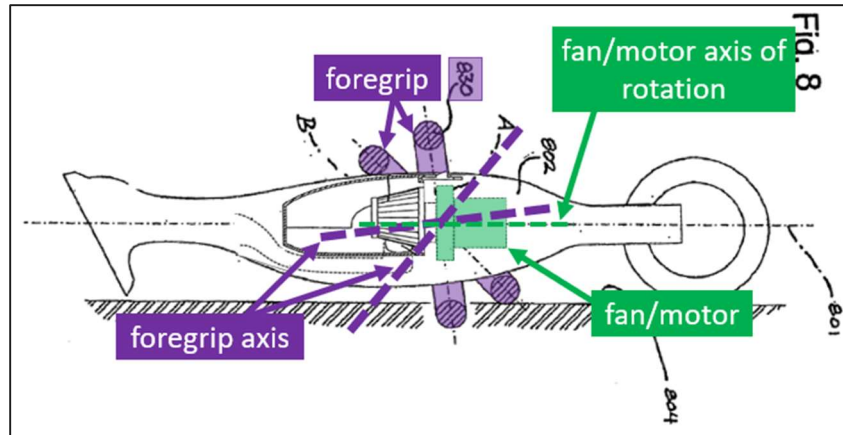
Butler anticipates claim 2. Ex1002 ¶¶126-28.

Butler teaches that the handle has a handle axis that intersects the suction motor axis of rotation. Ex1002 ¶¶127-28. In Butler, the **foregrip axis** intersects the **fan/motor axis of rotation**:









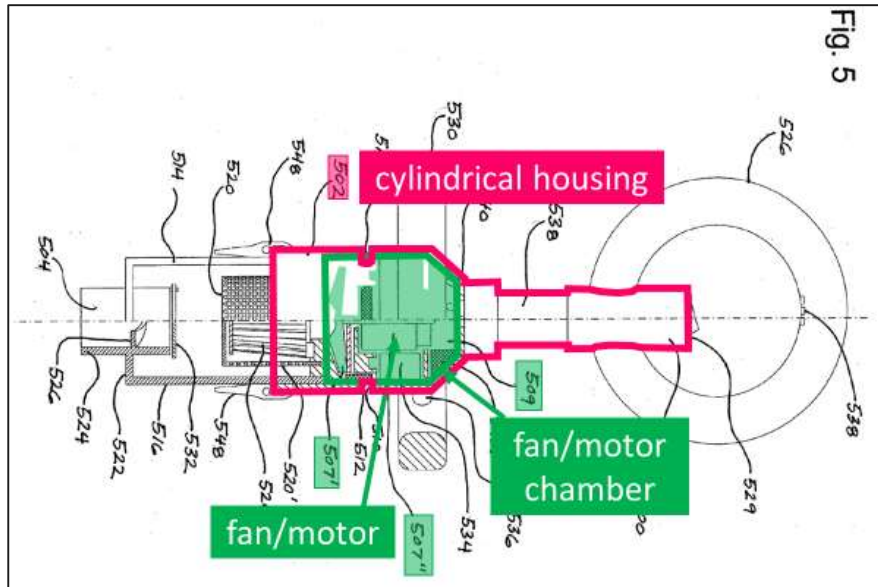
Ex1005, Figs. 2D(modified), 3(modified), 4(modified), 5(modified), 8(modified);
see also id., Figs. 2A, 6-7, 16, 23; Ex1002 ¶127.

A POSA would have understood that Butler’s “foregrips” have multiple **foregrip axes**, including an axis between any two points on the circumference of Butler’s circulate foregrip, and another **foregrip axis** running through its radial center, each of which intersects the fan/motor axis of rotation. Ex1002 ¶128.

3. [3]

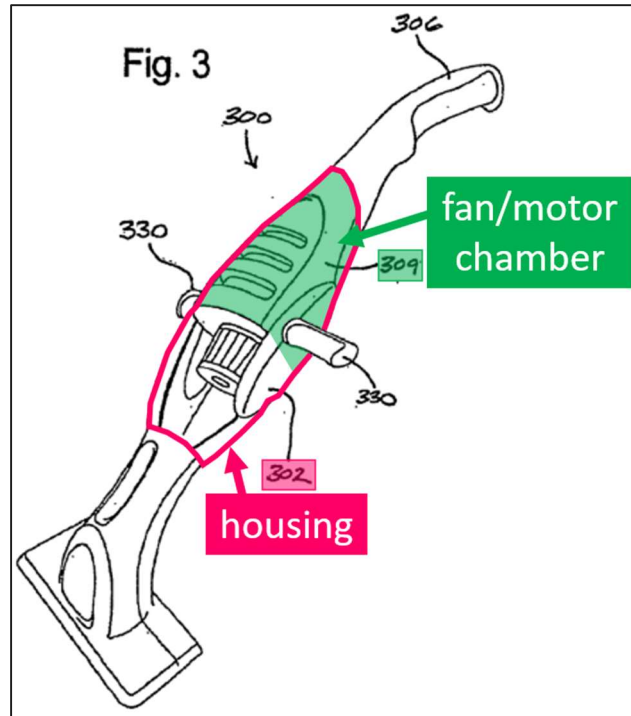
Butler anticipates claim 3. Ex1002 ¶¶129-36.

Butler teaches that the hand vacuum cleaner body comprises a suction motor and fan assembly housing. Ex1002 ¶¶130-32. Butler’s “**fan/motor chamber 509** in which the **fan/motor 507** is located” is housed within the body’s “**cylindrical housing 502**”:



Ex1005, 20:4-14, Fig. 5; *see also id.*, Figs. 2A, 6-8, 16, 23; Ex1002 ¶130.

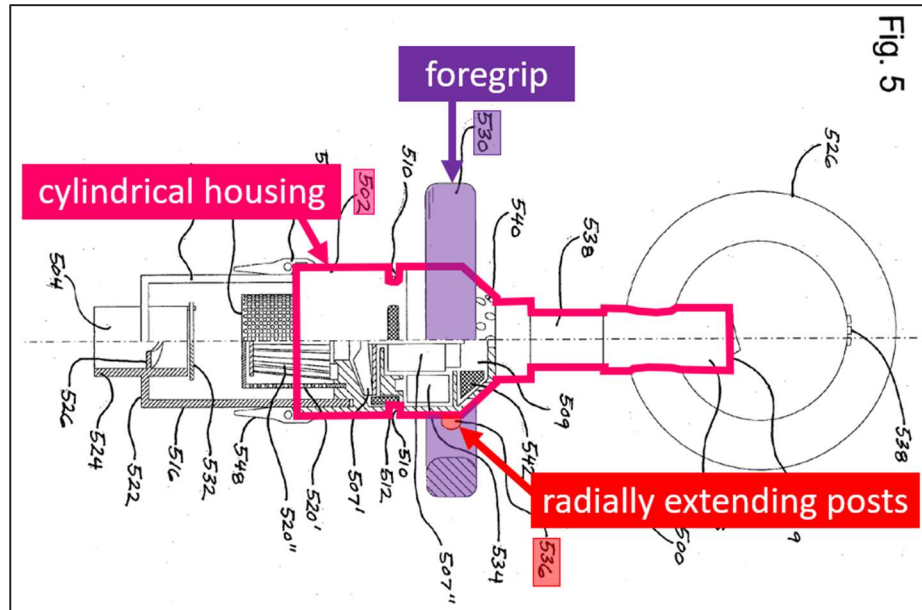
A POSA would have understood that Butler’s “cylindrical housing 502” is a suction motor and fan assembly housing because it houses “fan/motor 507.” Ex1002 ¶131. Likewise, Butler’s “fan/motor chamber 309[, 409]” in which the fan/motor is located is housed within the body’s “housing 302, 402”:



Ex1005, 19:18-22, Fig. 3; *see also id.*, Fig. 4; Ex1002 ¶131.

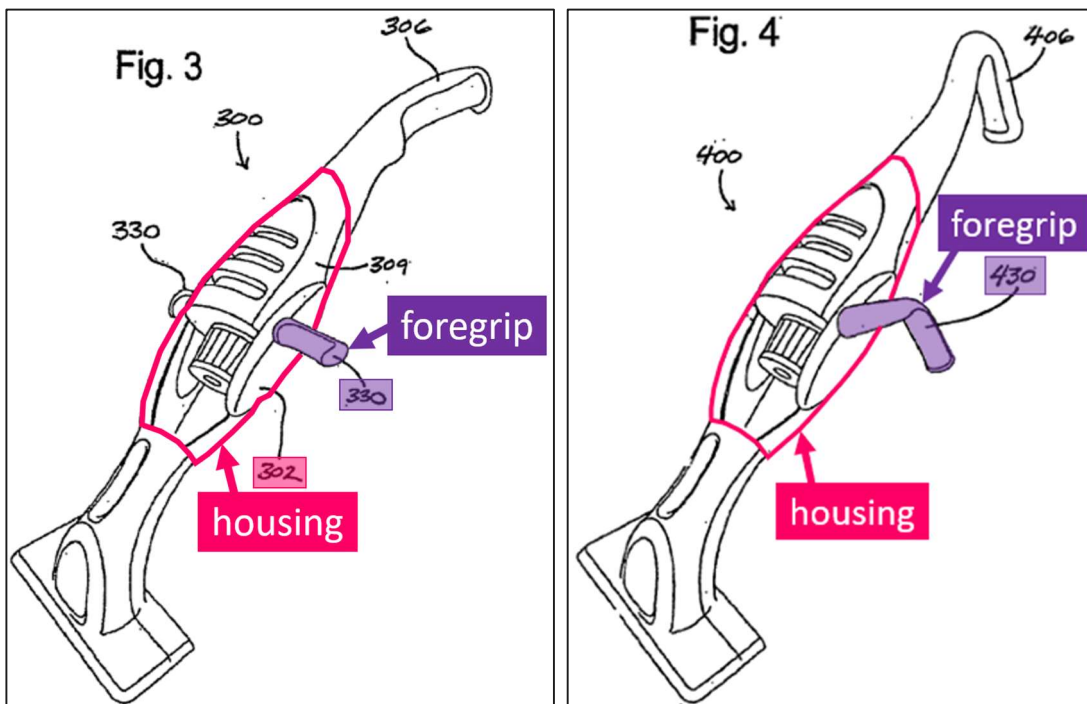
A POSA would have understood that Butler’s “housing 302, 402” is also a suction motor and fan assembly housing because it houses “fan/motor chamber 309[, 409]” having a fan/motor. Ex1002 ¶132.

Butler teaches that the handle extends away from the suction motor and fan assembly housing. Ex1002 ¶¶133-36. Butler’s “foregrip” “is attached to the housing 502 by a number of radially-extending posts 536,” which a POSA would have understood extend away from “housing 502” and cause the handle to extend away from “housing 502”:



Ex1005, 20:4-6, 20:10-11, Fig. 5; *see also id.*, Figs. 2A, 6-8, 16, 23; Ex1002 ¶133.

Likewise, Butler’s “foregrips 330, 430” “extend generally radially from the vacuum cleaner housing 302 at a location adjacent...the fan/motor chamber 309[, 409]”:



Ex1005, 19:18-22, 19:26-28; Figs. 3-4; Ex1002 ¶134.

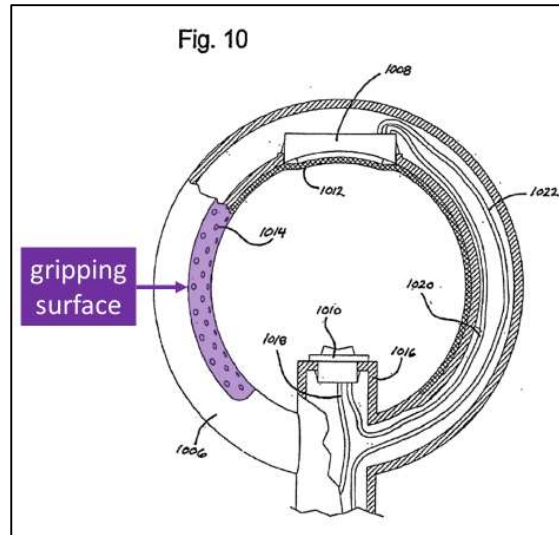
A POSA would have understood that Butler’s “radially” “extend[ing]” “foregrips 330, 430” extend away from the “fan/motor chamber 309[, 409].” Ex1002 ¶135.

A POSA would have further understood that these limitations are met when Butler’s “foregrip” is “pivot[ed] or otherwise articulated,” as explained for [1d]/[1e]. Ground 1, [1d]/[1e]; Ex1002 ¶136.

4. [4]/[12]

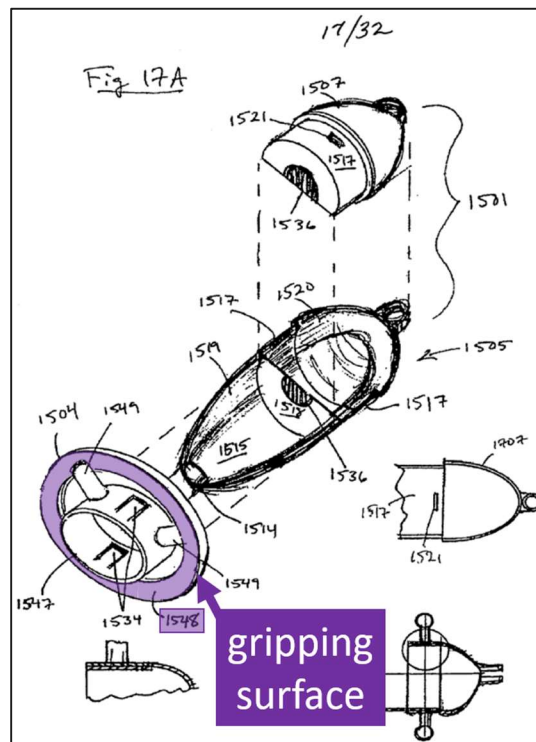
Butler anticipates claims 4 and 12. Ex1002 ¶¶137-42; Ground 1, [11].

Butler’s handles include a hand grip portion. Ex1002 ¶¶139-41. Butler teaches that a “gripping surface” may be placed on any or all portions of any of Butler’s disclosed handles: “**foregrip**...may be made from any suitable material, and may also include **gripping surfaces** or surface treatments to enhance the user’s grip and feel,” such as “dimples, checkering, ridges or bumps”:



Ex1005, 11:3-13, 11:22-24, Fig. 10; Ex1002 ¶139.

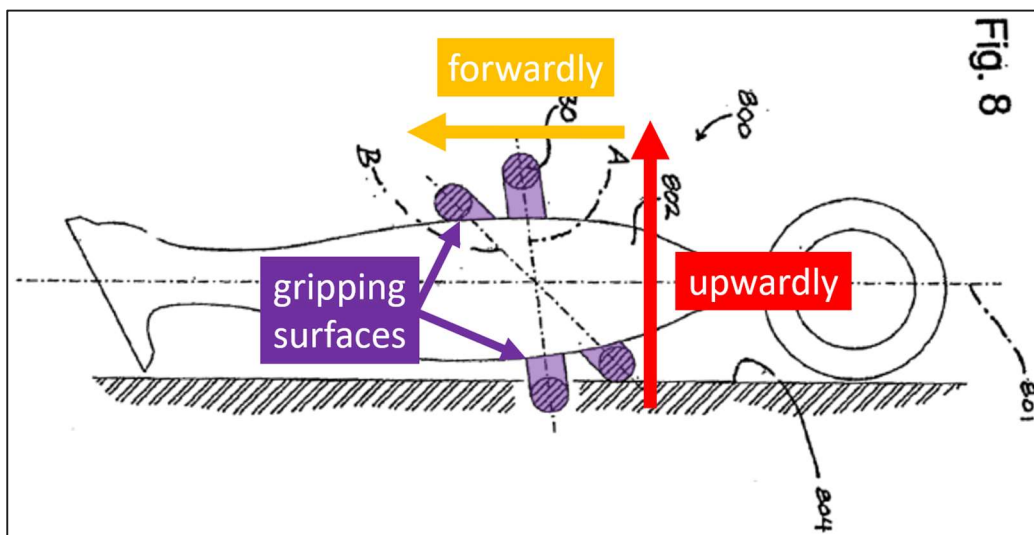
“[T]he foregrip...comprises...a toroidal **gripping surface 1548**”:

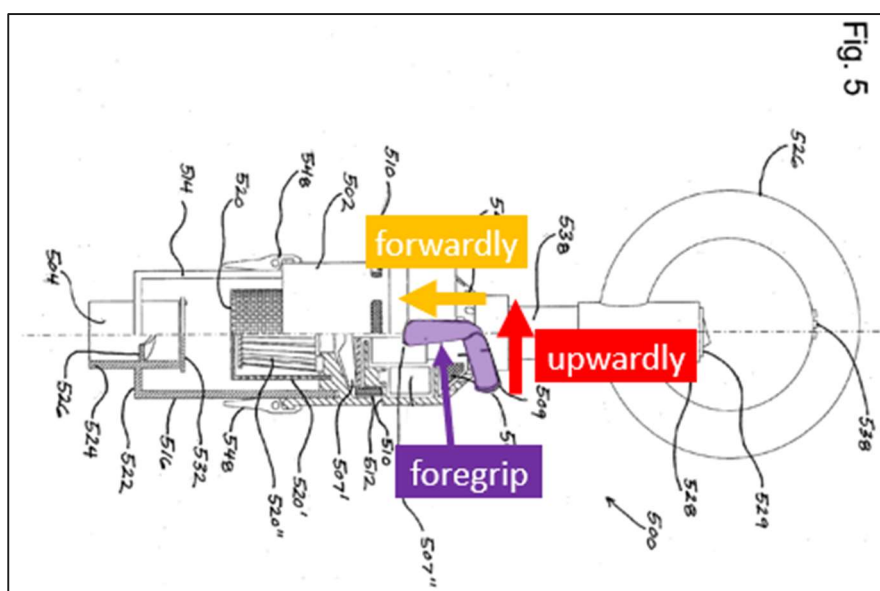
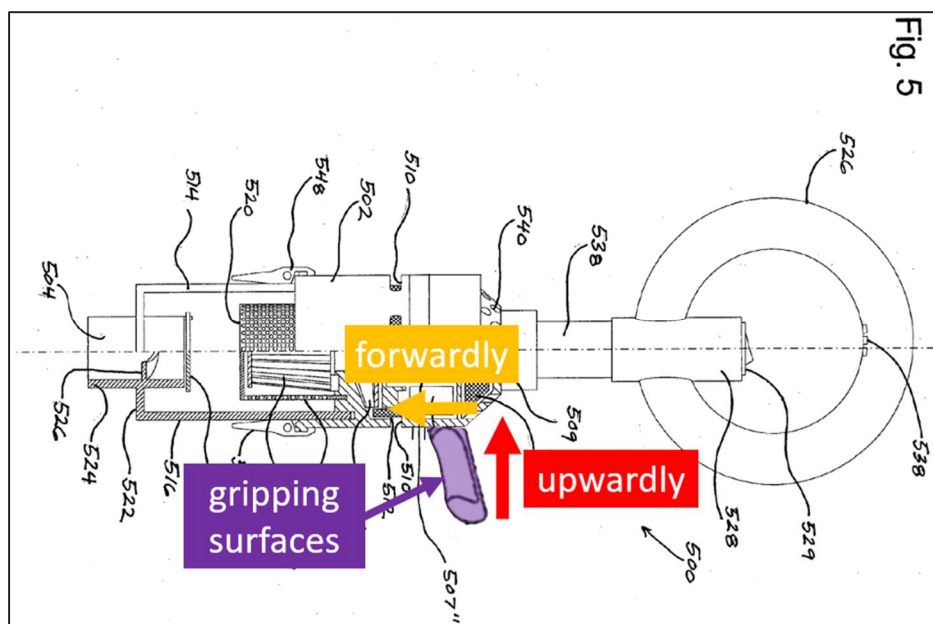


Ex1005, 37:10-13, Fig. 17A; Ex1002 ¶140.

Butler's "foregrip" "gripping surfaces," which a user grips with their hand, are hand grip portions. Ex1002 ¶141.

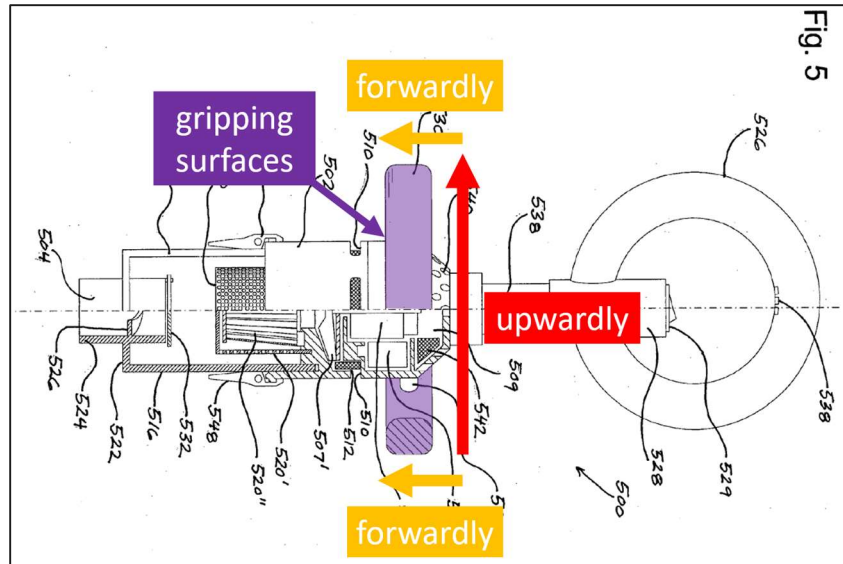
Butler teaches that the handle has a hand grip portion that extends upwardly and forwardly when the hand vacuum cleaner is positioned with the lower end of the hand vacuum cleaner on a horizontal surface. Ex1002 ¶142. The '661 Patent's claims do not require any particular starting point from which the handle extends "upwardly" or from which it extends "forwardly," or that the same starting point must be used for both. Butler's handle includes multiple portions that both (1) include a gripping surface and (2) extend upwardly and forwardly, regardless of what starting point(s) are used. For example, when "pivot[ed]," Butler's "foregrip" includes "**gripping surfaces**" that extend **upwardly** and **forwardly** when the hand vacuum cleaner is oriented as claimed:





Ex1005, 22:26-28, 37:10-13, Figs. 3(modified), 4(modified), 5(modified), 8;
Ex1002 ¶142; Ground 1, [1d].

So, too, does Butler's "foregrip" when oriented vertically:

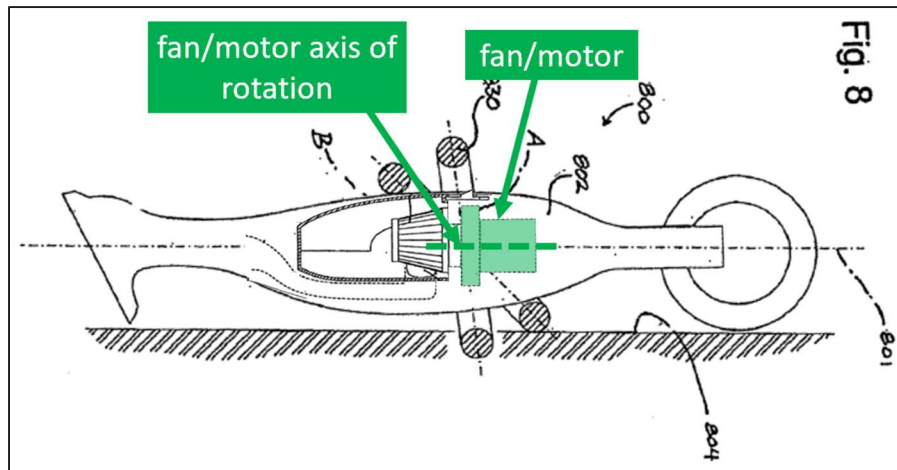
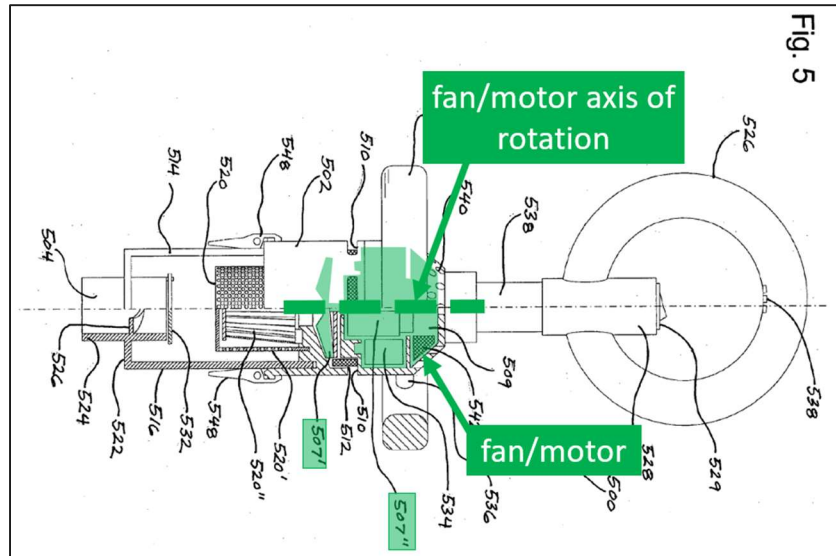


Ex1005, 20:4-6, 37:10-13, Fig. 5; *see also id.*, Figs. 2A, 6-7, 16, 23; Ex1002 ¶142.

5. [5]

Butler anticipates claim 5. Ex1002 ¶¶143-44.

Butler teaches that when the hand vacuum cleaner is positioned with the lower end of the hand vacuum cleaner on a horizontal surface, the suction motor axis of rotation is generally horizontal. Ex1002 ¶144. When Butler's hand vacuum is positioned as claimed, the **fan/motor axis of rotation** is generally horizontal:



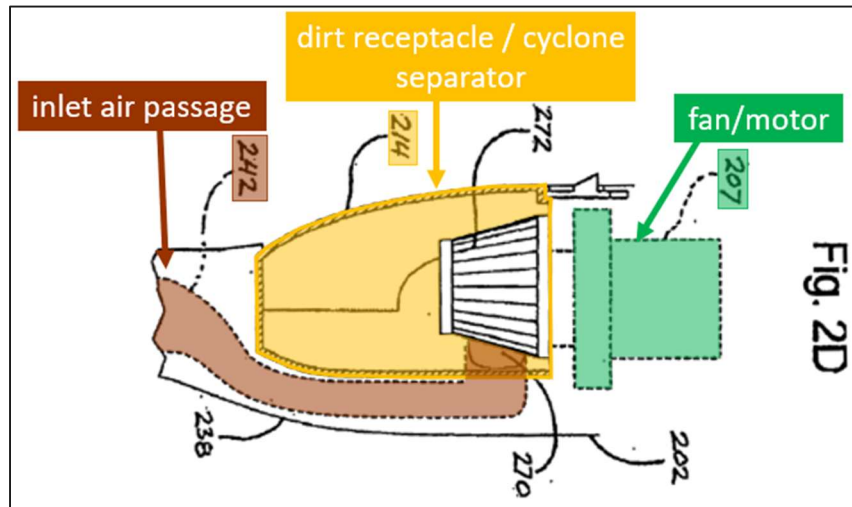
Ex1005, Figs. 2D(modified), 5, 8(modified); *see also id.*, Figs. 2A, 3, 4, 6-7, 16, 23; Ex1002 ¶144; Ground 1, [1a].

6. [6]/[13]

Butler anticipates claims 6/13. Ex1002 ¶¶145-49; Ground 1, [11].

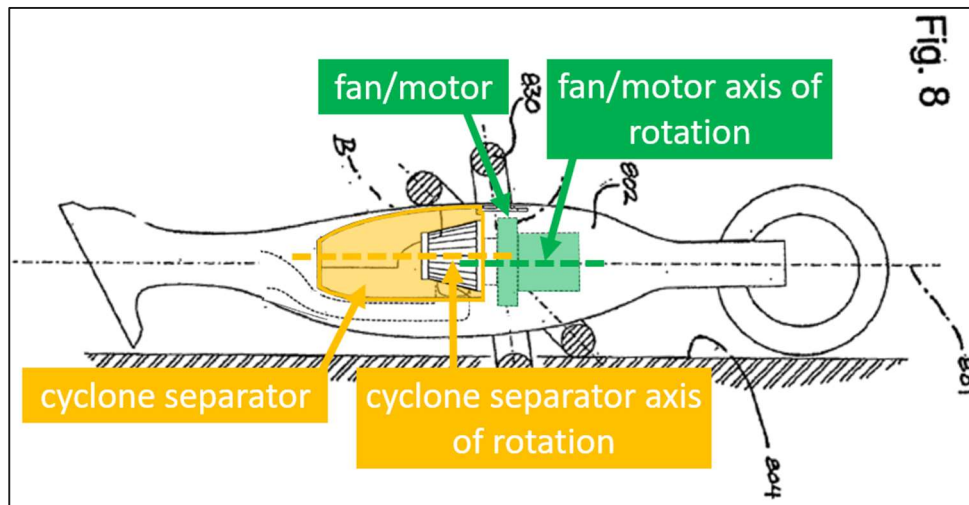
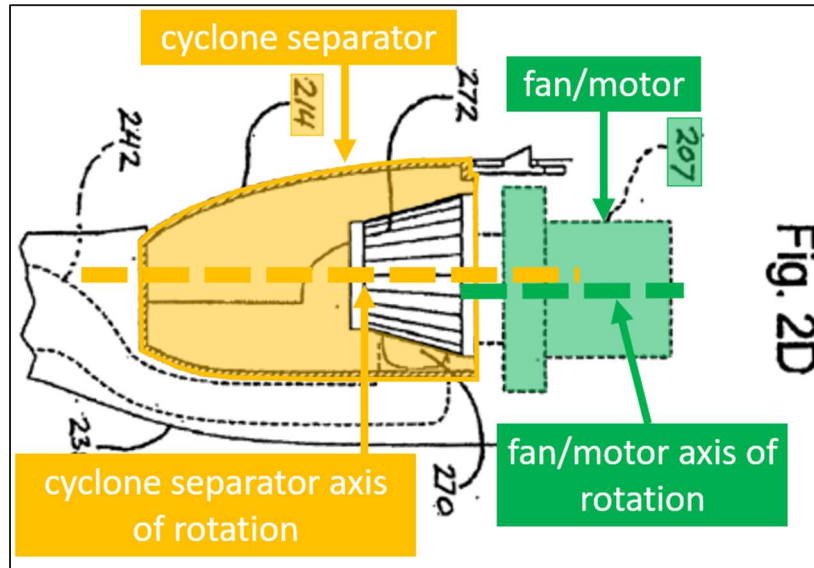
Butler teaches that when the hand vacuum cleaner is positioned with the lower end of the hand vacuum cleaner on a horizontal surface, the suction motor axis of rotation is positioned below the cyclone axis of rotation. Ex1002 ¶¶147-49. Butler

teaches that in Figure 2D, the “**inlet air passage 242**” may be provided through the structural portion 238 of the housing 202 and terminate at or near the top of the **dirt receptacle 214**,” which causes the “**fan/motor 207**” and **cyclone separator** to be slightly offset:



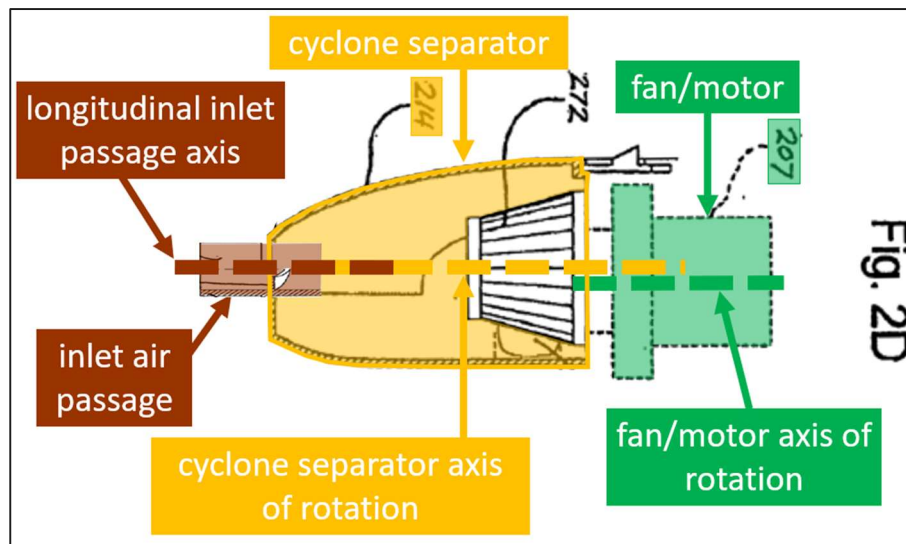
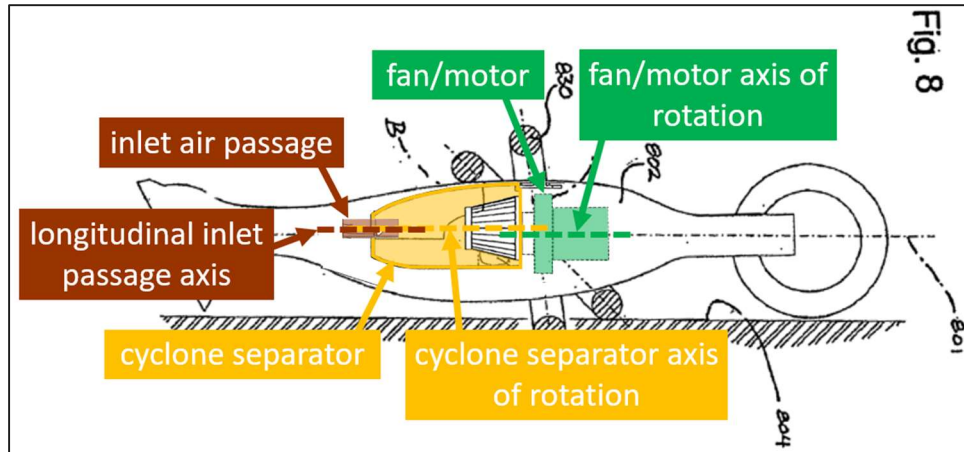
Ex1005, 18:5-7, Fig. 2D; Ex1002 ¶147.

Thus, when Butler’s hand vacuum cleaner shown in Figure 2D is positioned as claimed, the **fan/motor axis of rotation** is positioned just below the **cyclone separator axis of rotation**:



Ex1005, Fig. 2D, 8(modified); *see also id.*, Fig. 2A; Ex1002 ¶148; Ground 1, [1a]/[1b].

Regarding claim 13, which depends from claim 11, these limitations are also met when Butler’s “**inlet air passage 242**” with a **longitudinal inlet passage axis** is “through the bottom wall of the dirt receptacle 214”:

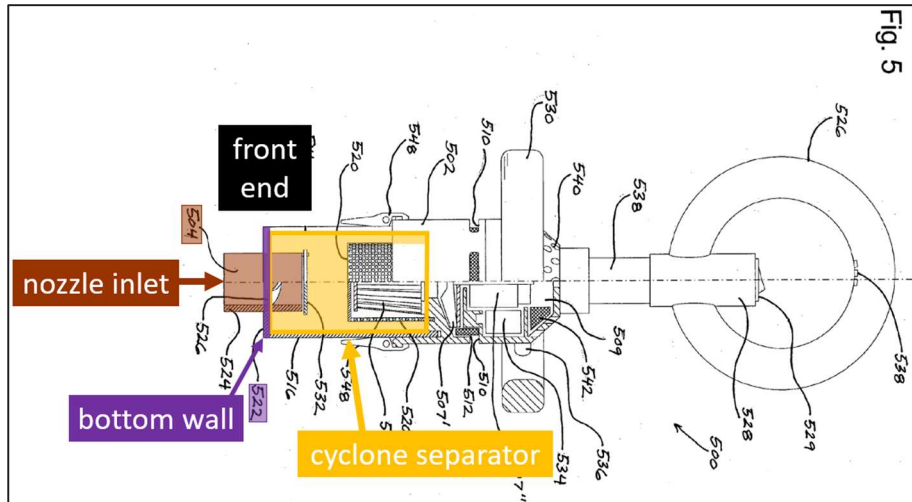


Ex1005, 18:18-20, Figs. 2D(modified), 5(modified), 8(modified); *see also id.*, Fig. 2A; Ex1002 ¶149; Ground 1, [7]/[11].

7. [7]

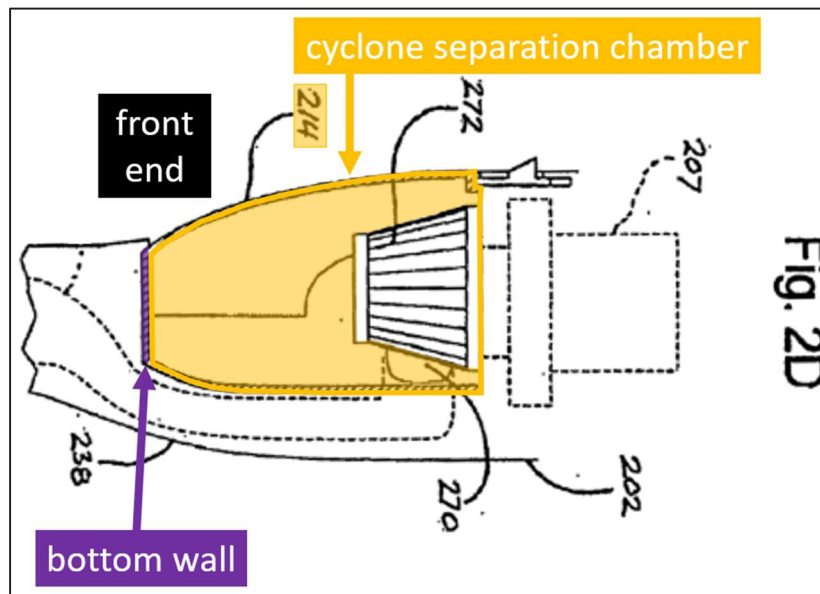
Butler anticipates claim 7. Ex1002 ¶¶150-53.

Butler teaches that the cyclone has a front end wall having the cyclone air inlet. Ex1002 ¶¶151-53. Butler teaches a “**cyclone separator**” comprising a cyclone with a front end wall (“**bottom wall 522**”) having a cyclone air inlet (“**nozzle inlet 504**”):



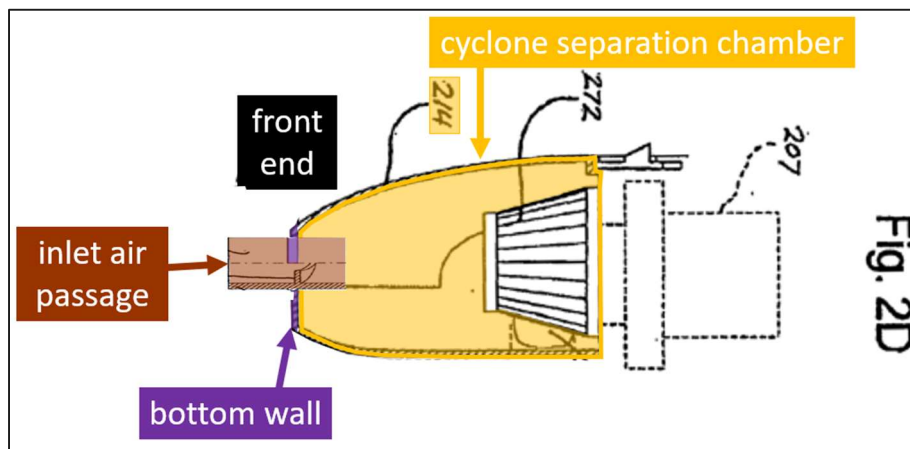
Ex1005, 21:19-23, Fig. 5; Ex1002 ¶151; Ground 1, [1pre]/[1b]; *see also* Ex1005, 22:5-6, Figs. 6-7, 16, 23.

Further, Butler teaches a “cyclone separation chamber” comprising a cyclone with a front end wall (“bottom wall”):



Ex1005, 18:3-5, 18:18-21, Fig. 2D; *see also id.*, Fig. 2A; Ex1002 ¶152; Ground 1, [1pre]/[1b].

Butler explains that “alternative means for initiating cyclonic airflow may be used with the embodiment of Figure 2D.” Ex1005, 18:15-16. “For example, the inlet air passage 242 may...be through the bottom wall of the dirt receptacle 214 and include a diverter to initiate cyclonic action.” *Id.*, 18:18-20. As shown above, Butler teaches a “nozzle inlet 504” with “a helical ramp 526” (diverter) “that passes through the dirt receptacle bottom wall 522.” *Id.*, 21:19-23, 22:5-6, 22:14-22, Fig. 5. A POSA would have understood that, like Butler’s Figure 5 embodiment, when such “alternative means” are implemented, the “cyclone separation chamber” comprises a cyclone with a front end wall (“bottom wall”) having a cyclone air inlet (“inlet air passage 242”):

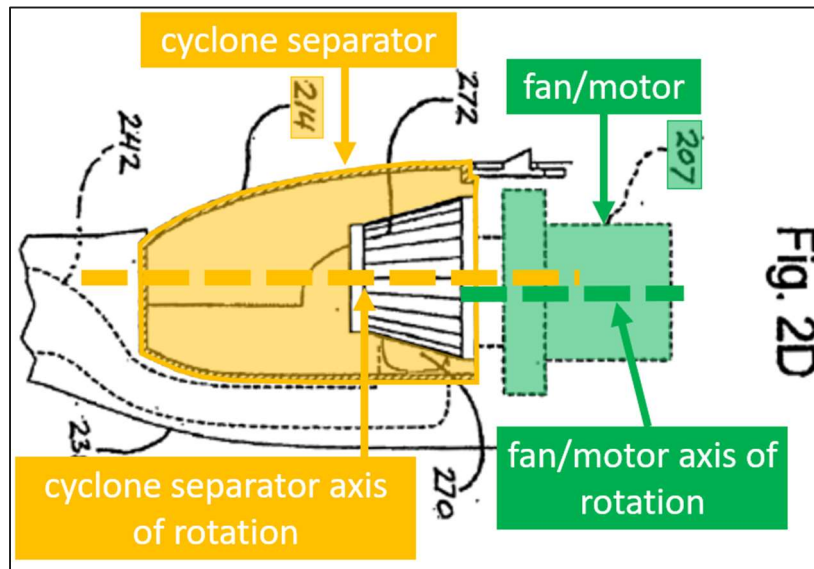
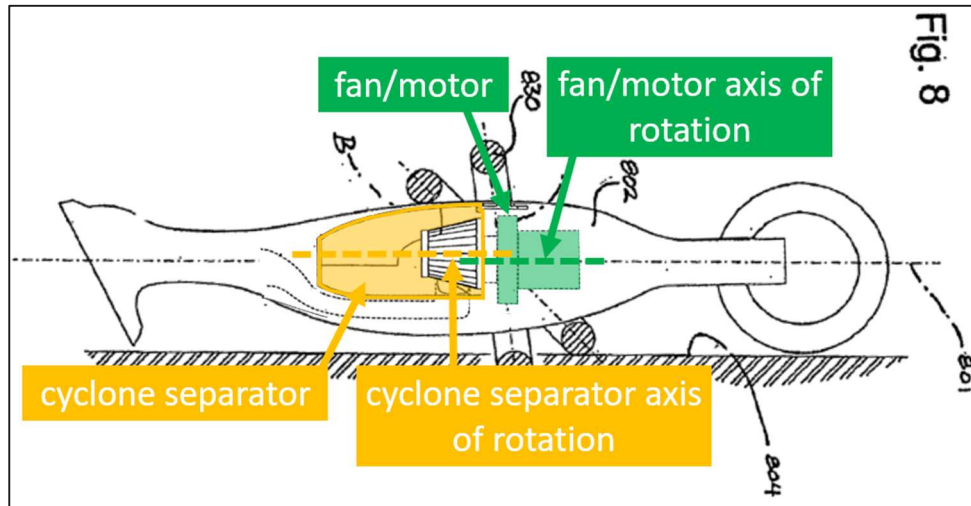


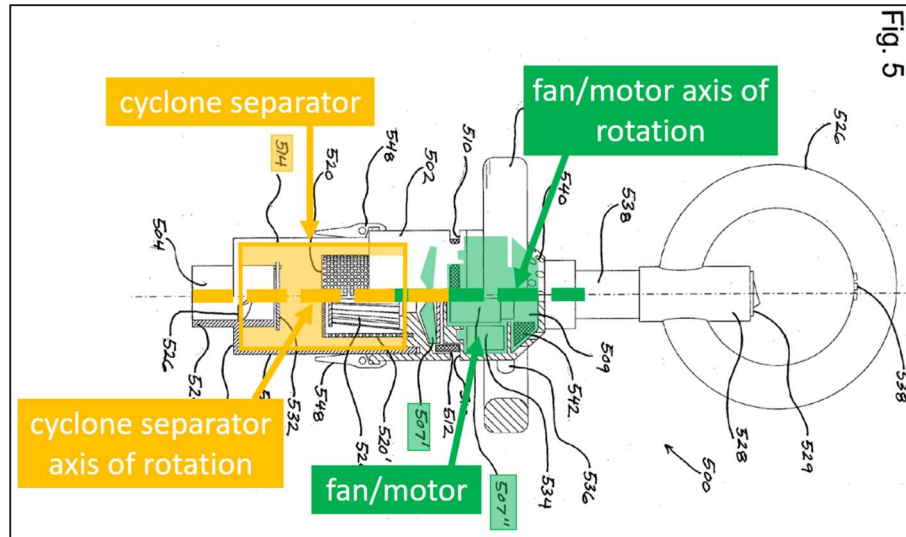
Ex1005, Figs. 2D(modified), 5(modified); Ex1002 ¶153.

8. [8]

Butler anticipates claim 8. Ex1002 ¶¶154-56.

Butler teaches that the cyclone axis of rotation is generally parallel to the suction motor axis of rotation. Ex1002 ¶¶155-56. Butler's **cyclone separator axis of rotation** is generally parallel to the **fan/motor axis of rotation**:





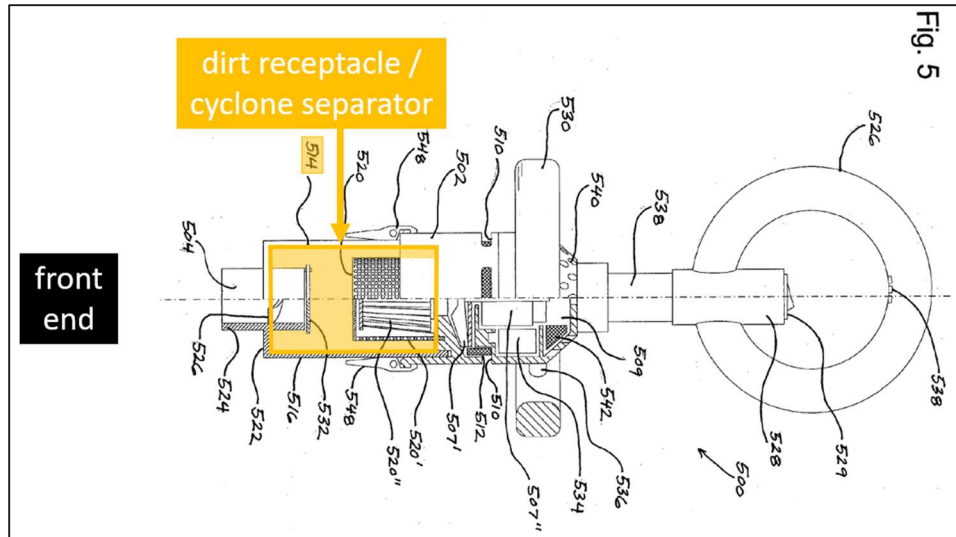
Ex1005, Figs. 5, 2D, 8 (modified); *see also id.*, Figs. 2A, 6-7, 16, 24; Ex1002 ¶155.

To the extent Butler’s fan/motor axis and cyclone separator axis are depicted as co-axial in Figure 5, a POSA would have understood that these axes are generally parallel because they extend in the same direction and maintain the same (zero) distance between them. Ex1002 ¶156.

9. [9]

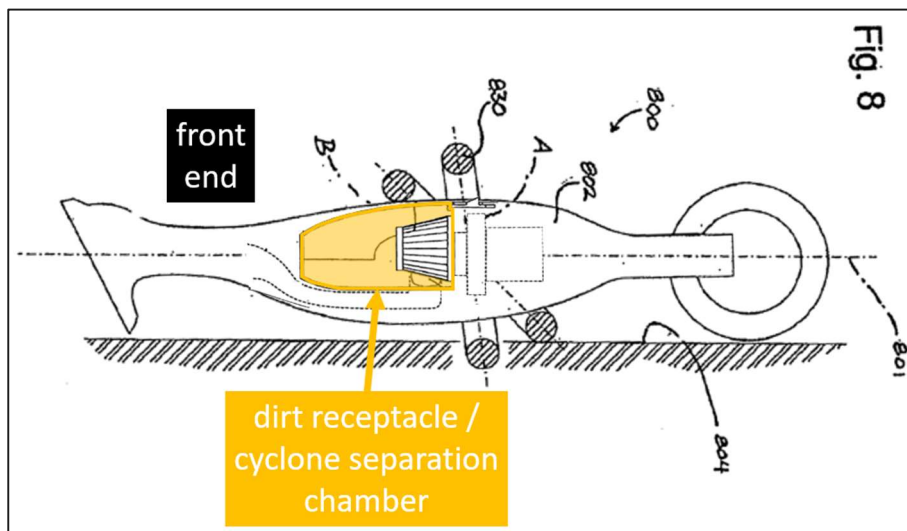
Butler anticipates claim 9. Ex1002 ¶¶157-59.

Butler teaches that the cyclone unit is provided at the front end of the hand vacuum cleaner body. Ex1002 ¶¶158-59. Butler’s “**dirt receptacle** compris[ing] a **cyclone separator**” (cyclone unit) is provided at the **front end** of Butler’s hand vacuum cleaner body:

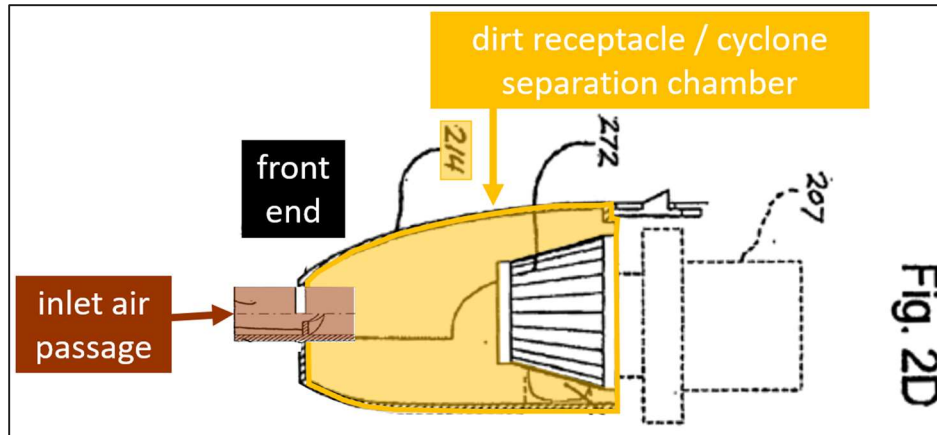


Ex1005, claim 11, Fig. 5; *see also id.*, Figs. 3, 4, 6-7, 16, 23; Ex1002 ¶158; Ground 1, [1a]/[1b].

So, too, is Butler's “**dirt receptacle 214** compris[ing] a **cyclone separation chamber**” (cyclone unit):



Ex1005, 18:3-5, Figs. 2D(modified), 8(modified); *see also id.*, Fig. 2A; Ex1002 ¶159.

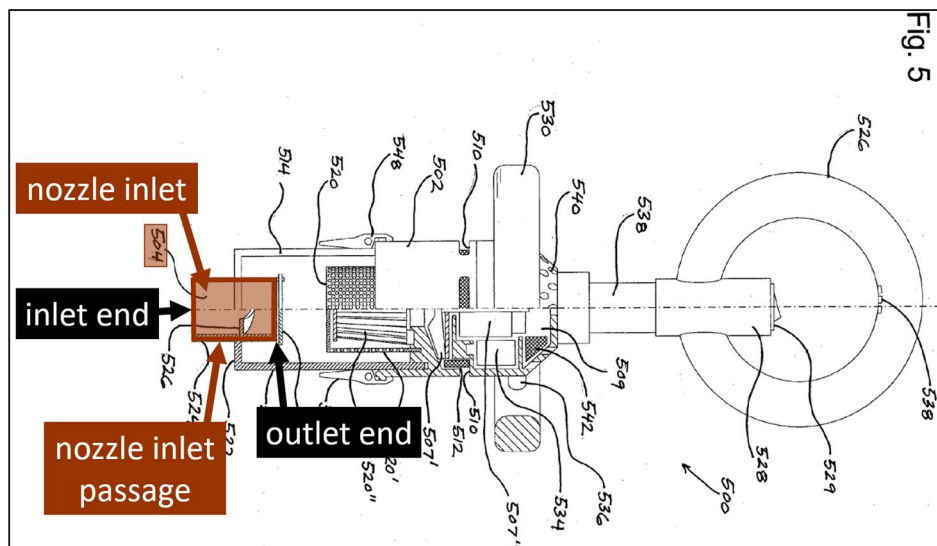


Ex1005, 18:18-20, Figs. 2D(modified), 5(modified); *see also id.*, Fig. 2A; Ex1002 ¶163; Ground 1, [1pre]/[1b], [7].

11. [11]

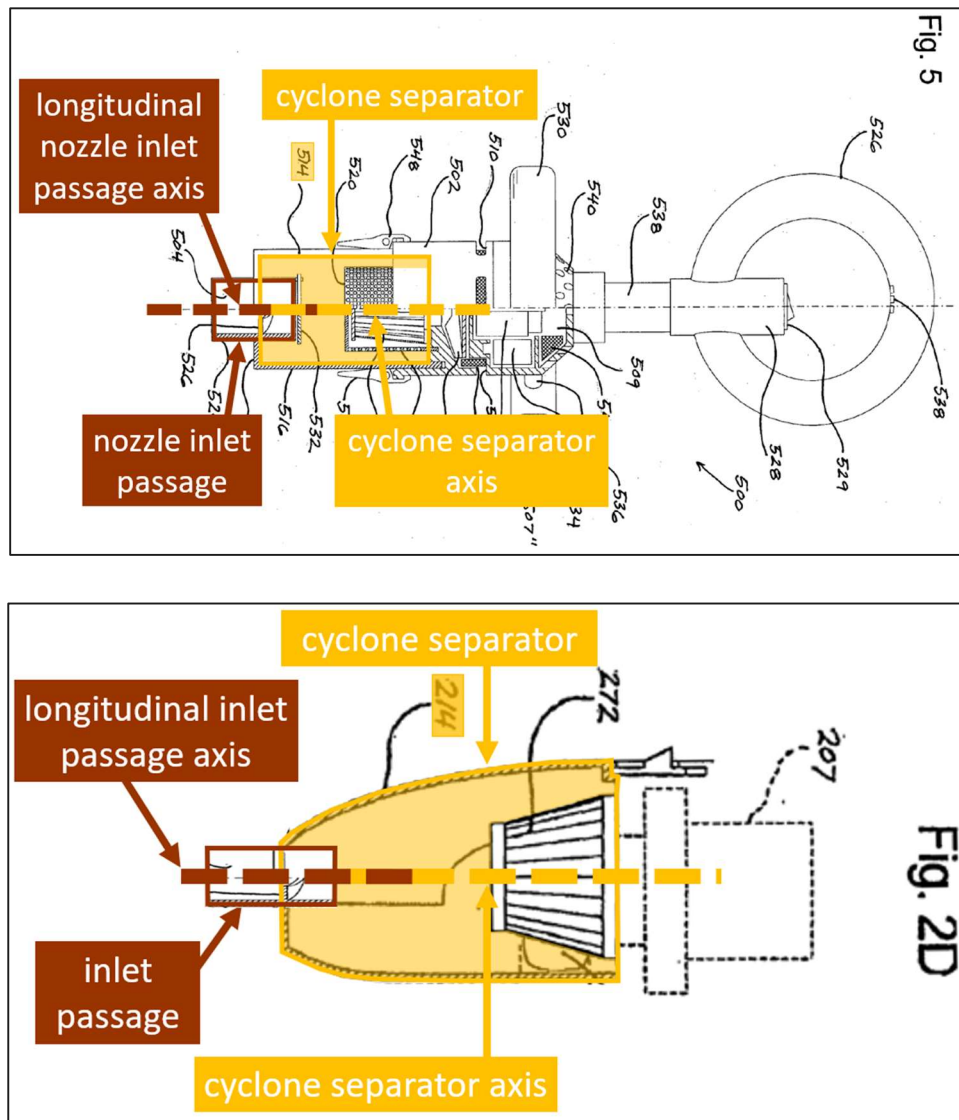
Butler anticipates claim 11. Ex1002 ¶¶164-69.

Butler teaches that the dirty air inlet comprises an inlet passage that extends longitudinally between an inlet end and an outlet end. Ex1002 ¶¶165-67. Butler’s “**nozzle inlet 504**” (dirty air inlet) comprises a **nozzle inlet passage** that extends longitudinally between an **inlet end** and an **outlet end**:



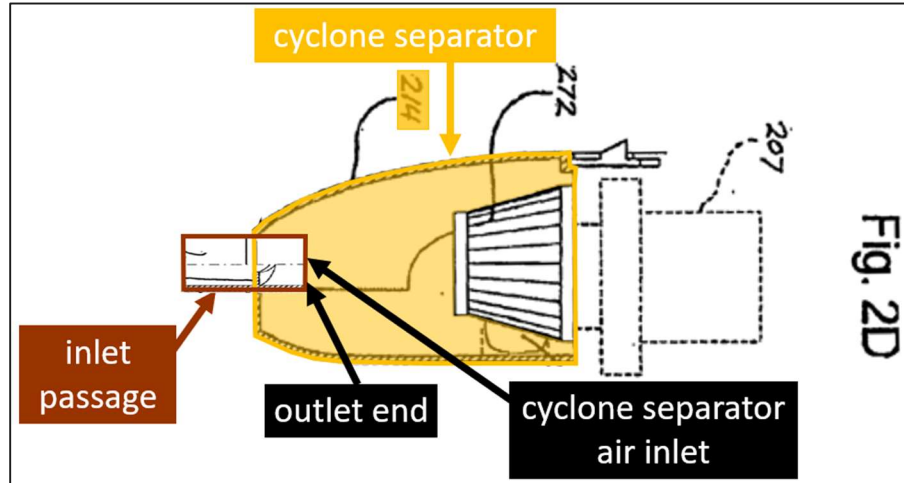
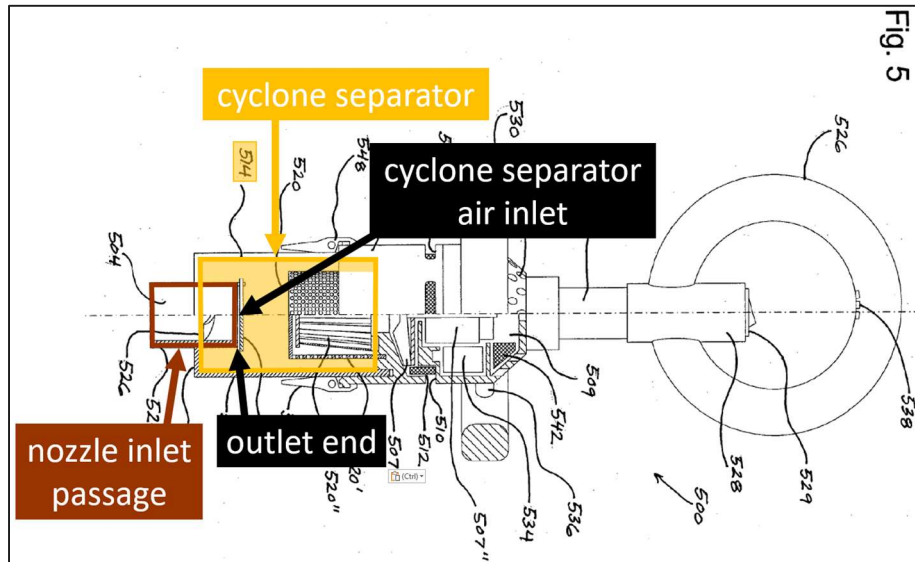
Ex1005, 18:18-20, Figs. 2D(modified), 5(modified); Ex1002 ¶167; *see also* Ex1005, Fig. 2A; Ground 1, [7].

Butler teaches that the inlet passage has a longitudinal passage axis that is coaxial with the cyclone axis. Ex1002 ¶168. Butler's **nozzle inlet passage** has a **longitudinal axis** that is coaxial with the **cyclone separator axis**:



Ex1005, Figs. 2D(modified), 5(modified); *see also id.*, Figs. 6-7; 23; Ex1002 ¶168.

Butler teaches that the inlet passage outlet end communicates with the cyclone air inlet. Ex1002 ¶169. Butler's **nozzle inlet passage outlet end** communicates with the **cyclone separator air inlet**:

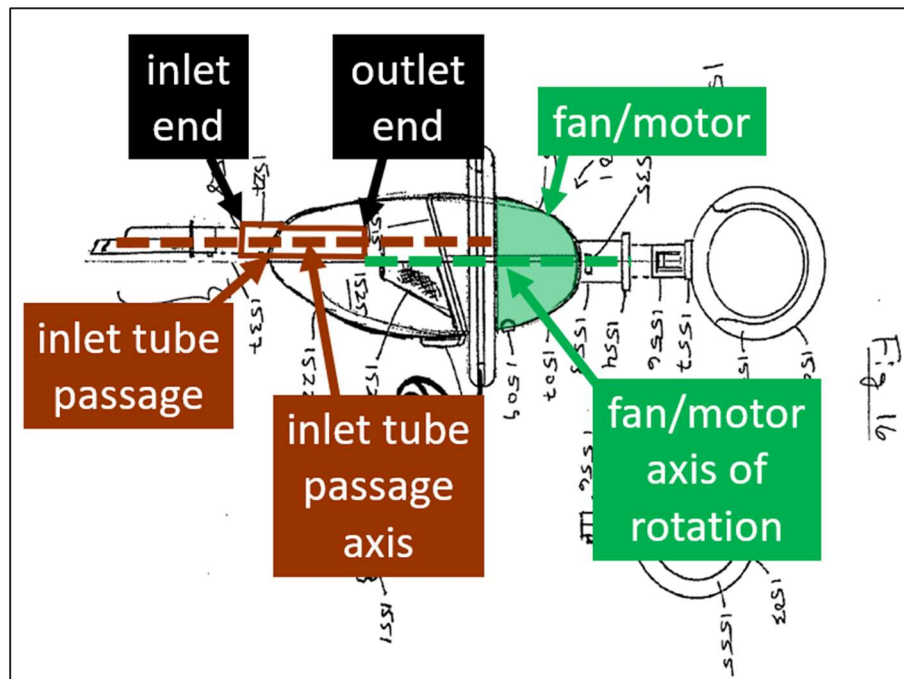


Ex1005, Figs. 2D(modified), 5(modified); *see also id.*, Figs. 6-7, 16, 23; Ex1002 ¶169; Ground 1, [1b].

12. [14]

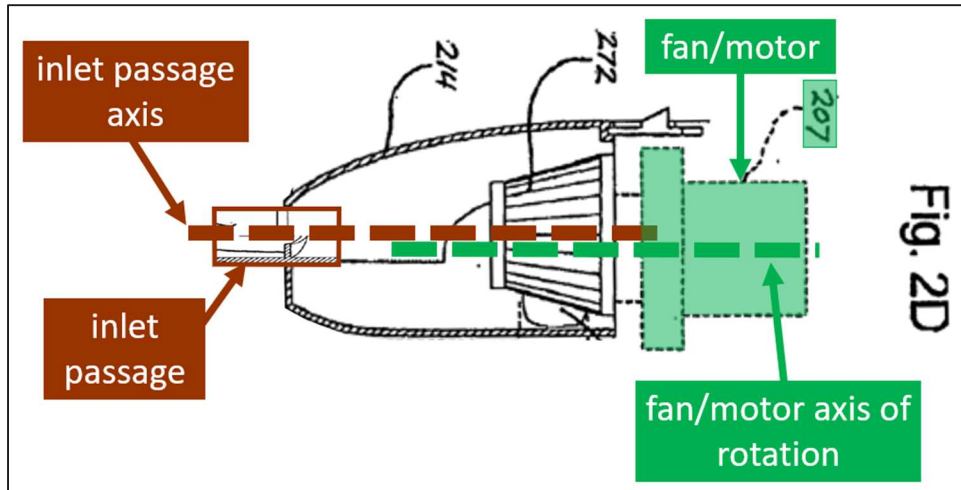
Butler anticipates claim 14. Ex1002 ¶¶170-72.

Butler teaches that the suction motor axis of rotation is positioned below the passage axis when the hand vacuum cleaner body is positioned with the lower end of the hand vacuum cleaner on a horizontal surface. Ex1002 ¶¶171-72. When positioned as claimed, Butler's **fan/motor axis of rotation** is positioned below the **inlet tube passage axis**:



Ex1005, Fig. 16; Ex1002 ¶171; Ground 1, [11].

Likewise, when Butler’s “**inlet air passage 242**” is “through the bottom wall of the dirt receptacle 214,” the **fan/motor axis of rotation** is positioned below the **inlet passage axis**:

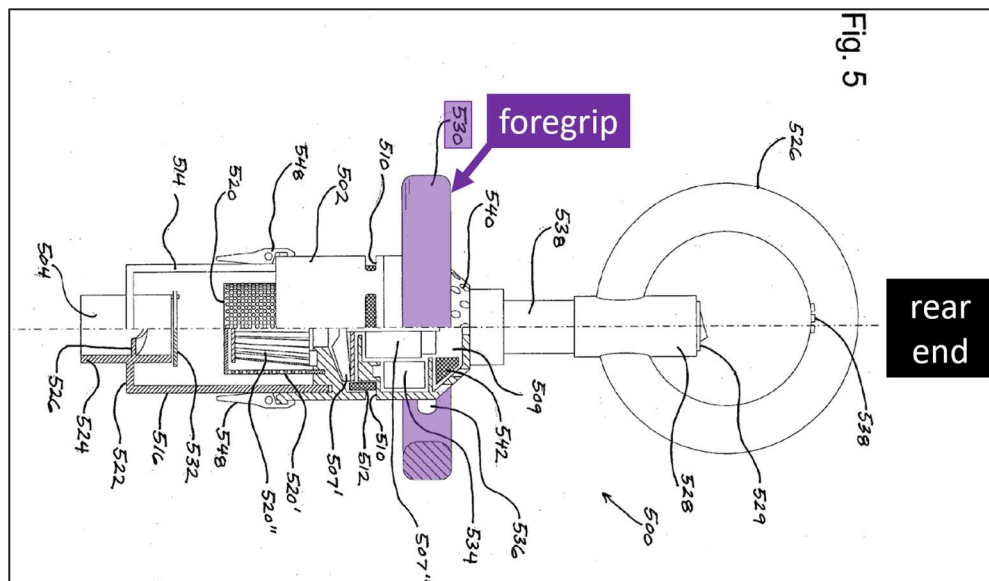


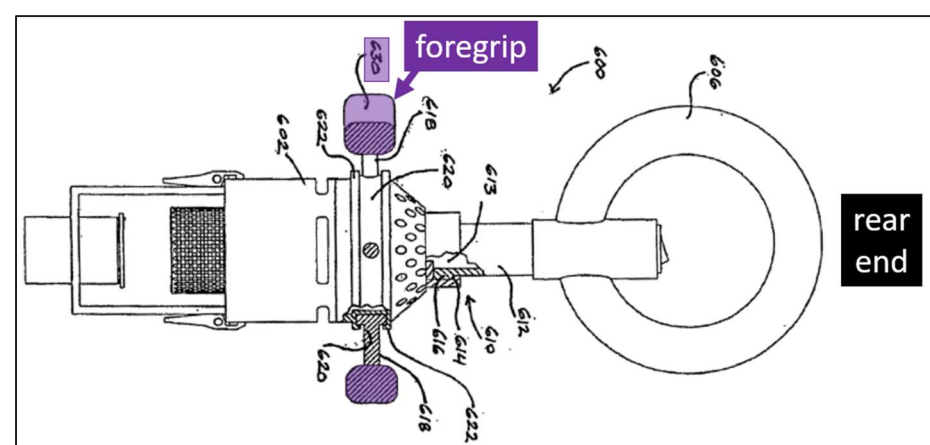
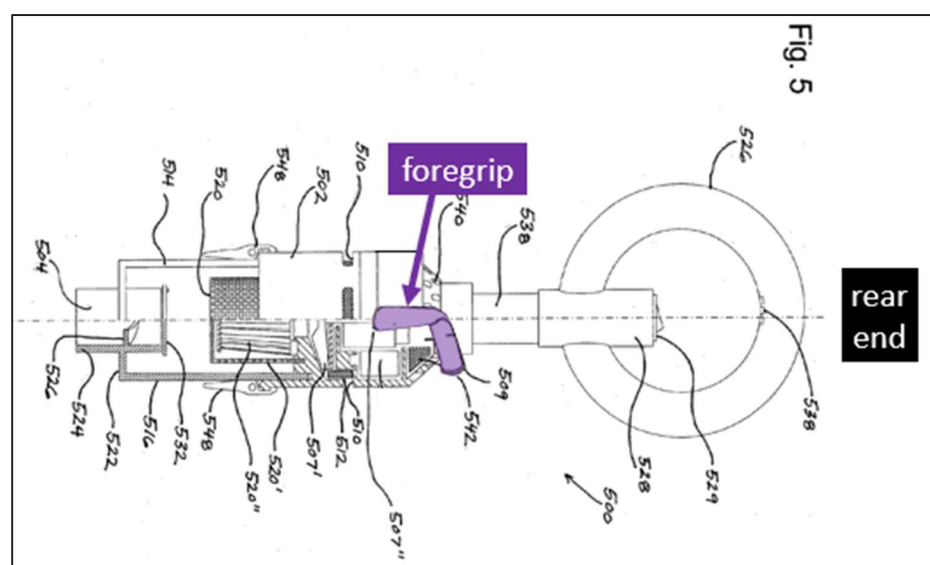
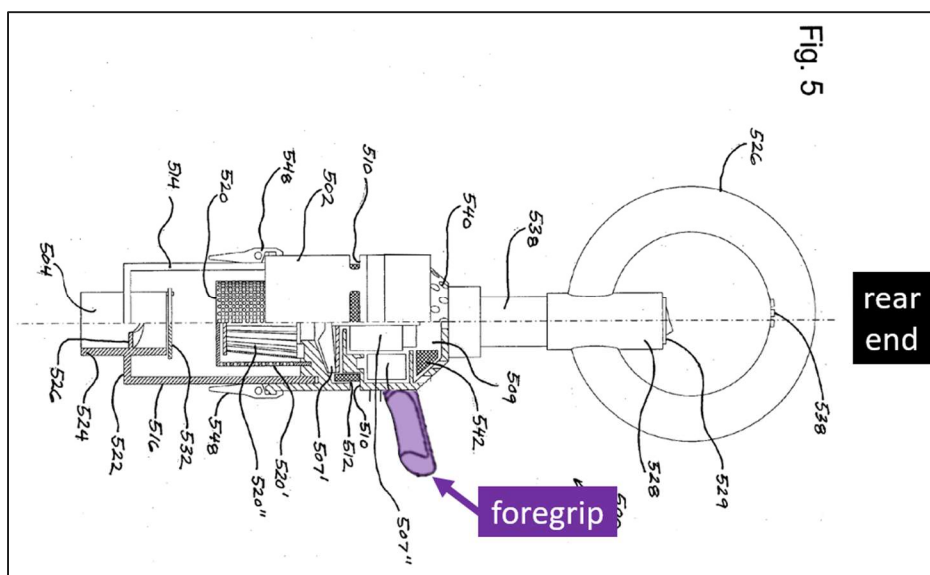
Ex1005, 18:18-20, Figs. 2D(modified), 5(modified); Ex1002 ¶172; Ground 1, [1a], [7]/[11].

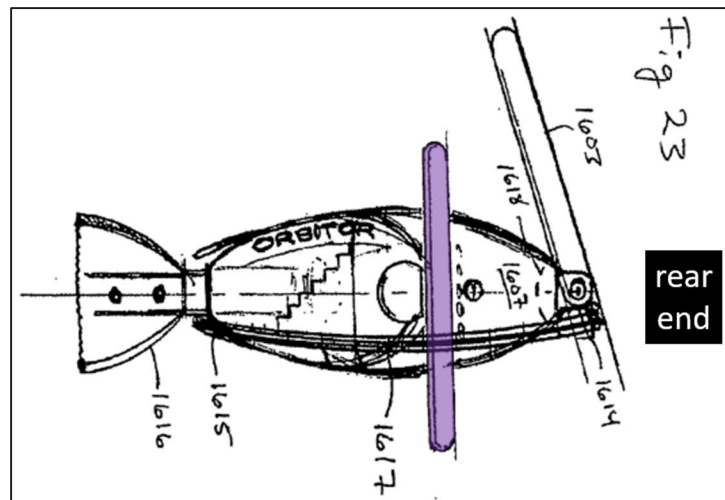
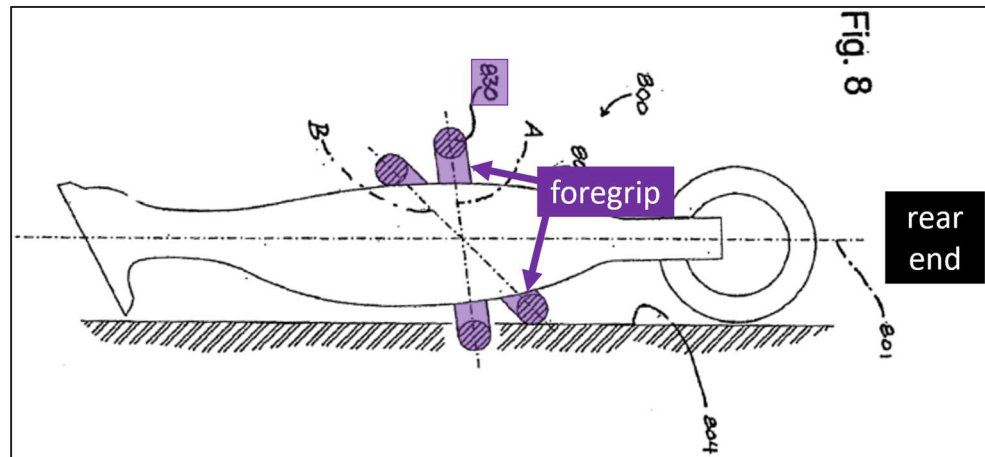
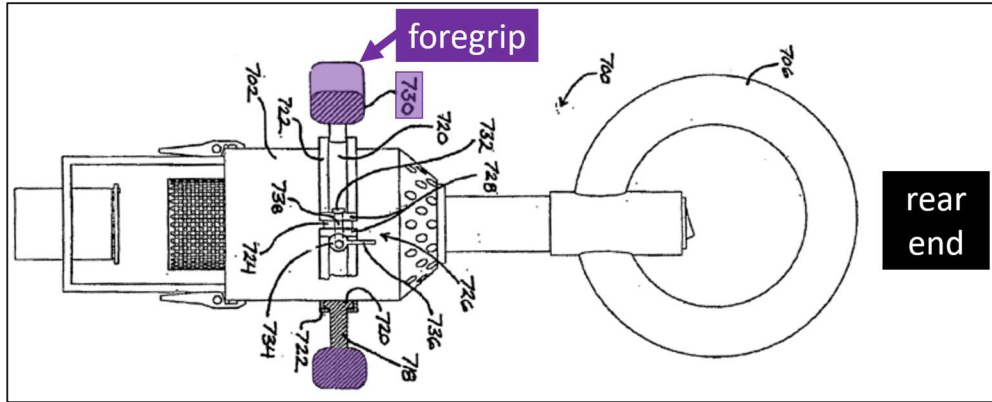
13. [15]

Butler anticipates claim 15. Ex1002 ¶¶173-74.

Butler teaches that the handle is forward of a rear end of the hand vacuum cleaner body. Ex1002 ¶174. Butler's "**foregrip**" is forward of a **rear end** of Butler's hand vacuum cleaner body:







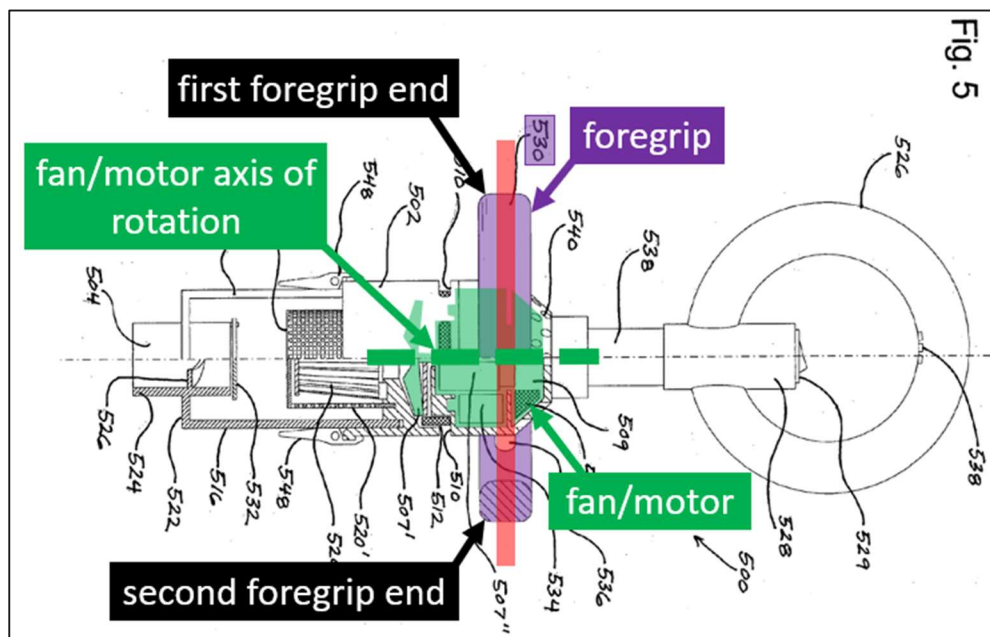
Ex1005, Figs. 3(modified), 4(modified), 5(modified), 6-8, 23; *see also id.*, Figs. 2A, 16; Ex1002 ¶174; Ground 1, [1a].

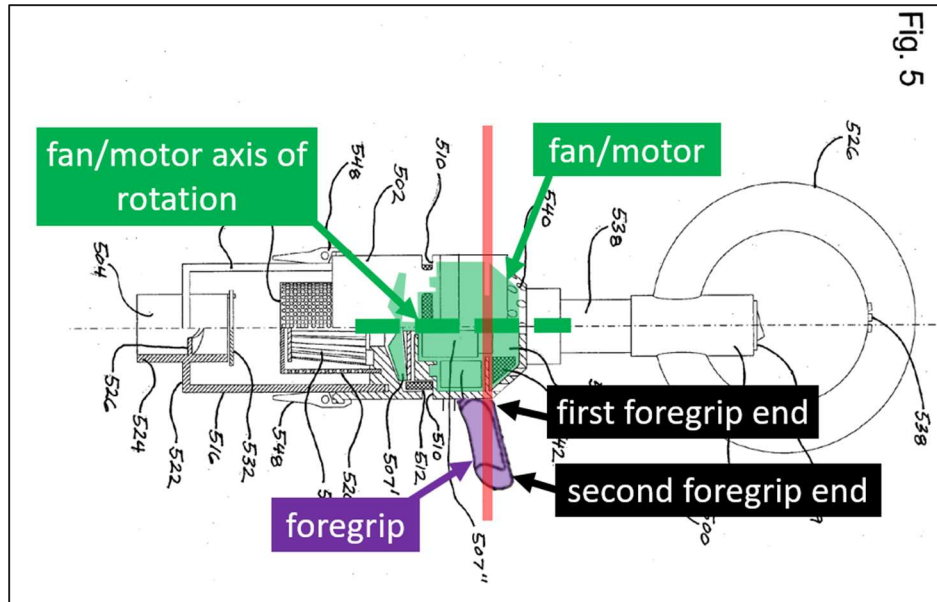
14. [16]

Butler anticipates claim 16. Ex1002 ¶¶175-76.

Butler teaches that a plane that is perpendicular to the motor axis extends through the handle from the first handle end to the second handle end. Ex1002 ¶176.

Butler teaches a **plane** that is perpendicular to the **fan/motor axis** that extends through the “**foregrip**” from the **first foregrip end** to the **second foregrip end**:





Ex1005, Figs. 3(modified), 5(modified); *see also id.*, Figs. 2A, 6-7, 16, 23; Ex1002 ¶176.

B. Ground 2: Butler Renders Claims 1-16 Obvious

To the extent PO argues that Butler does not anticipate claims 1-16, Butler alone also renders them obvious. Ex1002 ¶¶177-200.

1. Butler Teaches A Single Anticipatory System, But To The Extent PO Argues Otherwise, A POSA Would Have Combined Butler's Teachings

Butler teaches a single vacuum system that is configurable, including with various handles and cleaning tools, such that a POSA would immediately envisage all elements arranged as in the challenged claims, and therefore anticipates. Ground 1. To the extent PO argues that any of Butler's disclosures are not arranged as in the claims, a POSA would have combined them. Ex1002 ¶¶178-87. Butler teaches that its hand vacuum components, such as its dirt receptacle, are combinable and "may

be interchangeable with one another to provide the user with various cleaning options,” Ex1005, 16:25-29; and that “the present invention includes embodiments in which the features described herein are used individually or in various other inventive combinations,” *id.*, 43:29-44:3. *See also id.*, 4:17-28, 18:22-28, 19:9-15, 34:12-13 (components are combinable). Combining Butler’s components would have been obvious because it would have involved combining prior art elements (e.g., hand vacuum handles, grips, filters, and dust chambers) according to known methods to yield predictable results (ergonomic and efficient cleaning for different use cases), it would have involved a simple substitution of these known parts, which Butler expressly teaches are interchangeable, *id.*, and it would have involved applying known techniques (e.g., air filtration, attaching grips to a hand vacuum housing, and attaching cleaning tools to a hand vacuum air inlet). Ex1002 ¶¶179-85. Further, optimizing Butler’s cleaner for different uses by reconfiguring Butler’s interchangeable components would have at least been obvious to try as there are a finite number of identified, predictable solutions for arranging Butler’s well-known and interchangeable hand vacuum components. Ex1002 ¶186.

A POSA would have reasonably expected success, because these simple hand vacuum components were well known, and because Butler expressly teaches that they are interchangeable and that Butler’s hand vacuum can be optimally reconfigured based on use-case. Ex1002 ¶187.

2. Butler Renders Obvious A Hand Vacuum (Limitation [1pre])

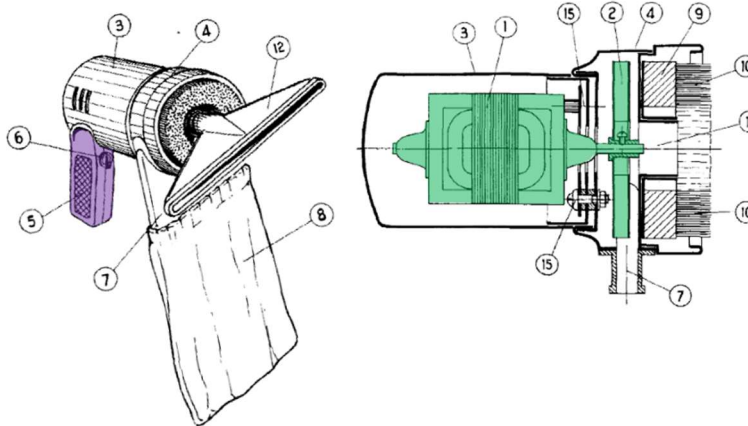
To the extent PO argues that the preamble is limiting and that Butler does not teach “a hand vacuum,” it would have been obvious for a POSA to further reduce Butler’s size. Ground 1, [1pre]; Ex1005, Abstract, 1:2-3, 13:1-19, 15:12-18, 26:1-10, 27:12-29; Ex1002 ¶¶188-89. As such, Butler’s cleaner would be even more “maneuver[able]” and “compact,” to achieve its purpose of cleaning “stairwells and other confined spaces.” *Id.*; Ex1002 ¶189. A POSA would have reasonably expected success, because it would involve simply reducing the size of certain components, such as Butler’s “cylindrical housing,” “dirt receptacle,” and “nozzle inlet,” which would make Butler’s cleaner smaller, and simply increasing the size of Butler’s “connector” to ensure a user could easily clean the floor and other surfaces while holding Butler’s hand vacuum. Ex1002 ¶189.

3. Butler Renders Obvious The Handle Is Provided On A Sidewall Of The Hand Vacuum Cleaner Body Underneath And/Or Adjacent The Suction Motor (Limitations [1d]/[1e])

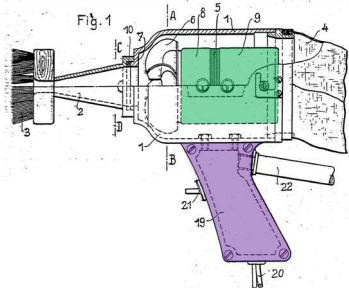
To the extent PO argues that locating Butler’s foregrips underneath and/or adjacent the suction motor and fan assembly requires modifying or combining Butler’s disclosures, a POSA would have been motivated to do so. Ex1002 ¶¶190-95. A POSA reading Butler’s disclosures that “foregrips 330, 430” can “pivot[,],” “rotate,” “slide,” and may be “removed and inserted in various different locations” on Butler’s vacuum cleaner body “to be articulated into more desirable positions,”

Ex1005, 19:9-12, 19:24-28, 23:12-17, 24:3-11, would have understood that one “desirable position” for “foregrip[] 330” would have been underneath the suction motor, and one “desirable position” for “foregrip[] 430” would have been adjacent the suction motor, and—to the extent PO argues Butler does not teach these limitations—would have been motivated to modify Butler or combine its disclosures to achieve such handle positionings. Ex1002 ¶191. A POSA would have understood that locating heavy components, such as a suction motor, above or directly adjacent a handle had certain benefits, including improved weight balance, reduced strain on the user’s wrist, and increased maneuverability. Ex1002 ¶192. Thus, a POSA would have been motivated to achieve these benefits by positioning Butler’s “foregrips, 330, 430” directly underneath and/or adjacent the suction motor. Ex1002 ¶192. Indeed, hand vacuums having **handles** positioned directly underneath and/or adjacent the **suction motor** have been known in the art for nearly 70 years:

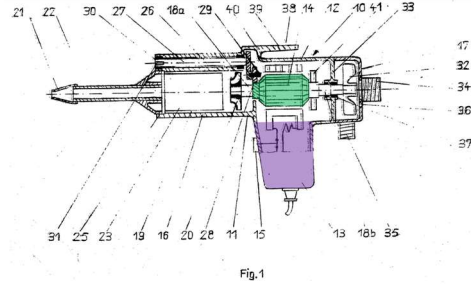
Ex1012, page 3 (1954)



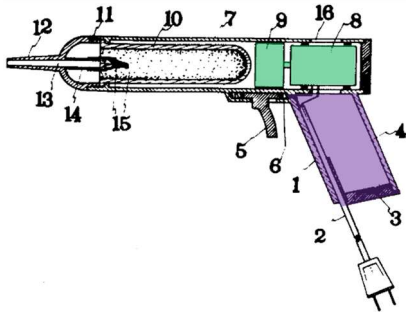
Ex1014, Fig. 1 (1955)



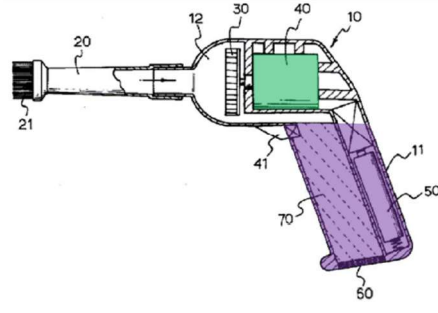
Ex1016, Fig. 1 (1971)



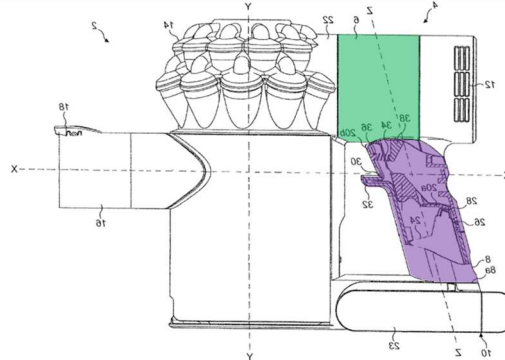
Ex1007, Fig. 1 (1973)



Ex1018, Fig. 2 (1998)



Ex1019, Fig. 2 (2013)



Ex1002 ¶193.

A POSA would have reasonably expected success modifying Butler or combining its disclosures as described because it would have involved a straightforward relocation of Butler's existing handles, and because Butler itself teaches that its handles may rotate, slide, and be positioned at any location on Butler's vacuum cleaner body. Ex1002 ¶¶194-95; Ground 1, [1d]/[1e]. Thus, positioning Butler's handles underneath and/or adjacent the suction motor would have been at least obvious to try, particularly given Butler's express teachings; easy to implement, using nearly 70-year-old teachings; and would have yielded the predictable result of "even greater ergonomic flexibility and control of the device," which is one of Butler's stated objectives. Ex1005, 22:26-28.

4. Butler Renders Obvious The Suction Motor Axis Of Rotation Is Positioned Below the Cyclone Axis Of Rotation And The Passage Axis (Claims 6/13/14)

To the extent PO argues that Butler does not teach the claims regarding the suction motor axis of rotation positioning, Butler renders them obvious. Ex1002 ¶¶196-200. A POSA would have been motivated by Butler's disclosures to increase the size of Butler's "inlet air passage 242," which would increase the amount of airflow into Butler's cleaner and further offset Butler's cyclone separator and "fan/motor." Ex1005, 18:5-7; Ground 1, [6]/[13]; Ex1002 ¶197. Likewise, a POSA would have been motivated to further offset Butler's cyclone separator and "fan/motor" to allow room for other vacuum components that are too large to

accommodate on either side of the motor when it is centered, such as wires and electronics that power the suction motor and fan assembly. Ex1002 ¶197; Ex1023, Fig. 2. A POSA also would have been motivated to offset Butler's cyclone separator and "fan/motor" to allow for different exterior shapes, such as an asymmetrical downward slope, and would have understood that locating the fan/motor closer to the user's hand would reduce strain on their wrist during operation. Ex1002 ¶197; Ex1023, Fig. 2. A POSA would have understood that these modifications would make Butler's cleaner even more "maneuver[able]" and "compact," which would further its purpose of cleaning "in confined spaces." Ex1005, 26:1-10; Ex1002 ¶197.

It would have been at least obvious to try these modifications. Ex1002 ¶198. There were a finite number of identified cyclone unit/suction motor and fan assembly orientations, and it would have been obvious to try to achieve the known benefits described above, would have been simple to implement using known techniques, and would have yielded the predictable results of increased vacuum effectiveness and ergonomics. Ex1002 ¶198. A POSA would have reasonably expected success making these modifications, including because such modification involves a simple relocation of Butler's existing elements performing similar functions in similar ways, and because of the express motivations in Butler to perform such modification. Ex1002 ¶199. When so modified, the suction motor

axis of rotation is positioned below the cyclone axis of rotation and the passage axis.

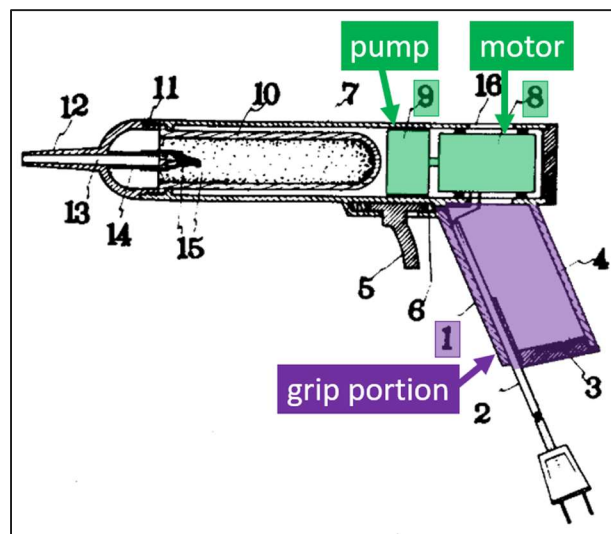
Ex1002 ¶200; Ground 1, [6]/[13]/[14].

C. Ground 3: Tsukuji in Combination with Martelliere Renders Obvious Claims 1-5, 7-12, and 15-16

1. A POSA Would Have Combined Tsukuji and Martelliere

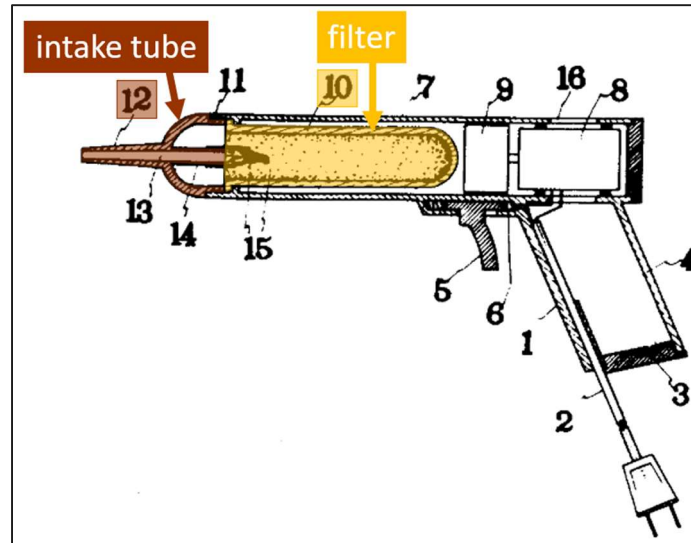
a. Scope and Content of the Prior Art

Tsukuji teaches a “small electric vacuum cleaner with an overall gun shape” and a “**grip portion 1**” positioned underneath “the **motor 8**” that “rotate[s] the turbofan inside the **pump 9**”:



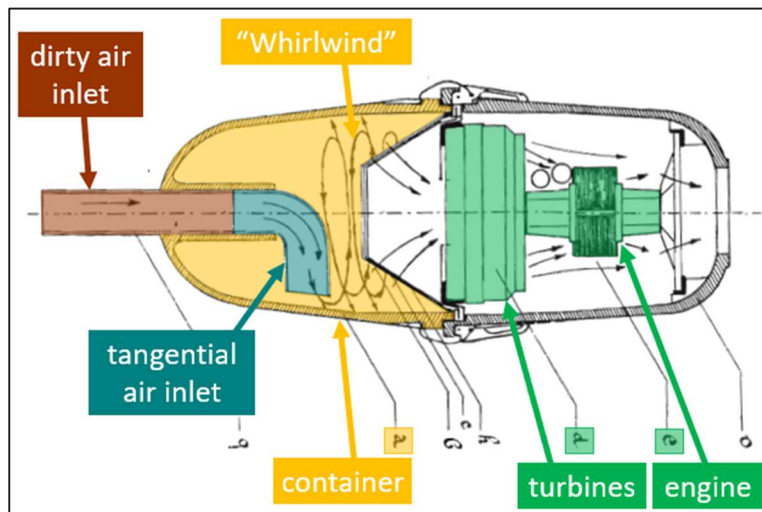
Ex1007, 2-3, Fig. 1; Ex1002 ¶201.

Dirty “[a]ir is taken in from...the **intake tube 12**,” “and the dust and debris is separated from the air by the **filter 10** and collected”:



Ex1007, 3, Fig. 1; Ex1002 ¶202.

Martelliere teaches a “broom type vacuum cleaner” with “**turbines d** ,” “**engine e** ,” and a **dirty air inlet** connected to a “**tangential[]**” **air inlet** that creates a “**Whirlwind**” within a “**container**” to cyclonically separate dirt from air:

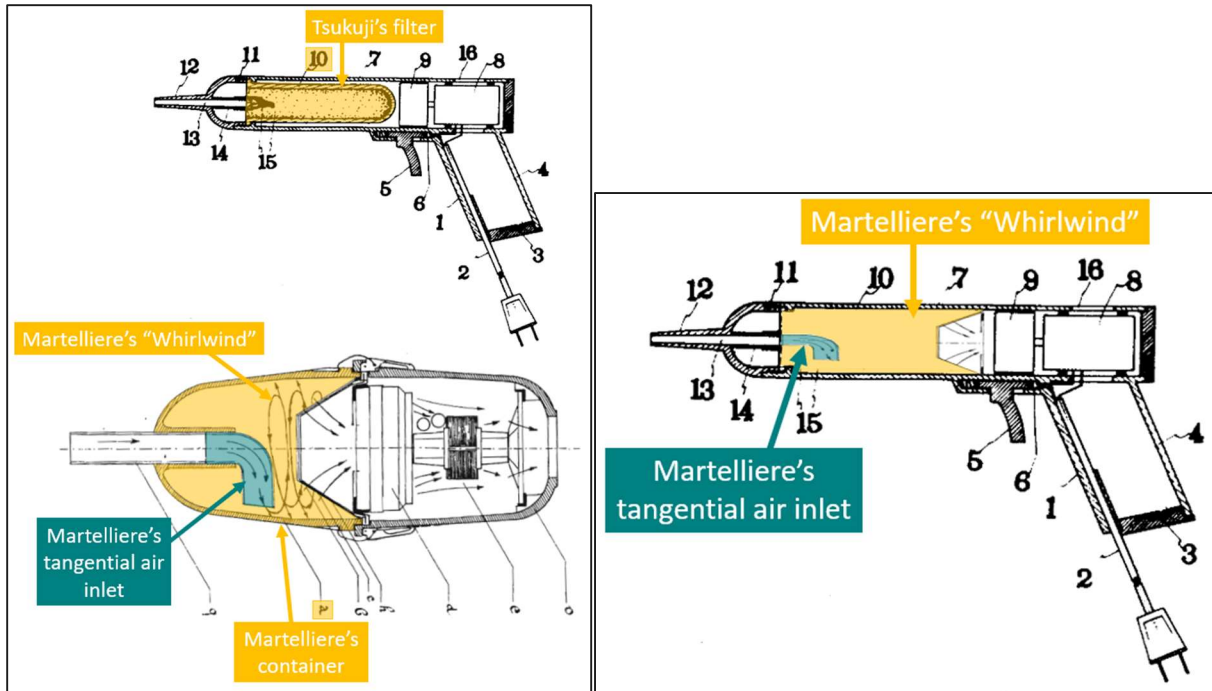


Ex1009, 1, Fig. 1; Ex1002 ¶203.

b. Motivation to Combine

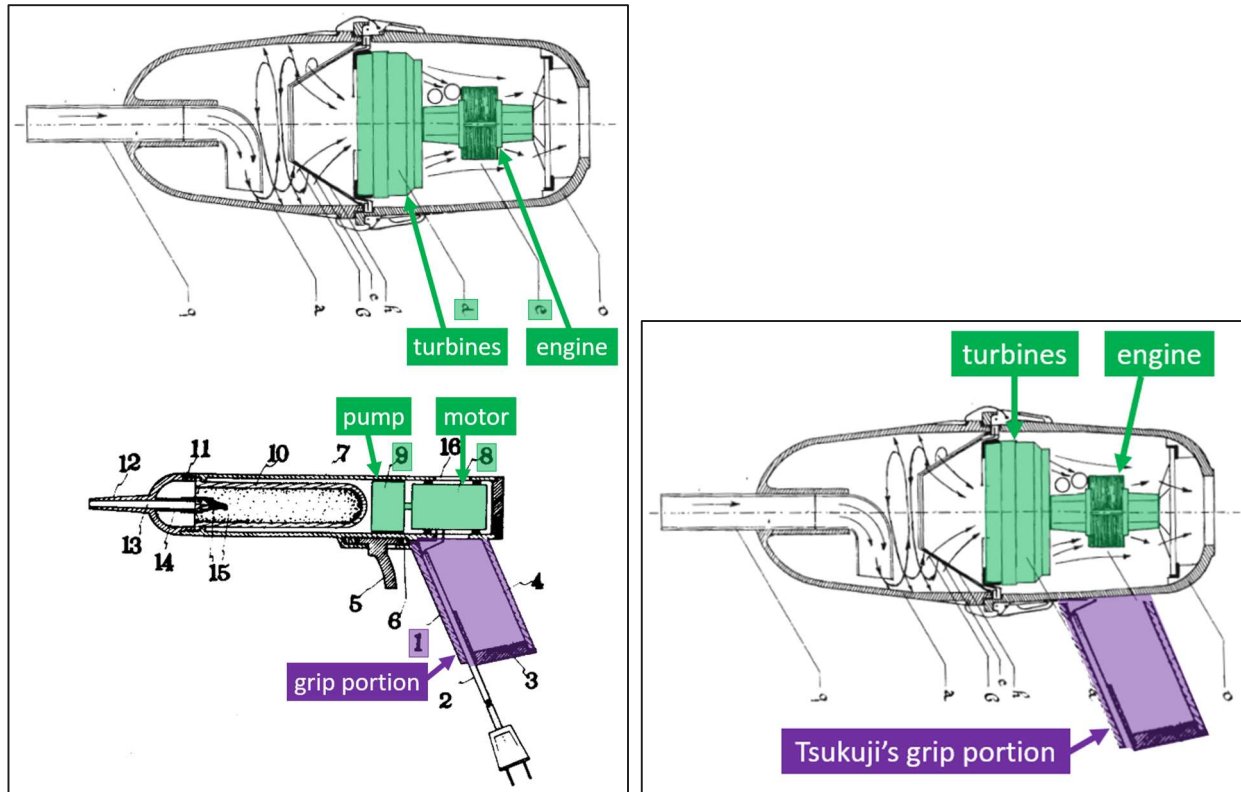
A POSA reading Tsukuji as of the priority date of the '661 Patent would have been motivated to modify Tsukuji to achieve the benefits of Martelliere's cyclonic-separation system. Ex1002 ¶¶204-12. Also, a POSA reading Martelliere as of the priority date of the '661 Patent would have been motivated to modify Martelliere to achieve the benefits of Tsukuji's handle. Ex1002 ¶¶204-12. Specifically, a POSA would have been motivated to combine the teachings of Tsukuji and Martelliere as follows:

A POSA would have been motivated to modify Tsukuji's dust-separation unit ("filter 10") to use a cyclonic-filtration unit, such as Martelliere's "container," which through the use of a curved pipe has a "tangential[]" air inlet that creates a "Whirlwind" (which a POSA would have understood is cyclonic air filtration) to separate dust from air:



Ex1007, 3, Fig. 1(modified); Ex1009, 1, Fig. 1(modified); Ex1002 ¶205.

A POSA also would have been motivated to modify Martelliere to include an angled handle positioned below “**turbines *d***” and “**engine *e***”, such as Tsukuji’s “**grip portion 1**” positioned below the “**motor 8**” and “**pump 9**”:



Ex1007, 3, Fig. 1(modified); Ex1009, 1, Fig. 1(modified); Ex1002 ¶206.

A POSA would have been motivated to combine Tsukuji and Martelliere as described for multiple reasons. Ex1002 ¶¶207-12. **First**, Tsukuji and Martelliere are analogous art with very similar layouts. Ex1002 ¶207. Like Tsukuji, which teaches a “small” vacuum cleaner with a dirty air inlet (“intake tube 12”) that extends into an air-filtration unit (“filter 10”) that is positioned upstream of and “in series” with a suction motor and fan assembly (“motor 8”/“pump 9”), Ex1007, 3, Fig. 1, Martelliere teaches a compact vacuum cleaner with a dirty air inlet connected to a “tangential[]” air inlet that extends into an air-filtration unit (“container,” which uses

a “Whirlwind” to separate dust from air) that is positioned upstream of and in series with a suction motor and fan assembly (“turbines *d*”/“engine *e*”), Ex1009, 1, Fig. 1.

Second, Tsukuji and Martelliere each provide motivations for this combination. Ex1002 ¶208. Tsukuji teaches that its filtration unit is a “filter 10” that “separate[s]” “dust and debris...from the air.” Ex1007, 3. Tsukuji recognizes that “air not being discharged via the filter leads to relatively weak suction force, so obstruction of suction force must be avoided as much as possible.” *Id.*, 4. A POSA would have looked for alternative ways for filtering air with reduced “obstruction of suction force,” including a cyclonic air-filtration unit. Ex1002 ¶208. A POSA would have understood that cyclonic-filtration had benefits over dust-bag filtration, including: (1) no bag needs to be replaced, reducing recurring costs; (2) cyclonic cleaners experience comparatively less suction loss as they fill, because most of the separated dust does not reach the physical filter; and (3) cyclonic cleaners give the user a visual indication of how full the container is and when to empty it. Ex1002 ¶208. These benefits were well-known in the art at the time the ’661 Patent’s priority application was filed. Ex1002 ¶208. For example, a 2002 PCT Publication explained that “so called bagless vacuum cleaners,” or “cyclonic” cleaners, “are becoming increasingly popular” because they “avoid[ed] the use of a filter bag as the primary form of separation” and thus “maintain a consistently high level of suction, even as the collecting chamber fills with dirt.” Ex1020, 1:5-10. And a 2007

U.S. patent explained that cyclonic cleaners “provide[] an economic advantage that, unlike conventional cleaners, it can be used semipermanently without any replacement of disposable paper bag.” Ex1021, 7:53-57. Martelliere itself teaches that “[b]y application of the ‘Whirlwind’ principle,” i.e., cyclonic-filtration, “the materials are deposited in the bottom of the container, after having separated from the air, before it passes through the filter screen,” which “prevent[s] clogging” and creates “stable suction,” and by using a transparent cyclonic chamber, “the user is able, when stopped, to see where the filling of the container is” and “can therefore better judge when it must be emptied.” Ex1009, 1.

Tsukuji further recognizes that “reverse flow of dust and debris that has already been collected toward the intake tube is a concern,” because it can cause “a certain amount of air resistance [to] develop,” and includes a “check valve” to “reduce[]” that “concern.” Ex1007, 4-5. Tsukuji’s identification of “reverse flow” as a “concern” would have further motivated a POSA to include Martelliere’s “tangential[]” air inlet when implementing Martelliere’s cyclonic-filtration teachings, because a POSA would have understood that using a curved pipe (as taught by Martelliere) would further reduce the “reverse flow of dust and debris” because it would be more difficult for dust and debris to travel backwards through a 90 degree corner (as taught by Martelliere) compared to the straight path used in Tsukuji. Ex1002 ¶209.

Third, a POSA would have understood that Tsukuji’s “grip portion 1” had benefits over Martelliere’s “broom type vacuum,” where the user grasps the rear portion of the cleaner during operation. Ex1002 ¶210. Tsukuji explains that its cleaner “may be used while being oriented in a direction that is not vertical,” and includes a “grip portion 1” with a “grip [that] can be reliably grasped.” Ex1007, 5. Likewise, Martelliere’s vacuum is designed to be “easy to handle” and may be “held vertically or slightly inclined” during use. Ex1009, 1. A POSA would have looked for vacuum components that could make Martelliere’s vacuum “eas[ier] to handle,” including an angled handle positioned below the suction motor and fan assembly. Ex1002 ¶210. A POSA would have understood that a handle positioned below Martelliere’s suction motor and fan assembly had benefits over Martelliere’s rear gripping portion, including (1) less strain on the user’s wrist, (2) more versatile gripping, and (3) closer location to the vacuum’s center of gravity, increasing vacuum maneuverability and ergonomics. Ex1002 ¶210. These benefits were well-known in the art at the time the ’661Patent’s priority application was filed. Ex1002 ¶210. For example, a 2013 PCT publication explained that positioning “[t]he motor and fan unit 6...above” “pistol-grip” “handle 8” “reduces stress on a user’s wrist during cleaning.” Ex1019, 1:6-7, 5:17-18, 6:11-12.

Fourth, this combination would have involved a simple substitution of known elements for others to obtain predictable results. Ex1002 ¶211. Tsukuji teaches a

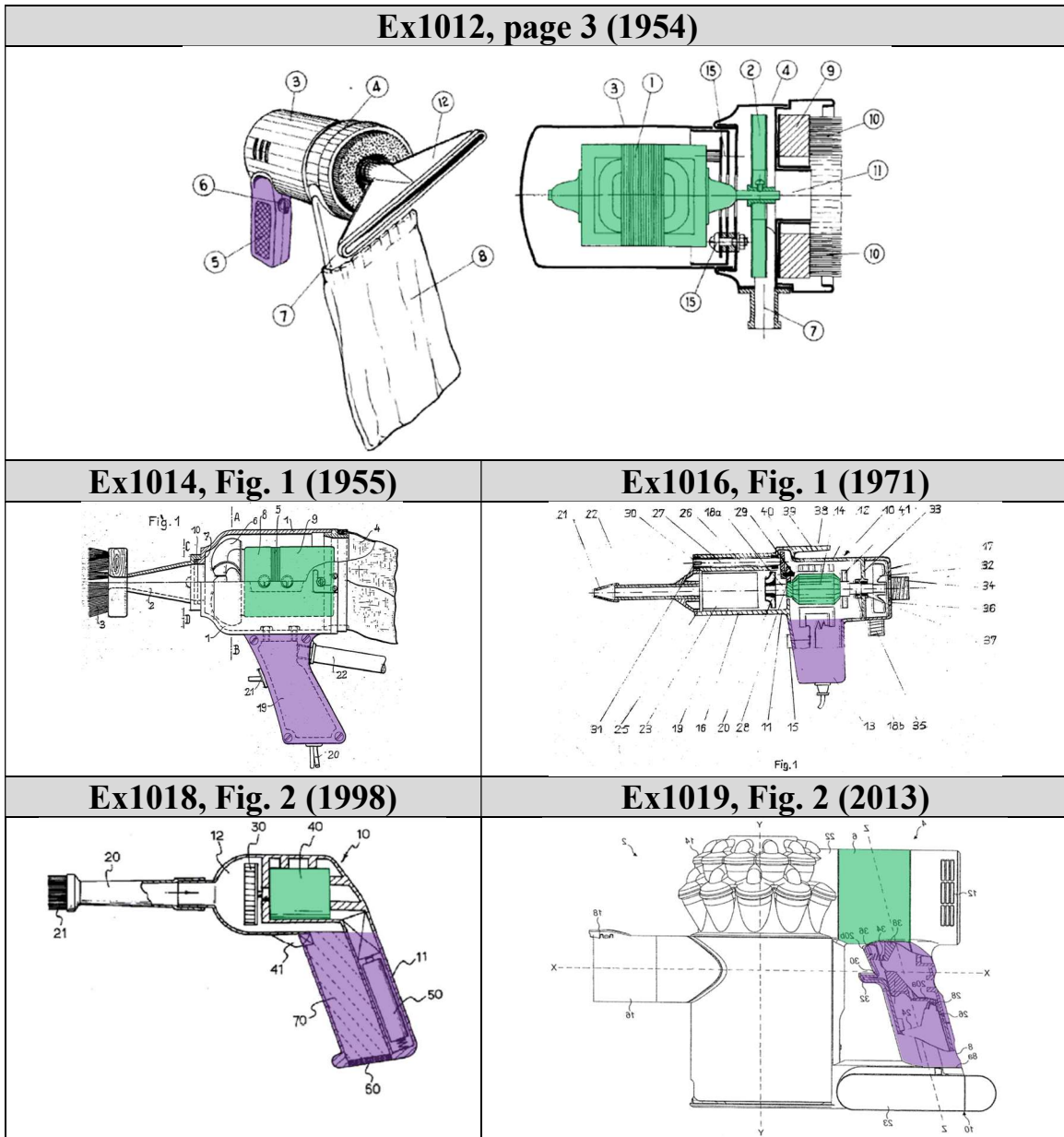
vacuum having a dirty air inlet that extends into a dust-separation unit (a filter), and a handle. Ex1007, Fig. 1. Martelliere teaches a vacuum having a dirty air inlet connected to a tangential air inlet that extends into a dust-separation unit (cyclonic airflow within a container), and a rear portion that the user grips with their hand. Ex1009, Fig. 1. A POSA would have understood that the simple substitution of these types of dust-separation units and gripping mechanisms would achieve the predictable results of filtering air and increased vacuum ergonomics and maneuverability. Ex1002 ¶211. Further, as depicted and explained above, Tsukuji and Martelliere are directed to vacuums having a similar orientation of separation unit relative to dirty air inlet and suction motor and fan assembly, which would have further motivated a POSA to make the substitution. Ex1007, Fig. 1; Ex1009, Fig. 1; Ex1002 ¶211.

Fifth, it would have been at least obvious to try this combination. Ex1002 ¶212. A POSA would have understood that there were a finite number of identified dust-separation solutions, including dust filters (as Tsukuji teaches) and cyclonic separators (as Martelliere teaches), and gripping solutions, including an angled handle (as Tsukuji teaches) and a rear gripping portion (as Martelliere teaches), and it would have been obvious to try to achieve the known benefits described above. Ex1002 ¶212.

c. Reasonable Expectation of Success

A POSA would have reasonably expected success combining Tsukuji's and Martelliere's teachings as described. Ex1002 ¶¶213-14. A POSA would have understood that these two types of dust-separation units could have been used interchangeably. Ex1002 ¶213. A POSA would have further expected success for the reasons stated above, including because such modification involves a simple substitution of known elements that perform similar functions in similar ways, and because of the express motivations found in Tsukuji and Martelliere to perform such substitution. Ex1002 ¶213.

Further, a POSA would have reasonably expected success incorporating Tsukuji's handle teachings into Martelliere because **handles** positioned below the **suction motor and fan assembly** have existed for nearly 70 years:



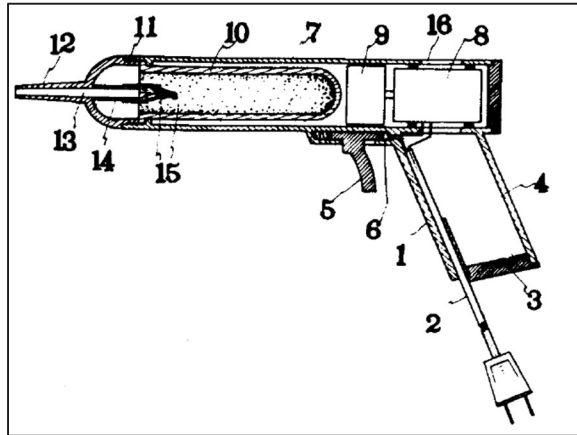
Ex1002 ¶214.

2. [1]

a. [1pre]

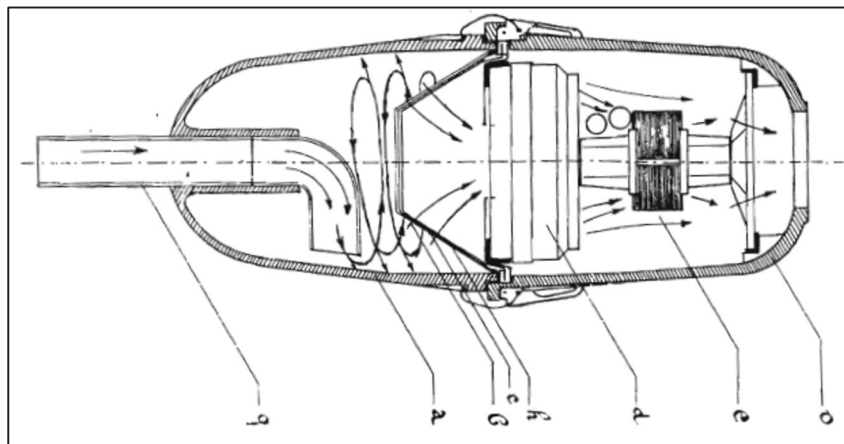
To the extent the preamble is limiting, Tsukuji and Martelliere each teach it, and the Tsukuji-Martelliere combinations teach it. Ex1002 ¶¶215-23. Tsukuji

teaches a “portable electric vacuum cleaner...[that] is small and de[s]igned for desktop use,” which is a hand vacuum cleaner:



Ex1007, 1, 4, Fig. 1; Ex1002 ¶216.

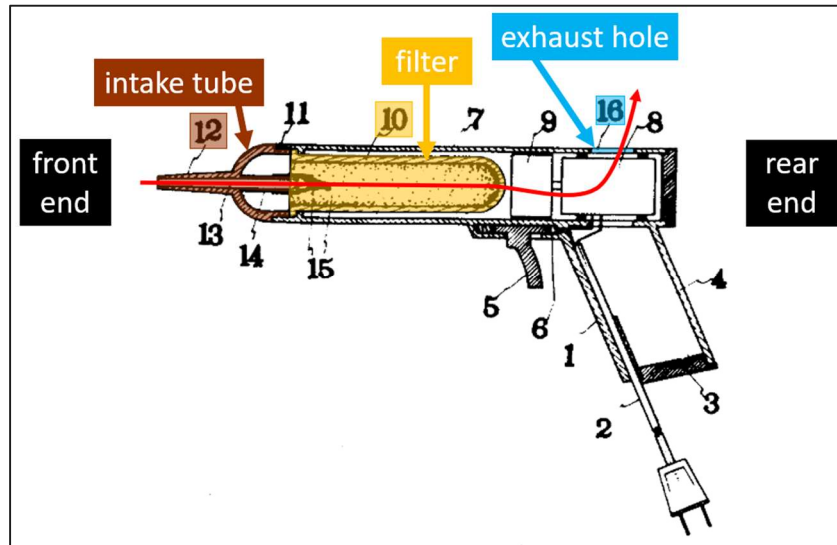
Likewise, Martelliere teaches a compact-sized “vacuum cleaner” that is “held vertically or slightly inclined,” which is also a hand vacuum cleaner:



Ex1009, 1, Fig. 1; Ex1002 ¶217.

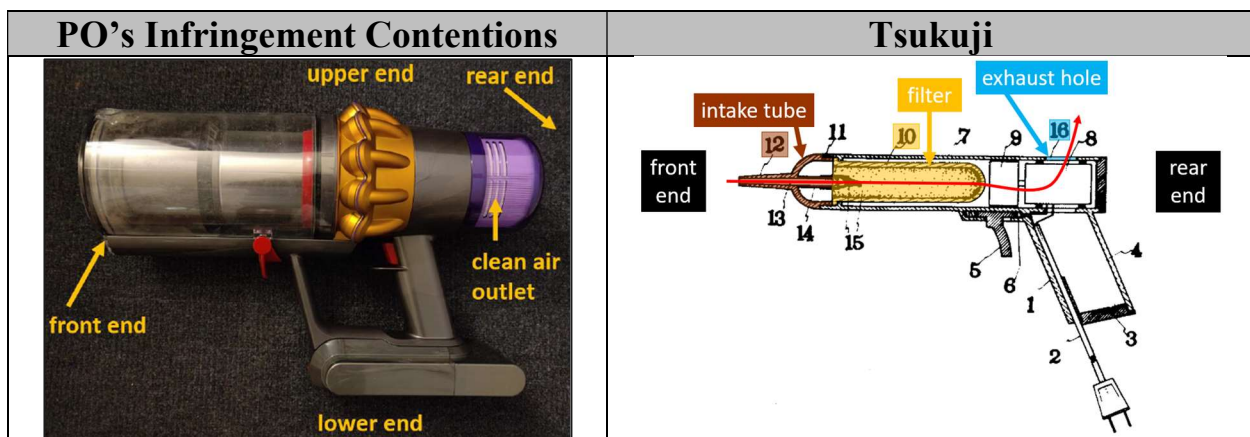
Tsukuji teaches that the hand vacuum cleaner has a front end having a dirty air inlet, and a clean air outlet. Ex1002 ¶¶218-19. In use, “**air**” is taken in from the

through-hole 13 in the **intake tube 12**” (located at the vacuum **front end**), “taken into the **filter 10**,” and “discharged...from the **exhaust hole 16**”:



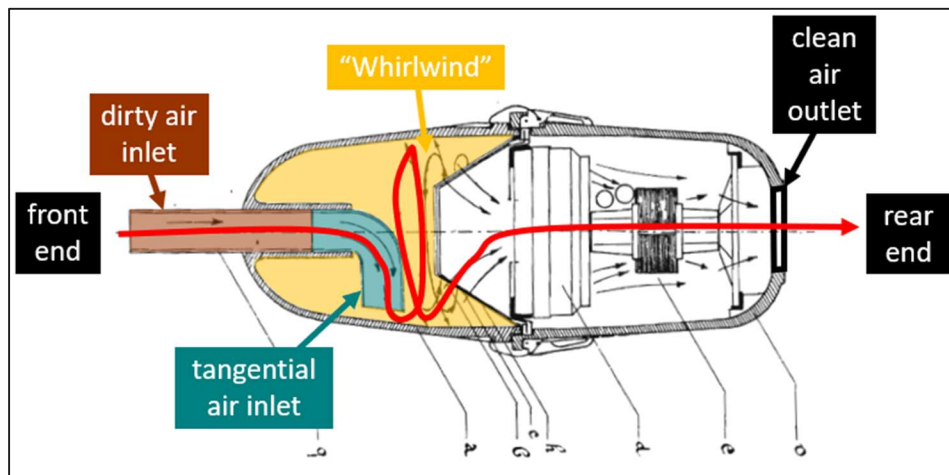
Ex1007, 3, Fig. 1; Ex1002 ¶218.

Tsukuji’s “intake tube 12” is a dirty air inlet at Tsukuji’s front end, and “exhaust hole 16” is a clean air outlet. Ex1002 ¶219. A POSA would have understood that Tsukuji has **front and rear ends** as shown above. Ex1002 ¶219. Further, this is at least as much disclosure of these limitations in Tsukuji as PO has accused of infringement in the related litigation:



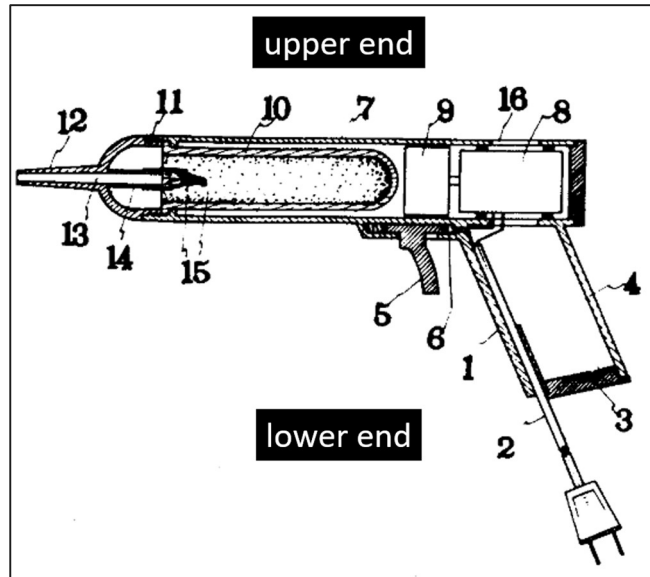
Ex1010, 3(PO's annotations); Ex1007, Fig. 5; Ex1002 ¶219.

Likewise, Martelliere teaches that the hand vacuum cleaner has a front end having a dirty air inlet, and a clean air outlet: “**air** [is] sucked” into Martelliere’s **dirty air inlet** (located at the vacuum **front end**), passes through the “**tangential**” **air inlet** that initiates a ““**Whirlwind**,”” which “separate[s]” dust from air “before it passes through the filter screen,” and then, “perfectly filtered, the **air** can then pass through the turbines *d* and into the engine *e*” and out the cleaner (through what a POSA would have understood is a **clean air outlet**):



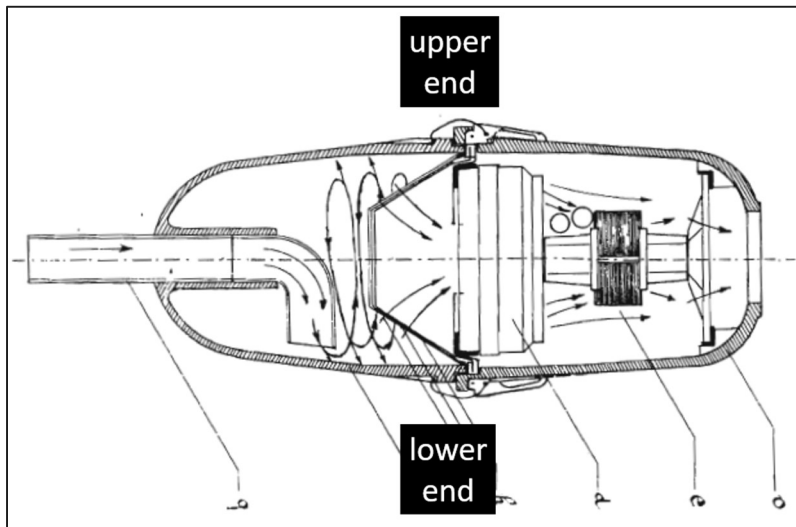
Ex1009, 1, Fig. 1; Ex1002 ¶220.

Tsukuji’s vacuum has an **upper end** and a **lower end**:



Ex1007, Fig. 1; Ex1002 ¶221.

Martelliere's vacuum also has an **upper end** and a **lower end**:



Ex1009, Fig. 1; Ex1002 ¶222.

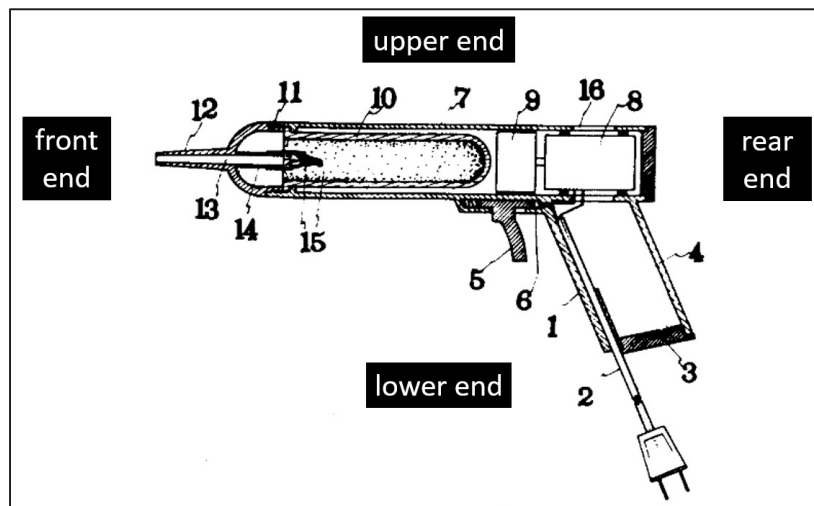
A POSA would have been motivated to combine Tsukuji and Martelliere and would have reasonably expected success. Ground 3, §1. The Tsukuji-Martelliere

combinations described in §1 likewise teach this limitation for the same reasons discussed above. *Id.*, Ex1002 ¶223.

a. [1a]

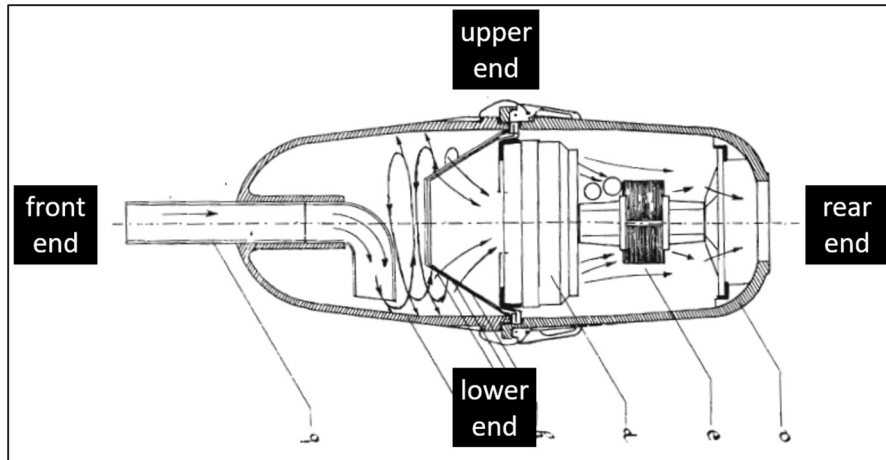
Tsukuji teaches and the Tsukuji-Martelliere combinations teach this limitation. Ex1002 ¶¶224-35.

Tsukuji's hand vacuum has a hand vacuum cleaner body comprising an **upper end**, a **lower end**, a **front end**, and a **rear end**:



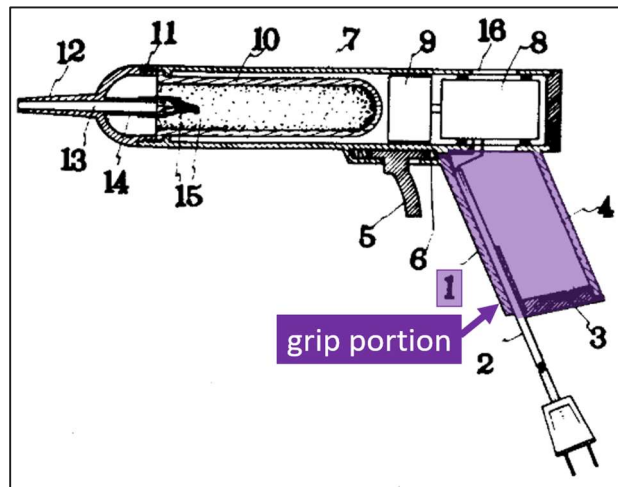
Ex1007, Fig. 1; Ex1002 ¶225; Ground 3, [1pre].

Martelliere's hand vacuum also has a hand vacuum cleaner body comprising an **upper end**, a **lower end**, a **front end**, and a **rear end**:



Ex1009, Fig. 1; Ex1002 ¶226.

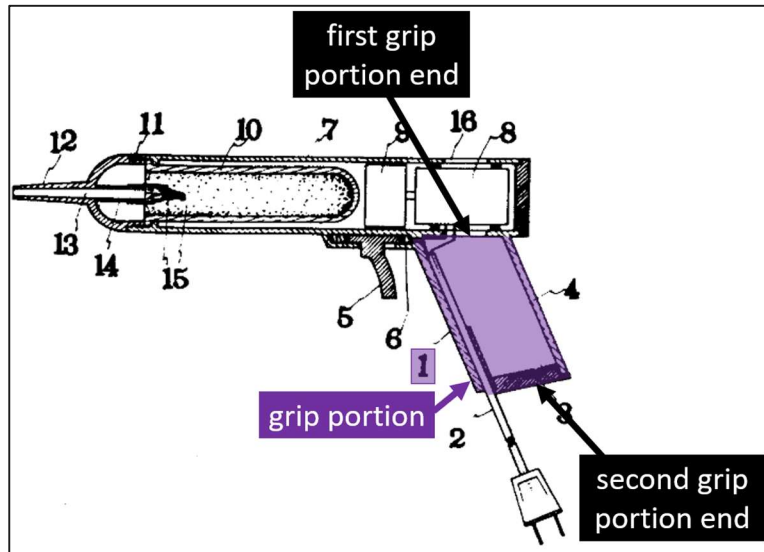
Tsukuji teaches that the hand vacuum cleaner body comprises a handle. Ex1002 ¶¶227-28. Tsukuji’s cleaner body includes a “**grip portion 1**” that “can be reliably grasped” when “the device [is] used”:



Ex1007, 3, 5, Fig. 1; Ex1002 ¶227.

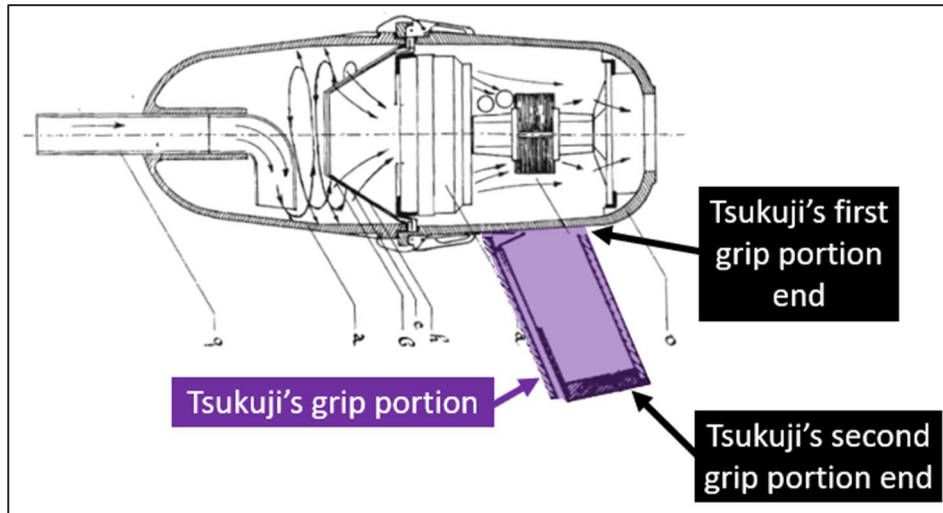
Tsukuji’s “grip portion 1” is a handle. Ex1002 ¶228.

Tsukuji teaches that the handle extends between a first handle end and a second handle end. Ex1002 ¶229. Tsukuji’s “**grip portion 1**” extends between a **first grip portion end** and a **second grip portion end**:



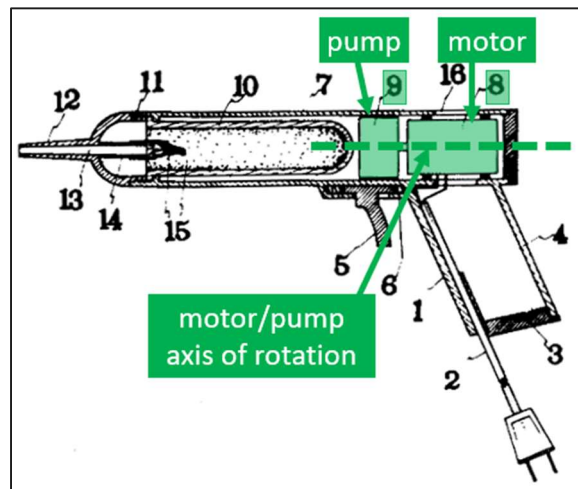
Ex1007, Fig. 1; Ex1002 ¶229.

A POSA would have been motivated to combine Tsukuji and Martelliere and would have reasonably expected success. Ground 3, §1. When Tsukuji’s “**grip portion 1**” is incorporated into Martelliere’s cleaner, it has a **first grip portion end** and a **second grip portion end**:



Ex1007, Fig. 1(modified); Ex1009, Fig. 1(modified); Ex1002 ¶230.

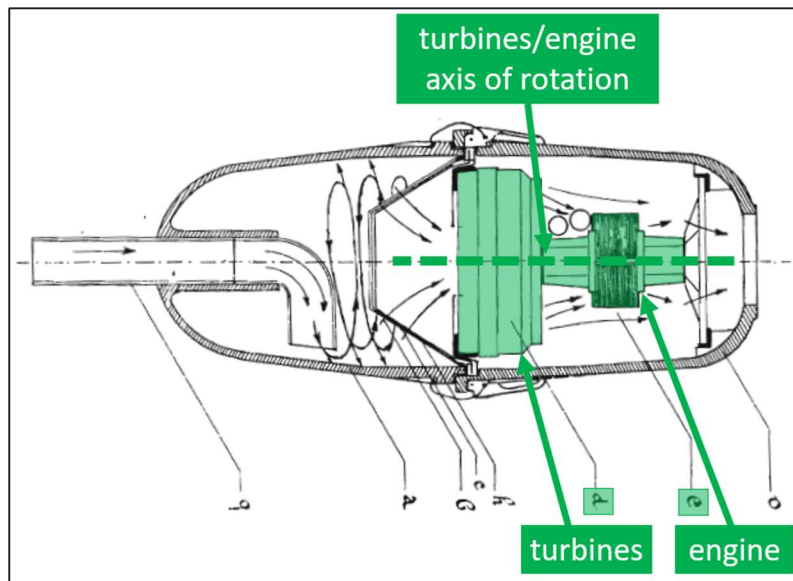
Tsukuji and Martelliere each teach that the hand vacuum cleaner body includes a suction motor and fan assembly having a suction motor axis of rotation. Ex1002 ¶¶231-35. Tsukuji's vacuum body has a “**motor 8**” that “rotate[s] the turbofan inside the **pump 9**” and has a **motor/pump axis of rotation**:



Ex1007, 3, Fig. 1; Ex1002 ¶231.

Tsukuji's "motor 8" and "pump 9," (which contains the "turbofan"), individually and collectively, are a suction motor and fan assembly with a suction motor axis of rotation. Ex1002 ¶232.

Likewise, Martelliere teaches "**turbines *d***" and "**engine *e***" with a **turbines/engine axis of rotation**:



Ex1009, 1, Fig. 1; Ex1002 ¶233.

Martelliere's "engine *e*" and "turbines *d*," individually and collectively, are also a suction motor and fan assembly with a suction motor axis of rotation. Ex1002 ¶234.

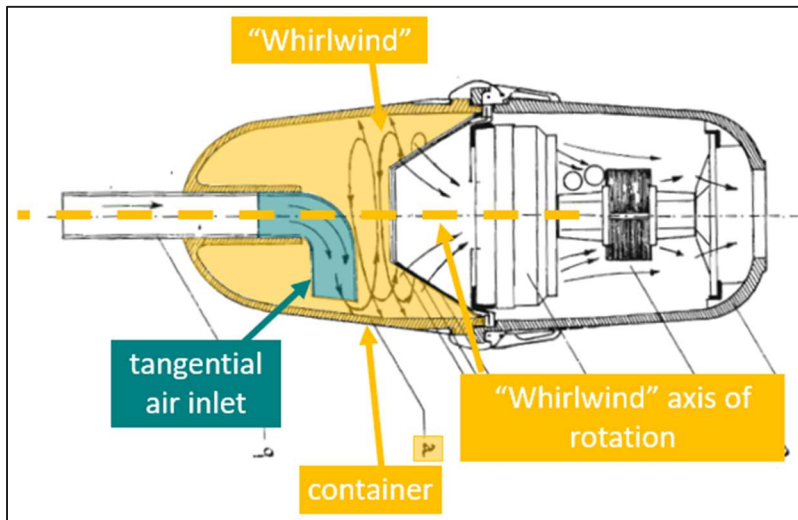
Further, the combination of Tsukuji and Martelliere likewise meets this limitation when Martelliere's cyclonic-filtration teachings are incorporated into Tsukuji's cleaner, for the same reasons discussed above. Ex1002 ¶235.

b. [1b]

Martelliere teaches and the Tsukuji-Martelliere combinations teach this limitation. Ex1002 ¶¶236-43.

Tsukuji teaches a “filter 10” that “separate[s]” “dust and debris,” which is an air-filtration unit. Ex1007, 3; Ex1002 ¶237.

Martelliere teaches a cyclone unit comprising a cyclone having a cyclone axis of rotation. Ex1002 ¶¶238-39. Martelliere teaches a “**container**” with a “**tangential[]**” **air inlet** that creates a “**Whirlwind**” to cyclonically separate air from dirt that deposits “in the bottom of the **container**”:

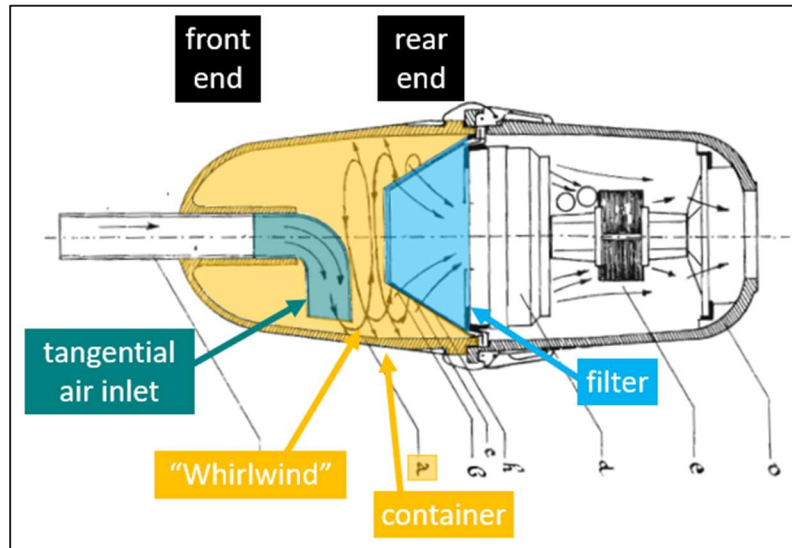


Ex1009, 1, Fig. 1; Ex1002 ¶238.

Martelliere’s “**container**” is a cyclone unit and includes a cyclone (separating debris by a “**Whirlwind**”) with a **cyclone axis of rotation**. Ex1002 ¶239.

Martelliere teaches a cyclone unit having a cyclone air inlet, a cyclone air outlet, a front end and a rear end. Ex1002 ¶¶240-41. Martelliere’s “**container**”

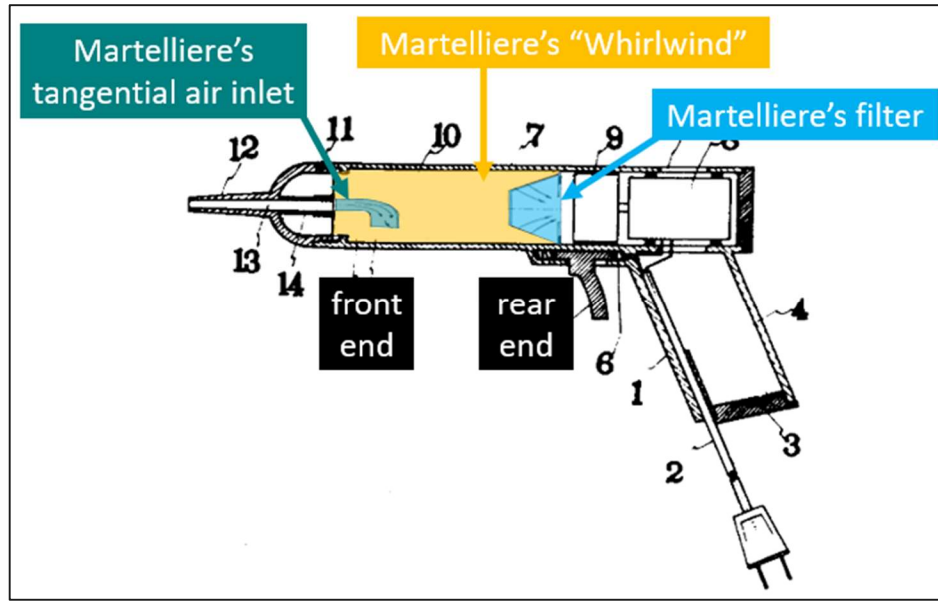
comprising a cyclone has a **front end** (where air enters via a “**tangential[]**” **air inlet**), and a **rear end** (where air exits via “**filter b**”):



Ex1009, 1, Fig. 1; Ex1002 ¶240.

Martelliere’s “tangential[]” air inlet is a cyclone air inlet because it initiates cyclonic airflow as air enters Martelliere’s “container,” and Martelliere’s “filter *b*” is a cyclone air outlet because air passes through it, and cyclonic separation ends, as it exits Martelliere’s cyclone. Ex1009, 1; Ex1002 ¶241.

A POSA would have been motivated to combine Tsukuji and Martelliere and would have reasonably expected success. Ground 3, §1. The combination teaches this limitation when Tsukuji’s “filter 10” is modified in view of Martelliere’s cyclonic-filtration teachings, including “container” with a ““**Whirlwind**,” “**tangential[]**” **air inlet**, and “**filter *b***”:



Ex1007, Fig. 1(modified); Ex1009, Fig. 1(modified); Ex1002 ¶¶242-43.

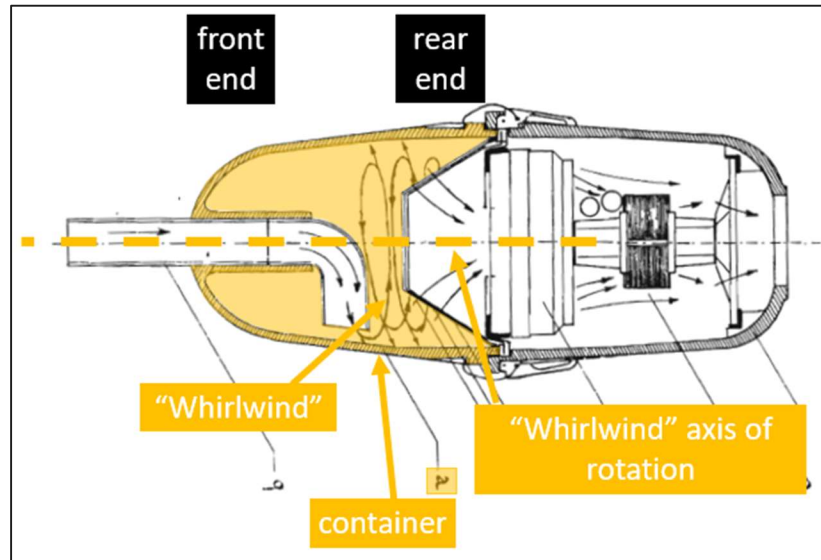
Further, the combination of Martelliere and Tsukuji likewise teaches this limitation when Tsukuji's handle is incorporated into Martelliere's cleaner, for the same reasons discussed above. Ex1002 ¶¶242-43.

c. [1c]

Martelliere teaches and the Tsukuji-Martelliere combinations teach this limitation. Ex1002 ¶¶244-46.

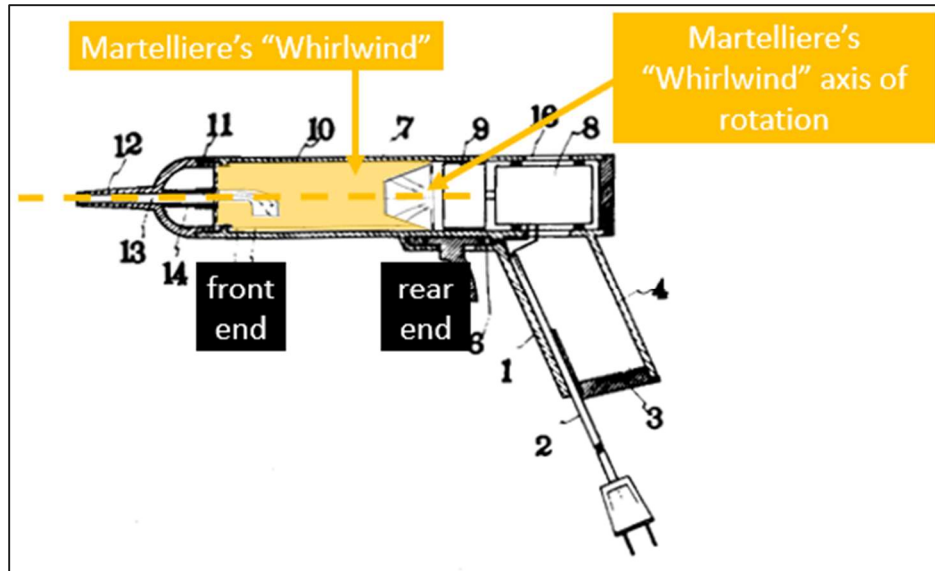
Martelliere teaches that when the hand vacuum cleaner is positioned with the upper end of the hand vacuum cleaner above the lower end of the hand vacuum cleaner and the lower end of the hand vacuum cleaner is on a horizontal surface, the cyclone axis of rotation is generally horizontal and extends between the front and rear ends of the cyclone. Ex1002 ¶245. When Martelliere's vacuum is positioned as claimed, the "**Whirlwind**" **axis of rotation** is generally horizontal and extends

between the **front** and **rear ends** of the “**container**” (cyclone unit) comprising the “**Whirlwind**” (cyclone):



Ex1009, 1, Fig. 1; Ex1002 ¶245; Ground 3, [1pre].

A POSA would have been motivated to combine Tsukuji and Martelliere and would have reasonably expected success. Ground 3, §1. This limitation is likewise met when Tsukuji’s handle is incorporated into Martelliere and Martelliere’s cleaner is oriented as claimed, for the same reasons discussed above. Ex1002 ¶246. The combined teachings also meet this limitation when Martelliere’s cyclonic-filtration teachings are incorporated into Tsukuji’s cleaner:

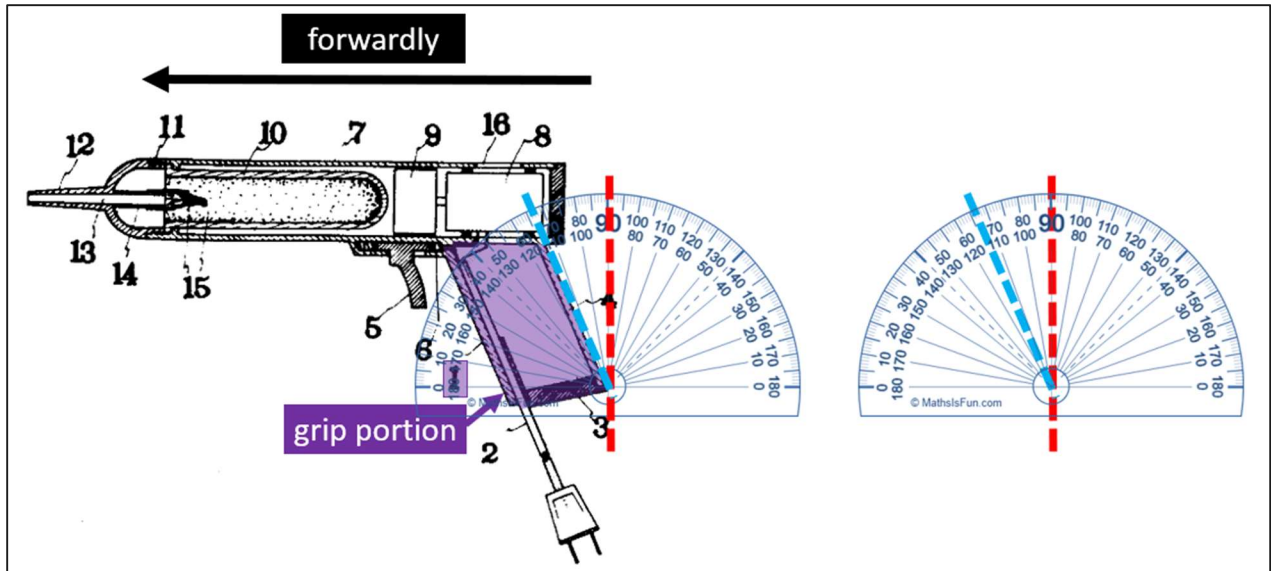


Ex1007, Fig. 1(modified), Ex1009, Fig. 1(modified); Ex1002 ¶246.

d. [1d]

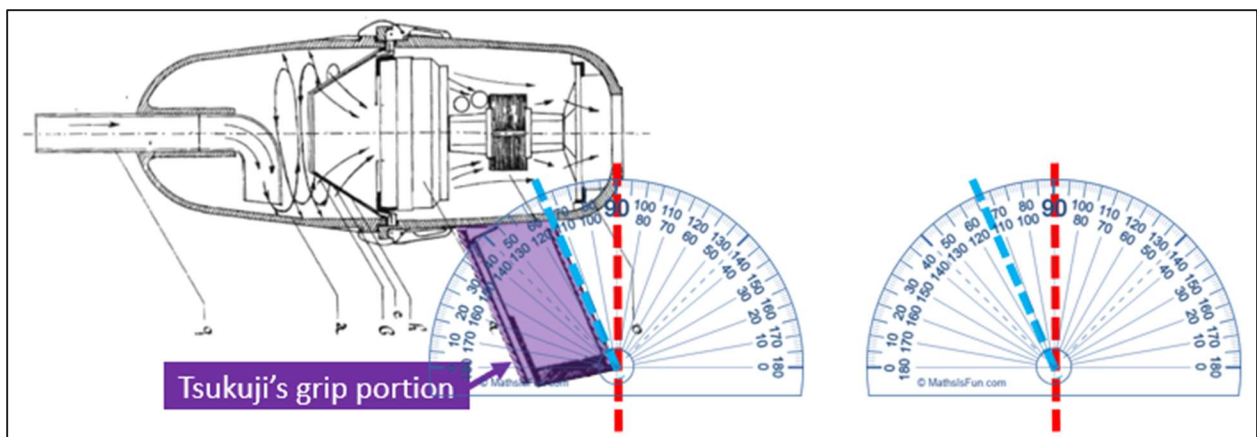
Tsukuji teaches and the Tsukuji-Martelliere combinations teach this limitation. Ex1002 ¶¶247-49.

Tsukuji teaches that when the hand vacuum cleaner is positioned with the upper end of the hand vacuum cleaner above the lower end of the hand vacuum cleaner and the hand vacuum cleaner is on a horizontal surface, the handle is inclined forwardly at an angle that is between 10 and 80 degrees from a vertical axis. Ex1002 ¶248. When positioned as claimed, Tsukuji's "**grip portion 1**" is inclined forwardly at approximately **23 degrees** from a **vertical axis**:



Ex1007, 3, Fig. 1; Ex1002 ¶248; Ground 3, [1pre].

A POSA would have been motivated to combine Tsukuji and Martelliere and would have reasonably expected success. Ground 3, §1. This limitation is likewise met when Martelliere’s cyclonic-filtration teachings are incorporated into Tsukuji’s cleaner, for the same reasons discussed above. Ex1002 ¶249. Further, when Tsukuji’s “**grip portion 1**” is incorporated into Martelliere’s cleaner, it is also inclined forwardly at approximately **23 degrees** from a **vertical axis**:

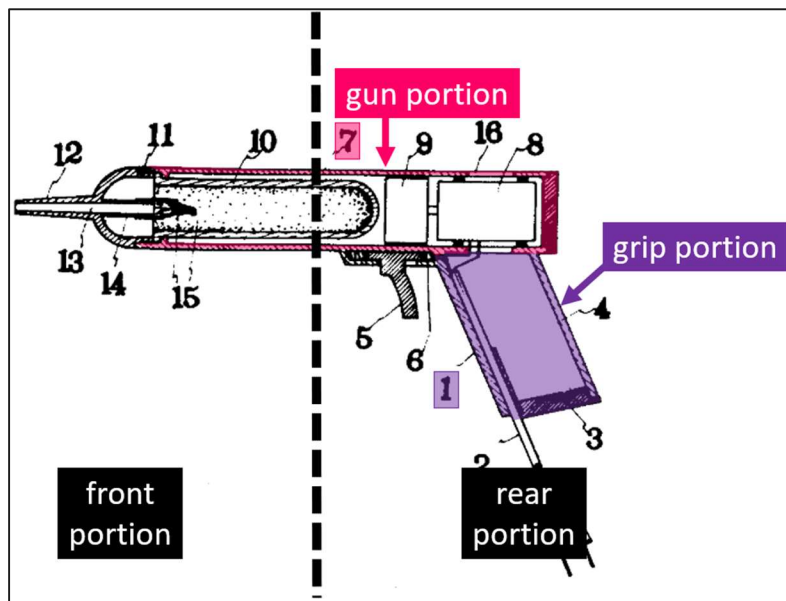


Ex1007, Fig. 1(modified); Ex1009, Fig. 1(modified); Ex1002 ¶249.

e. [1e]

Tsukuji teaches and the Tsukuji-Martelliere combinations teach this limitation. Ex1002 ¶¶250-54.

Tsukuji teaches that the handle is provided on a sidewall at a rear portion of the hand vacuum cleaner body. Ex1002 ¶¶251-52. Tsukuji’s “**grip portion 1**” is provided on a “**gun portion 7**” at a **rear portion** of the hand vacuum cleaner body:

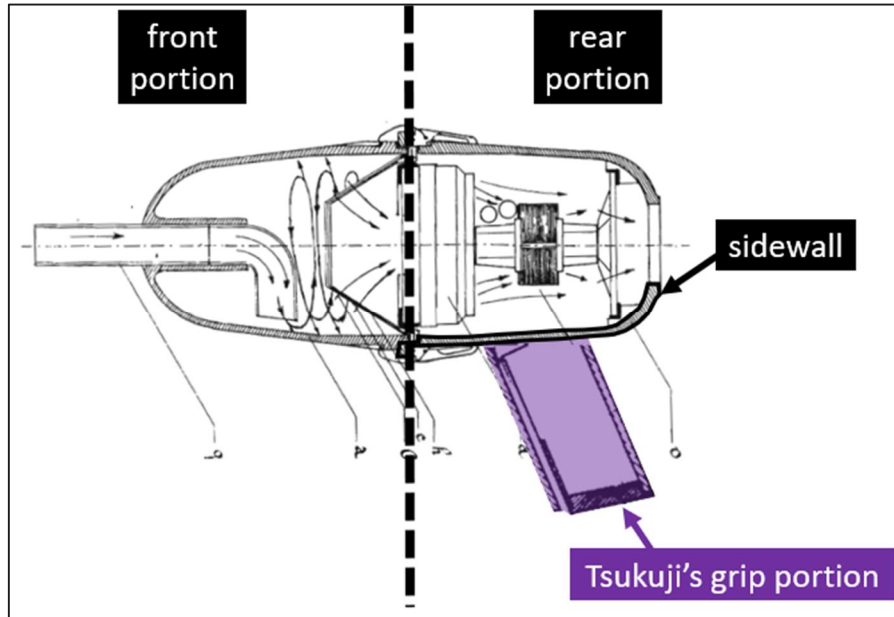


Ex1007, 3, Fig. 1; Ex1002 ¶251; Ground 3, [1a].

Tsukuji’s “gun portion 7” is a sidewall of the hand vacuum cleaner body, and Tsukuji’s “grip portion 1” is a handle provided on a sidewall at a rear portion of the hand vacuum cleaner body. Ex1002 ¶252.

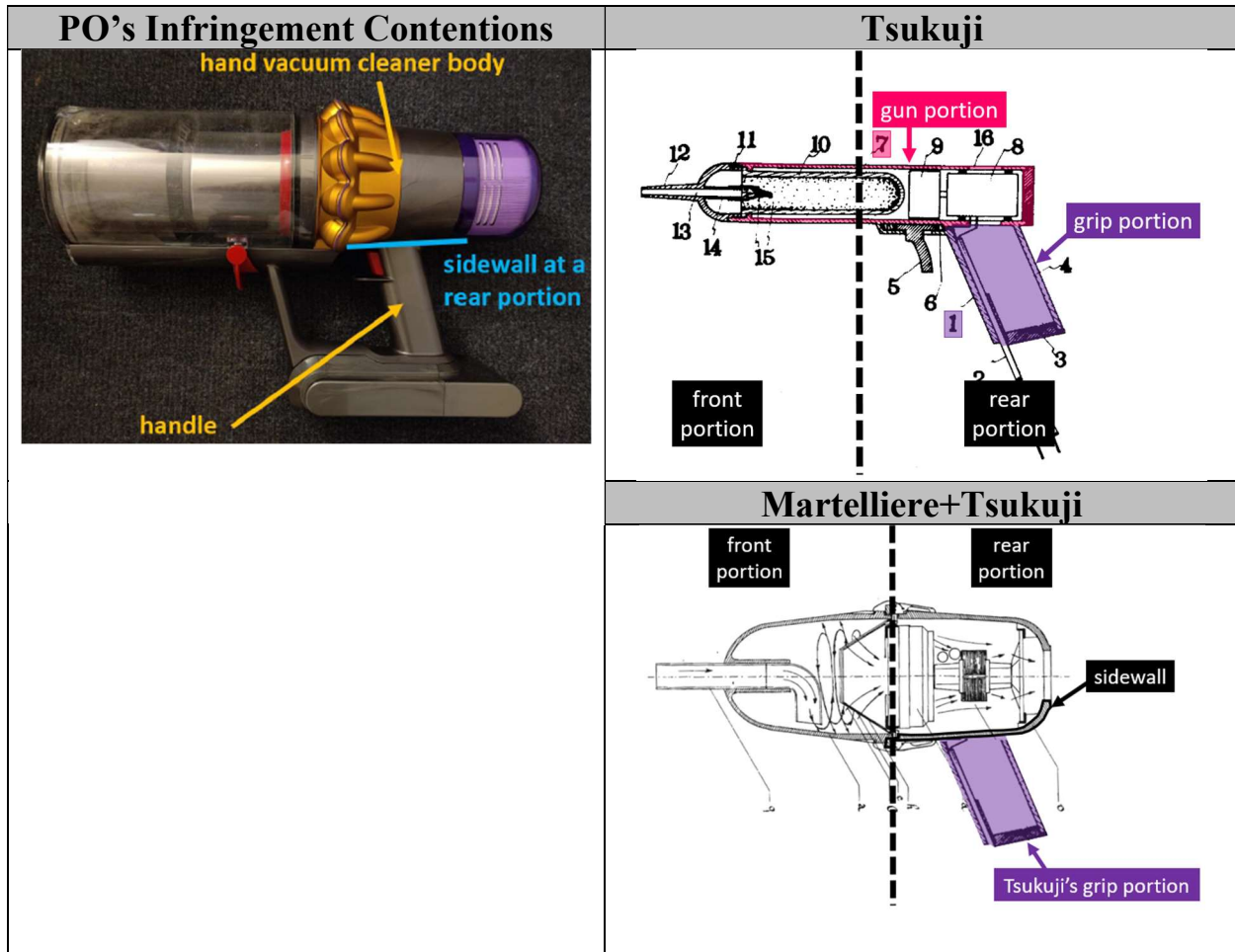
A POSA would have been motivated to combine Tsukuji and Martelliere and would have reasonably expected success. Ground 3, §1. This limitation is likewise

met when Martelliere's cyclonic-filtration teachings are incorporated into Tsukuji's cleaner, for the same reasons discussed above. Ex1002 ¶253. Further, when Tsukuji's “**grip portion 1**” is incorporated into Martelliere's cleaner, it is also provided on a **sidewall** at a rear portion of Martelliere's hand vacuum cleaner body:



Ex1007, Fig. 1(modified); Ex1009, Fig. 1(modified); Ex1002 ¶253; Ground 3, [1pre].

Further, this is at least as much disclosure of these limitations in Tsukuji and Martelliere as PO has accused of infringement in the related litigation:

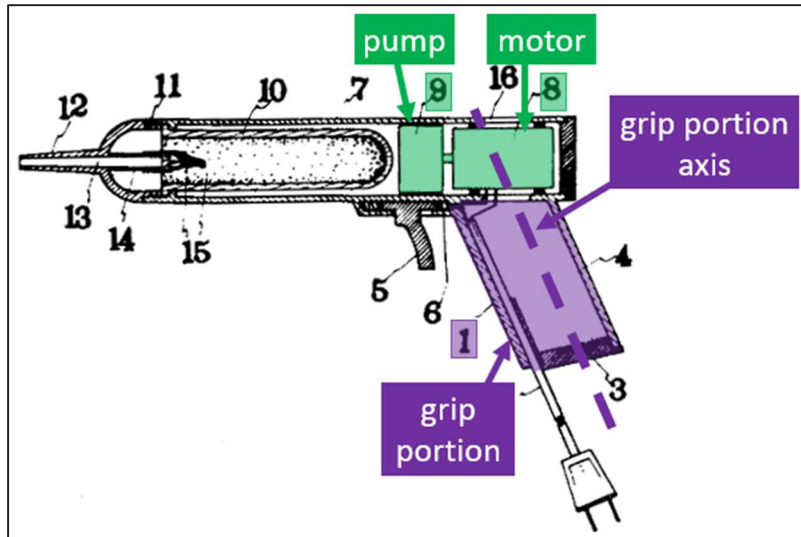


Ex1010, 11(PO's annotations); Ex1007, Fig. 1; Ex1009, Fig. 1(modified); Ex1002 ¶254.

f. [1f]

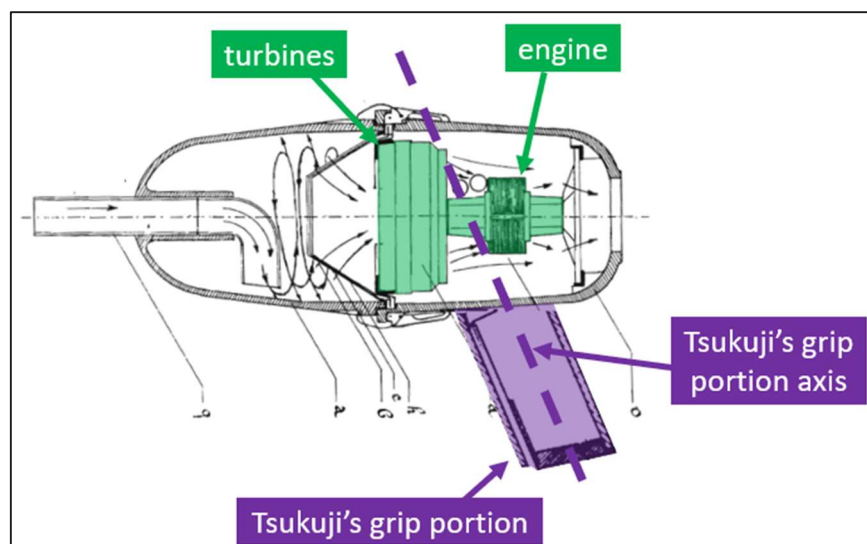
Tsukuji teaches and the Tsukuji-Martelliere combinations teach this limitation. Ex1002 ¶¶255-57.

Tsukuji teaches that the handle has a handle axis that intersects the suction motor. Ex1002 ¶256. Tsukuji's “**grip portion 1**” (handle) has a **grip portion axis** that intersects the “**motor 8**” that “rotate[s] the turbofan inside the **pump 9**”:



Ex1007, 3, Fig. 1; Ex1002 ¶256.

A POSA would have been motivated to combine Tsukuji and Martelliere and would have reasonably expected success. Ground 3, §1. This limitation is likewise met when Martelliere’s cyclonic-filtration teachings are incorporated into Tsukuji’s cleaner, for the same reasons discussed above. Ex1002 ¶257. Further, when Tsukuji’s “**grip portion 1**” is incorporated into Martelliere’s cleaner, its **axis** also intersects each of Martelliere’s “**turbines *d***” and “**engine *e***”:

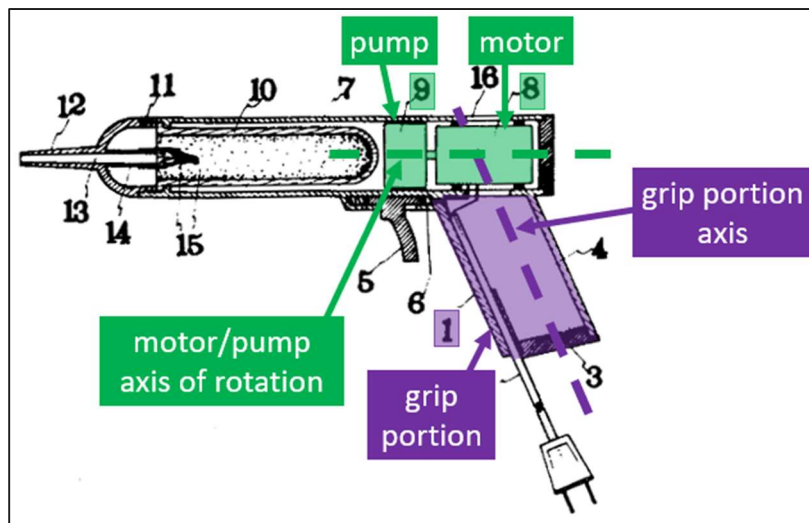


Ex1007, Fig. 1(modified); Ex1009, Fig. 1(modified); Ex1002 ¶257.

3. [2]

Tsukuji in combination with Martelliere teaches claim 1. Ground 3, [1]. Tsukuji teaches, and the Tsukuji-Martelliere combinations teach, the remaining limitations of this claim. Ex1002 ¶¶258-60.

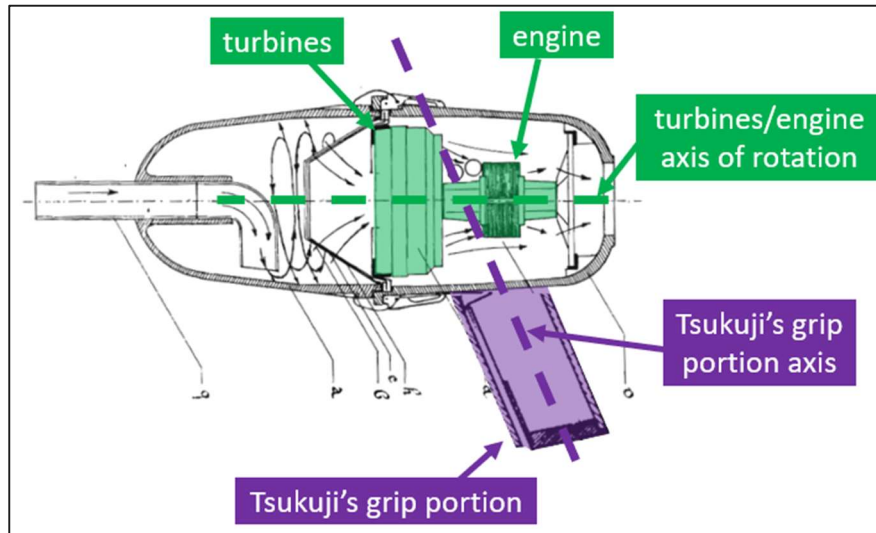
Tsukuji teaches that the handle axis intersects the suction motor axis of rotation. Ex1002 ¶259. Tsukuji's **grip portion axis** intersects the **motor/pump axis of rotation**:



Ex1007, 3, Fig. 1; Ex1002 ¶259.

A POSA would have been motivated to combine Tsukuji and Martelliere and would have reasonably expected success. Ground 3, §1. These limitations are likewise met when Martelliere's cyclonic-filtration teachings are incorporated into Tsukuji's cleaner, for the same reasons discussed above. Ex1002 ¶260. Further,

when Tsukuji's “**grip portion 1**” is incorporated into Martelliere's cleaner, its **axis** also intersects Martelliere's **turbines/engine axis of rotation**:

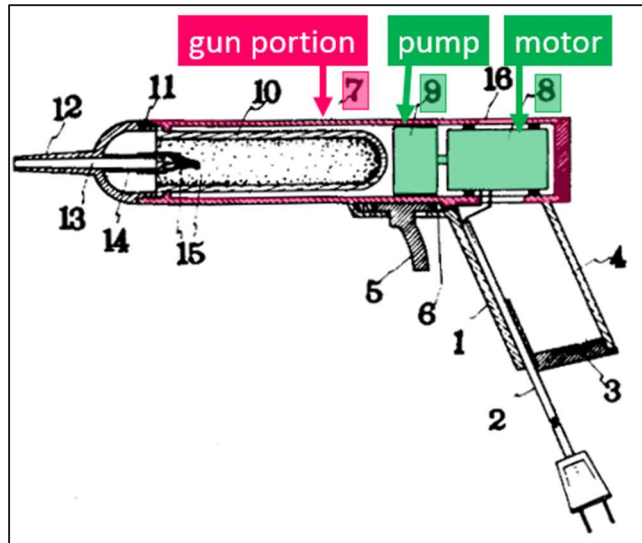


Ex1007, Fig. 1(modified); Ex1009, Fig. 1(modified); Ex1002 ¶260.

4. [3]

Tsukuji in combination with Martelliere teaches claim 1. Ground 3, [1]. Tsukuji teaches, and the Tsukuji-Martelliere combinations teach, the remaining limitations of this claim. Ex1002 ¶¶261-66.

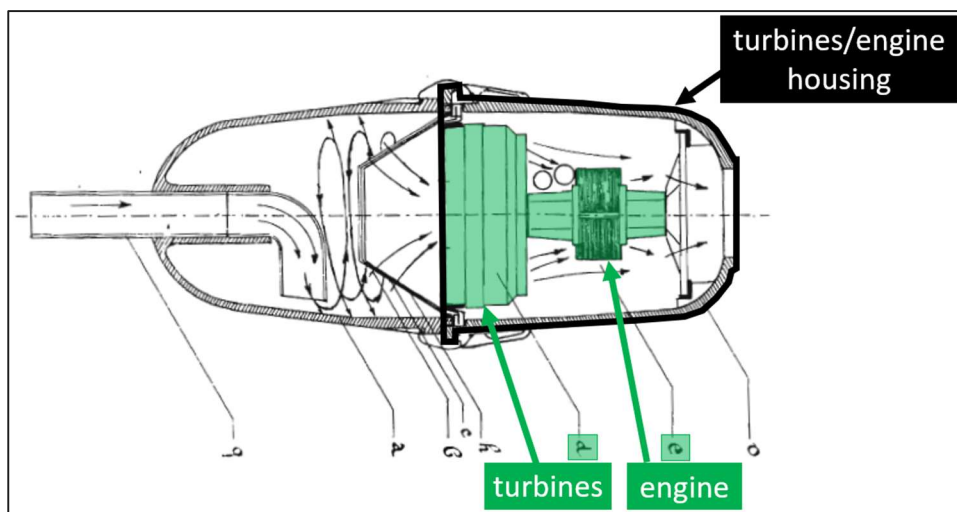
Tsukuji and Martelliere each teach that the hand vacuum cleaner body comprises a suction motor and fan assembly housing. Ex1002 ¶¶262-64. Tsukuji's “**motor 8**” and “turbofan inside the **pump 9**” “are arranged...in the **gun portion 7**”:



Ex1007, 3, Fig. 1; Ex1002 ¶262.

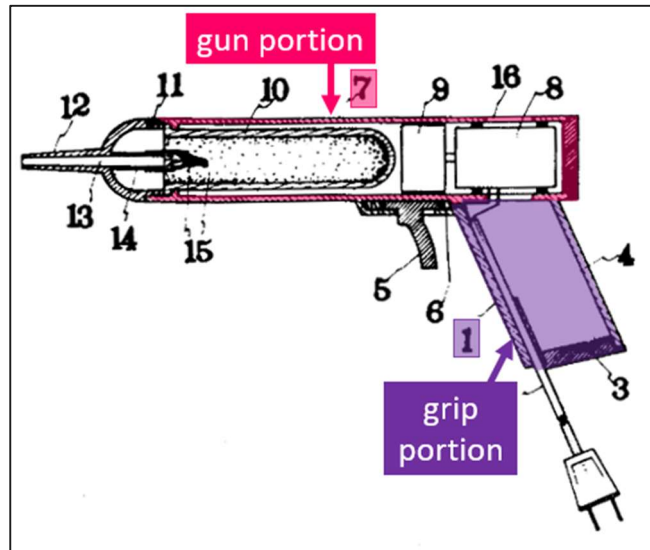
A POSA would have understood that Tsukuji’s “gun portion 7” is a suction motor and fan assembly housing because it houses “motor 8”/“pump 9.” Ex1002 ¶263.

Likewise, a POSA would have understood that Martelliere’s “**turbines *d***” and “**engine *e***” are housed in a **turbines/engine housing**:



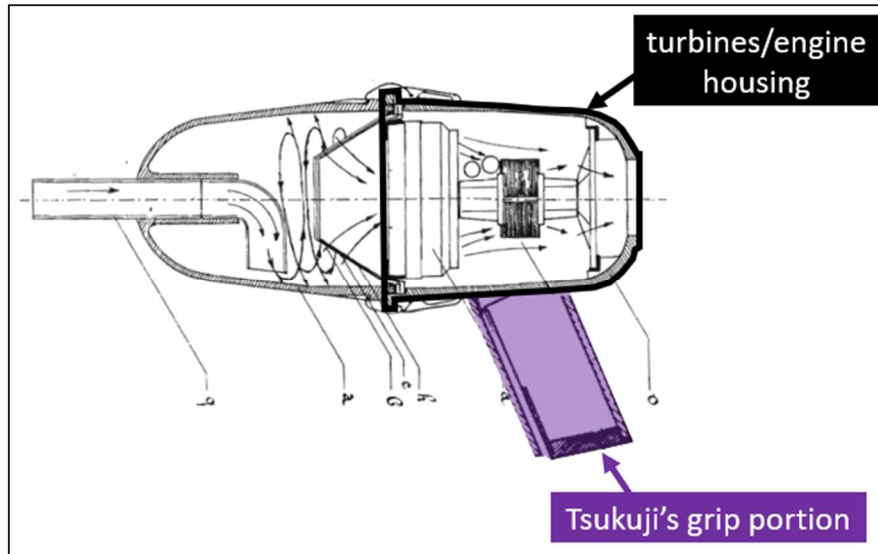
Ex1009, 1, Fig. 1; Ex1002 ¶264.

Tsukuji further teaches that the handle extends away from the suction motor and fan assembly housing. Ex1002 ¶265. A POSA would have understood that Tsukuji’s “**grip portion 1**” extends away from “**gun portion 7**”:



Ex1007, 3, Fig. 1; Ex1002 ¶265.

A POSA would have been motivated to combine Tsukuji and Martelliere and would have reasonably expected success. Ground 3, §1. These limitations are likewise met when Martelliere’s cyclonic-filtration teachings are incorporated into Tsukuji’s cleaner, for the same reasons discussed above. Ex1002 ¶266. Further, when Tsukuji’s “**grip portion 1**” is incorporated into Martelliere’s cleaner, it extends away from the **turbines/engine housing**:



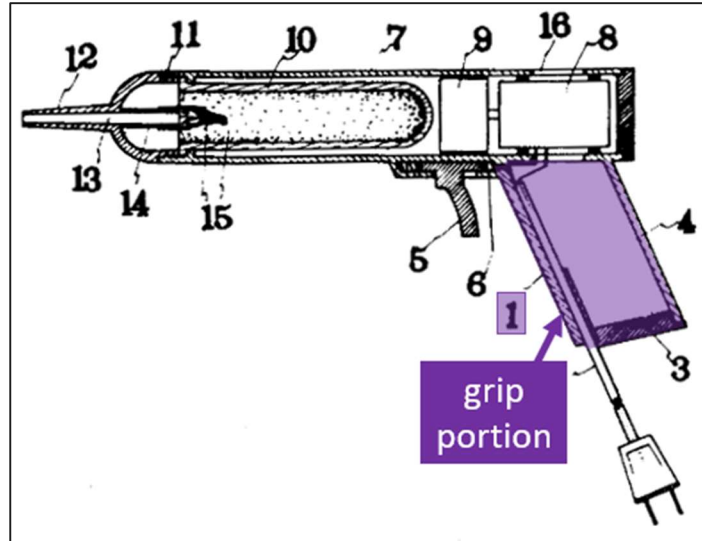
Ex1007, Fig. 1(modified); Ex1009, Fig. 1(modified); Ex1002 ¶266.

5. [4]/[12]

Tsukuji in combination with Martelliere teaches claims 1/11. Ground 3, [1]/[11]. Tsukuji teaches, and the Tsukuji-Martelliere combinations teach, the remaining limitations of these claims. Ex1002 ¶¶267-72.

Tsukuji teaches that the handle has a hand grip portion. Ex1002 ¶¶269-70.

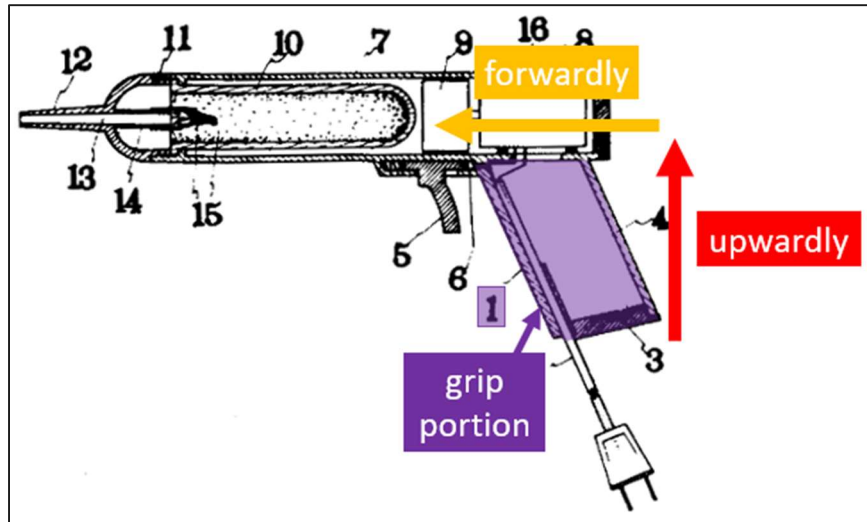
Tsukuji teaches a “**grip portion 1** [that] is gripped” by the user:



Ex1007, 3, Fig. 1; Ex1002 ¶269.

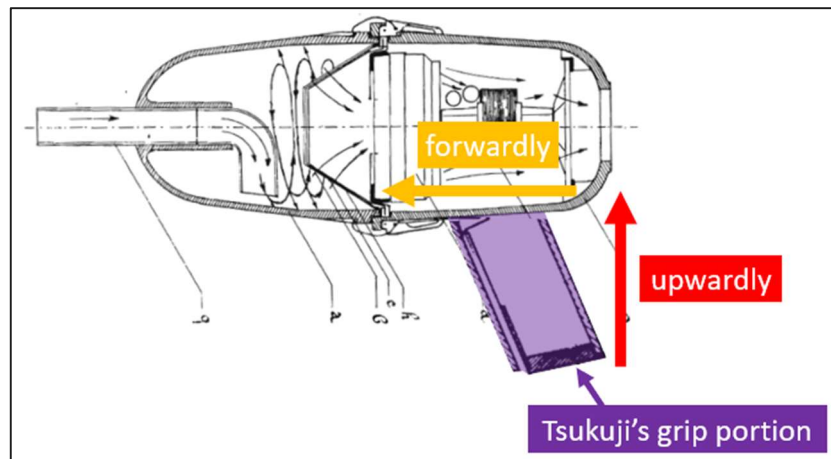
A POSA would have understood that Tsukuji’s “grip portion 1” is a handle having a hand grip portion based on its disclosure of a “grip.” Ex1002 ¶270.

Tsukuji further teaches that the hand grip portion extends upwardly and forwardly when the hand vacuum cleaner is positioned with the lower end of the hand vacuum cleaner on a horizontal surface. Ex1002 ¶271. When Tsukuji’s vacuum is positioned as claimed, Tsukuji’s “**grip portion 1**” extends **upwardly** and **forwardly**:



Ex1007, 3, Fig. 1; Ex1002 ¶271.

A POSA would have been motivated to combine Tsukuji and Martelliere and would have reasonably expected success. Ground 3, §1. These limitations are likewise met when Martelliere’s cyclonic-filtration teachings are incorporated into Tsukuji’s cleaner, for the same reasons discussed above. Ex1002 ¶272. Further, when Tsukuji’s “**grip portion 1**” having a hand grip portion is incorporated into Martelliere’s cleaner, it extends **upwardly** and **forwardly**:

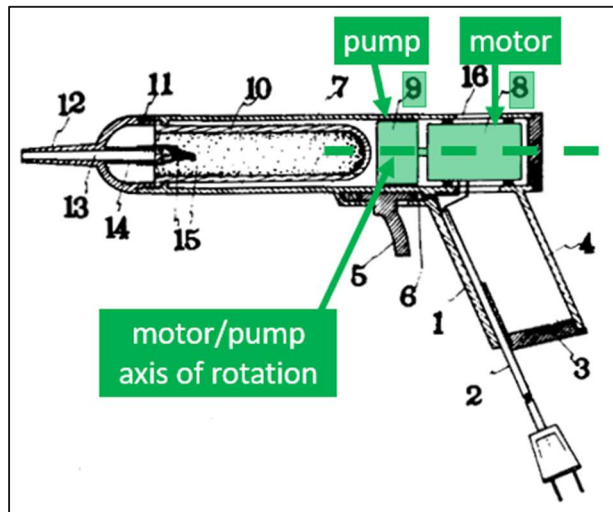


Ex1007, Fig. 1(modified); Ex1009, Fig. 1(modified); Ex1002 ¶272.

6. [5]

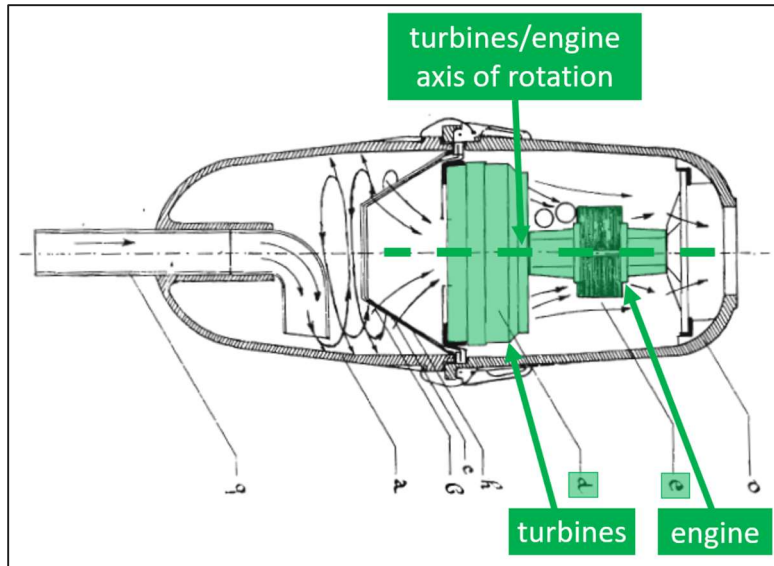
Tsukuji in combination with Martelliere teaches claim 1. Ground 3, [1]. Tsukuji and Martelliere, individually and in combination, teach the remaining limitations of this claim. Ex1002 ¶¶273-76.

Tsukuji and Martelliere each teach that when the hand vacuum cleaner is positioned with the lower end of the hand vacuum cleaner on a horizontal surface, the suction motor axis of rotation is generally horizontal. Ex1002 ¶274. When Tsukuji's vacuum is positioned as claimed, Tsukuji's **motor/pump axis of rotation** is generally horizontal:



Ex1007, 3, Fig. 1; Ex1002 ¶274; Ground 1, [1pre].

Likewise, when Martelliere's vacuum is positioned as claimed, Martelliere's **turbines/engine axis of rotation** is generally horizontal:



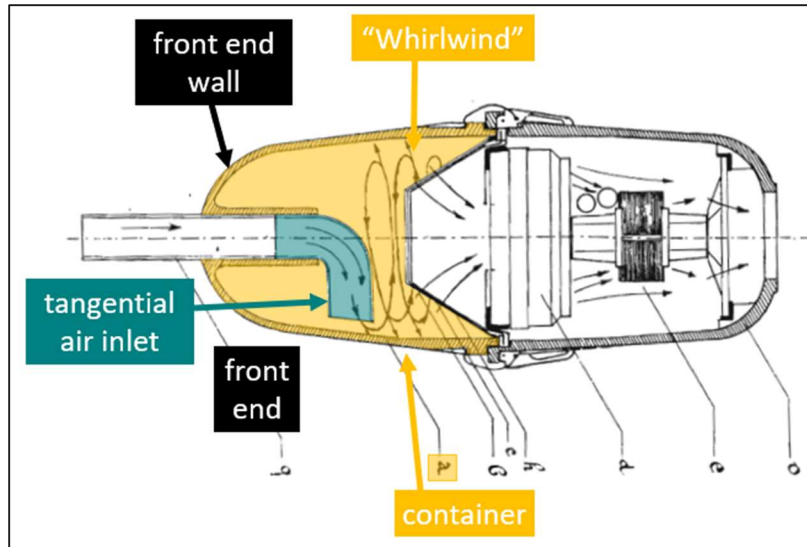
Ex1009, Fig. 1; Ex1002 ¶275.

A POSA would have been motivated to combine Tsukuji and Martelliere as discussed in §1 and would have reasonably expected success. Ground 3, §1. Each combination likewise teaches this claim for the same reasons discussed above. Ex1002 ¶276.

7. [7]

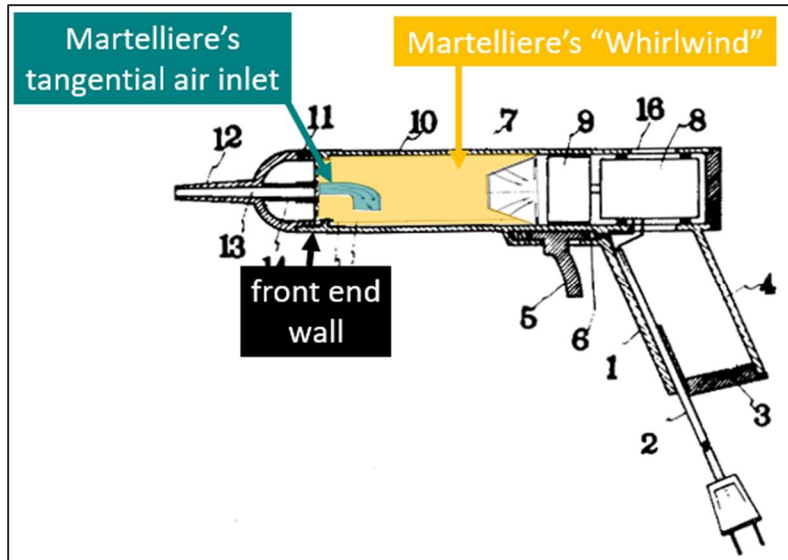
Tsukuji in combination with Martelliere teaches claim 1. Ground 3, [1]. Martelliere teaches, and Tsukuji-Martelliere combinations teach, the remaining limitations of this claim. Ex1002 ¶¶277-79.

Martelliere teaches that the cyclone has a front end wall having the cyclone air inlet. Ex1002 ¶278. A POSA would have understood that the **front end** of Martelliere's "**container**" comprising a "**Whirlwind**" (cyclone) is a **front end wall**, and that the **front end wall** has the "**tangential**" **air inlet** (cyclone air inlet):



Ex1009, 1, Fig. 1; Ex1002 ¶278.

A POSA would have been motivated to combine Tsukuji and Martelliere and would have reasonably expected success. Ground 3, §1. These limitations are likewise met when Tsukuji's handle teachings are incorporated into Martelliere's cleaner, for the same reasons discussed above. Ex1002 ¶279. The combined teachings also meet these limitations when Martelliere's cyclonic-filtration teachings are incorporated into Tsukuji's cleaner:

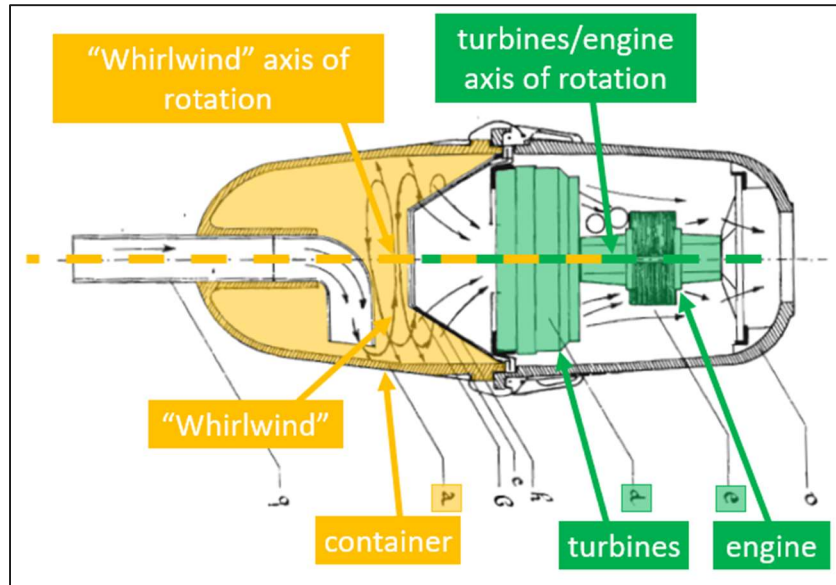


Ex1007, Fig. 1(modified); Ex1009, Fig. 1(modified); Ex1002 ¶279.

8. [8]

Tsukuji in combination with Martelliere teaches claim 1. Ground 3, [1]. Martelliere teaches, and the Tsukuji-Martelliere combinations teach, the remaining limitations of this claim. Ex1002 ¶¶280-83.

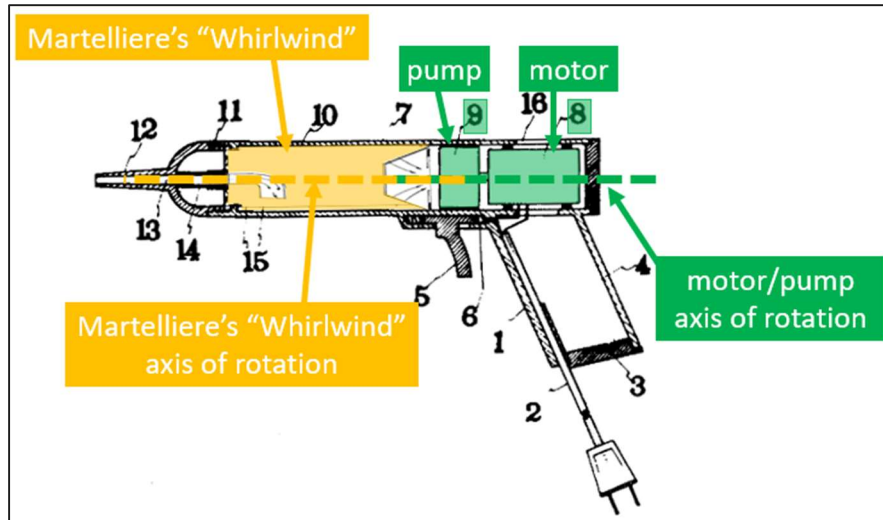
Martelliere teaches that the cyclone axis of rotation is generally parallel to the suction motor axis of rotation. Ex1002 ¶¶281-82. Martelliere's "**Whirlwind**" (cyclone) **axis of rotation** is generally parallel to the **turbines/engine** (suction motor) **axis of rotation**:



Ex1009, 1, Fig. 1; Ex1002 ¶281.

To the extent Martelliere's turbines/engine axis of rotation and "Whirlwind" axis of rotation are depicted as co-axial in Figure 1, a POSA would have understood these axes are generally parallel because they extend in the same direction and maintain the same (zero) distance between them. Ex1002 ¶282.

A POSA would have been motivated to combine Tsukuji and Martelliere and would have reasonably expected success. Ground 3, §1. These limitations are also met when Tsukuji's handle teachings are incorporated into Martelliere's cleaner, for the same reasons discussed above. Ex1002 ¶283. Further, the combined teachings also meet these limitations when Martelliere's cyclonic-filtration teachings are incorporated into Tsukuji's cleaner:

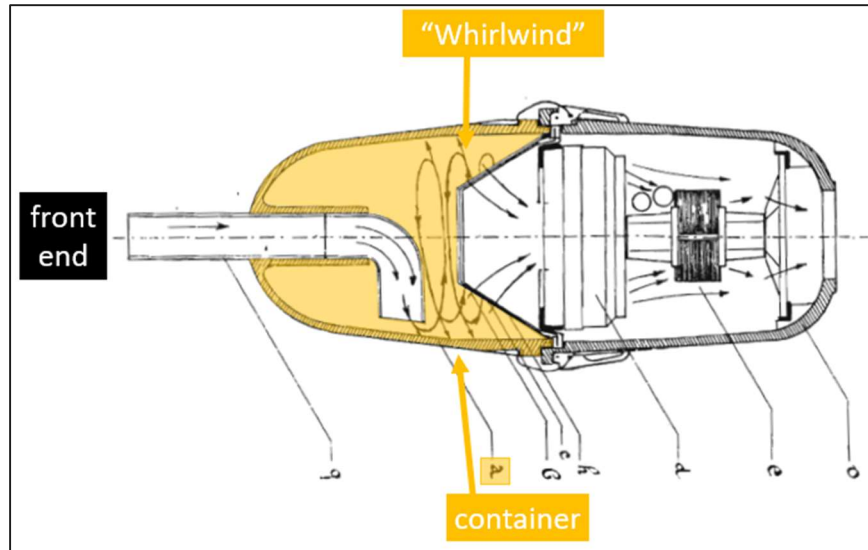


Ex1007, Fig. 1(modified); Ex1002 ¶283.

9. [9]

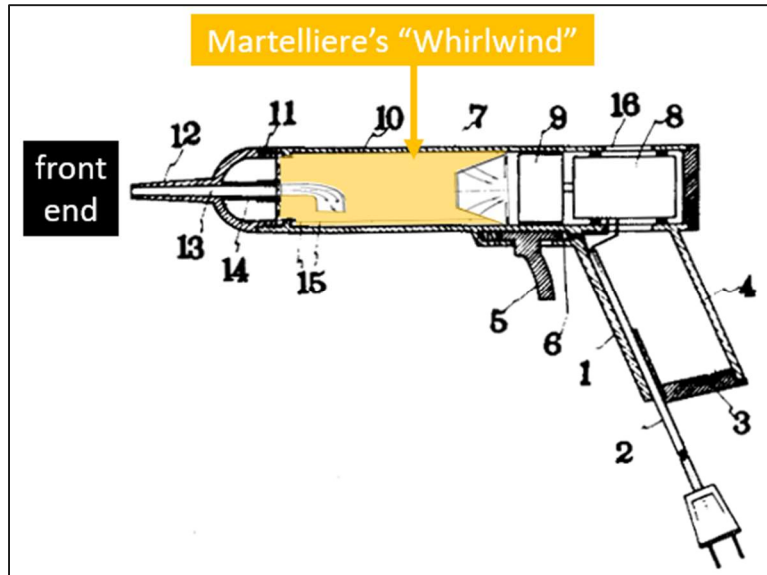
Tsukuji in combination with Martelliere teaches claim 1. Ground 3, §1. Martelliere teaches, and the Tsukuji-Martelliere combinations teach, the remaining limitations of this claim. Ex1002 ¶¶284-86.

Martelliere teaches that the cyclone unit is provided at the front end of the hand vacuum cleaner body. Ex1002 ¶285. Martelliere's "**container**" (cyclone unit) comprising a "**Whirlwind**" (cyclone) is provided at the **front end** of Martelliere's hand vacuum cleaner body:



Ex1009, 1, Fig. 1; Ex1002 ¶285.

A POSA would have been motivated to combine Tsukuji and Martelliere and would have reasonably expected success. Ground 3, §1. These limitations are also met when Tsukuji's handle teachings are incorporated into Martelliere's cleaner, for the same reasons discussed above. Ex1002 ¶286. The combined teachings likewise meet this claim when Martelliere's cyclonic-filtration teachings are incorporated into Tsukuji's cleaner:

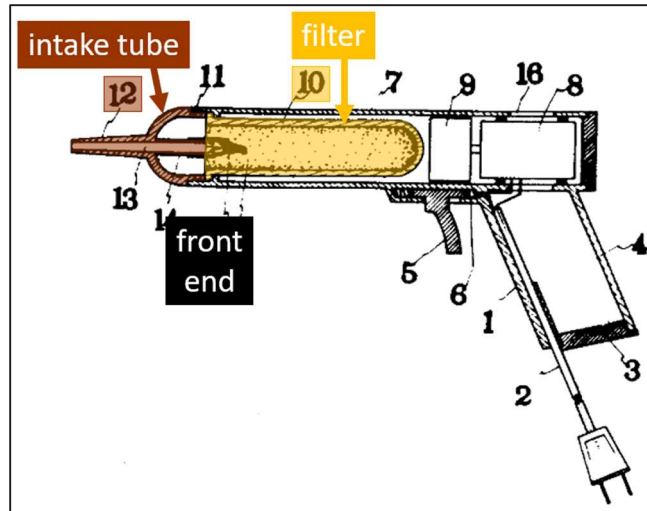


Ex1007, Fig. 1(modified); Ex1009, Fig. 1(modified); Ex1002 ¶286.

10. [10]

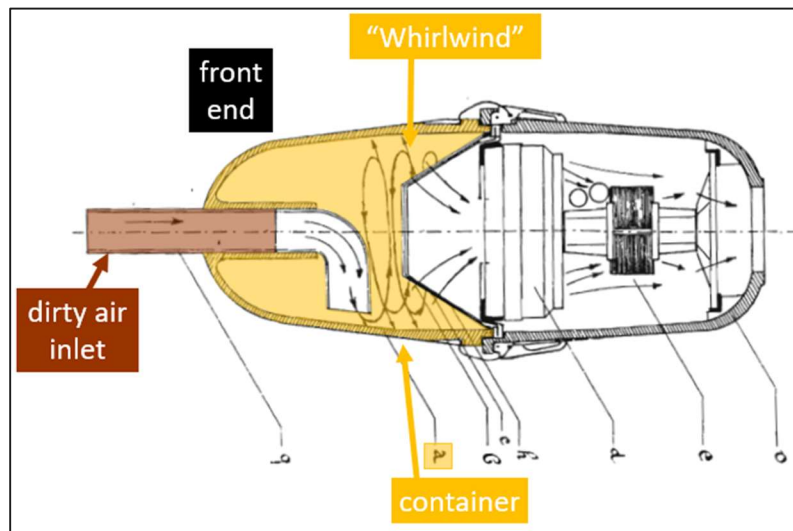
Tsukuji in combination with Martelliere teaches claim 1. Ground 3, [1]. Martelliere teaches, and the Tsukuji-Martelliere combinations teach, the remaining limitations of this claim. Ex1002 ¶¶287-90.

Tsukuji teaches that the “**intake tube 12**” is provided at a **front end** of “**filter 10**,” which is an air-filtration unit:



Ex1007, 3, Fig. 1; Ex1002 ¶288.

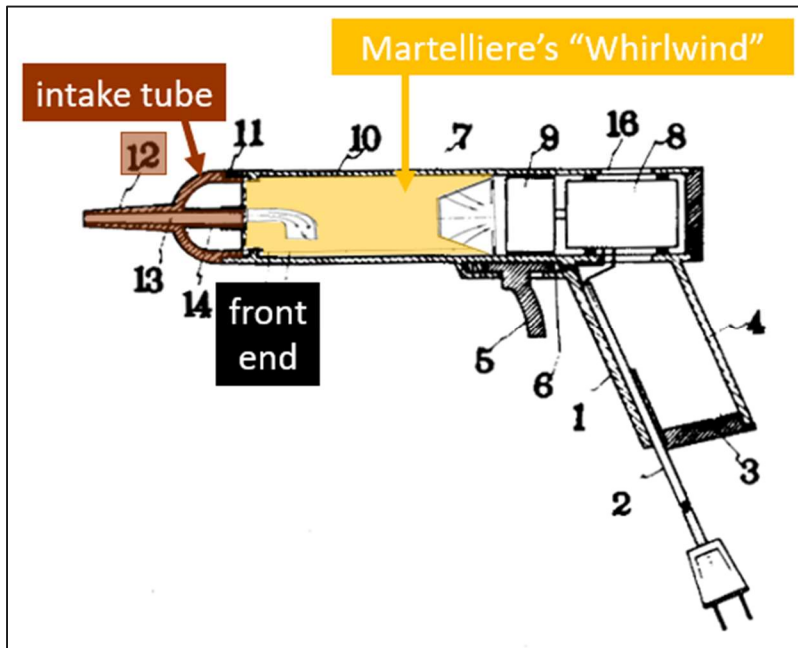
Martelliere teaches that the dirty air inlet is provided at a front end of the cyclone unit. Ex1002 ¶289. Martelliere's **dirty air inlet** is provided at a **front end** of the "**container**" (cyclone unit):



Ex1009, 1, Fig. 1; Ex1002 ¶289.

A POSA would have been motivated to combine Tsukuji and Martelliere and would have reasonably expected success. Ground 3, §1. These limitations are also

met when Tsukuji's handle teachings are incorporated into Martelliere's cleaner, for the same reasons discussed above. Ex1002 ¶290. The combined teachings likewise meet these limitations when Martelliere's cyclonic-filtration teachings are incorporated into Tsukuji's cleaner:

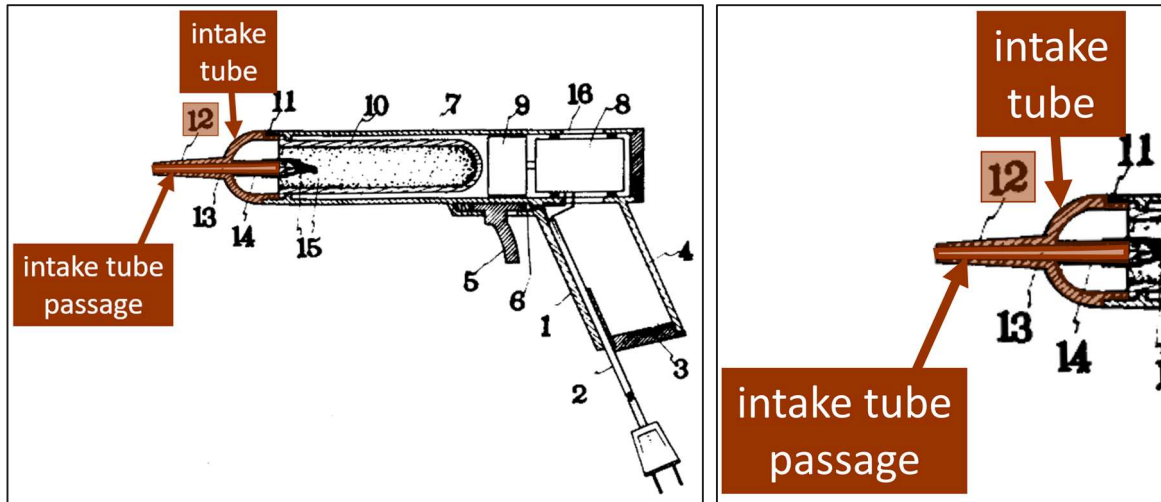


Ex1007, Fig. 1(modified); Ex1009, Fig. 1(modified); Ex1002 ¶290.

11. [11]

Tsukuji in combination with Martelliere teaches claim 1. Ground 3, [1]. Martelliere teaches, and the Tsukuji-Martelliere combinations teach, the remaining limitations of this claim. Ex1002 ¶¶291-98.

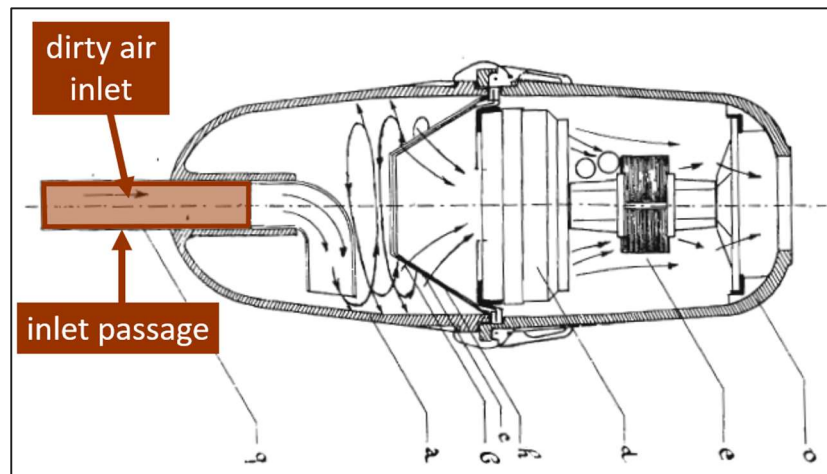
Tsukuji and Martelliere each teach that the dirty air inlet comprises an inlet passage. Ex1002 ¶¶292-94. Tsukuji's "**intake tube 12**" (dirty air inlet) has a "**guide tube 14** [that] extends inside from a **through-hole 13** in the **intake tube 12**":



Ex1007, 3, Fig. 1; Ex1002 ¶292.

A POSA would have understood that Tsukuji’s “intake tube 12” with a “through-hole 13” and “guide tube 14” comprises an inlet passage. Ex1002 ¶293.

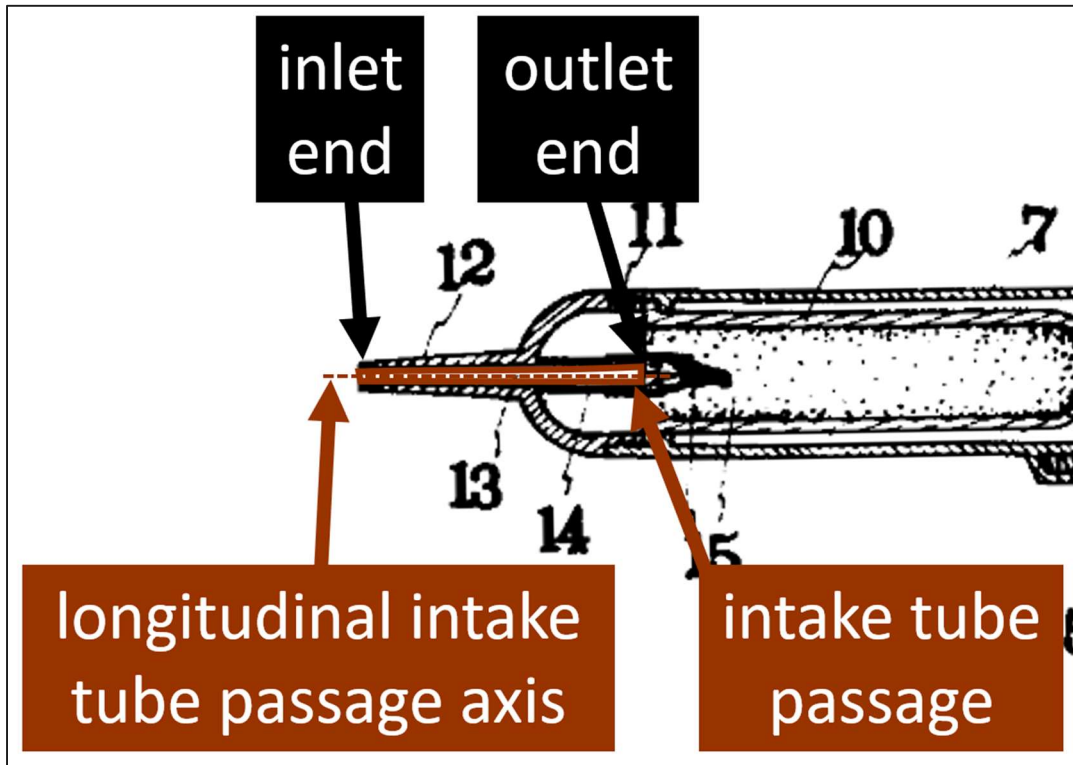
Likewise, a POSA would have understood that Martelliere’s **dirty air inlet** comprises an **inlet passage**:



Ex1009, 1, Fig. 1; Ex1002 ¶294.

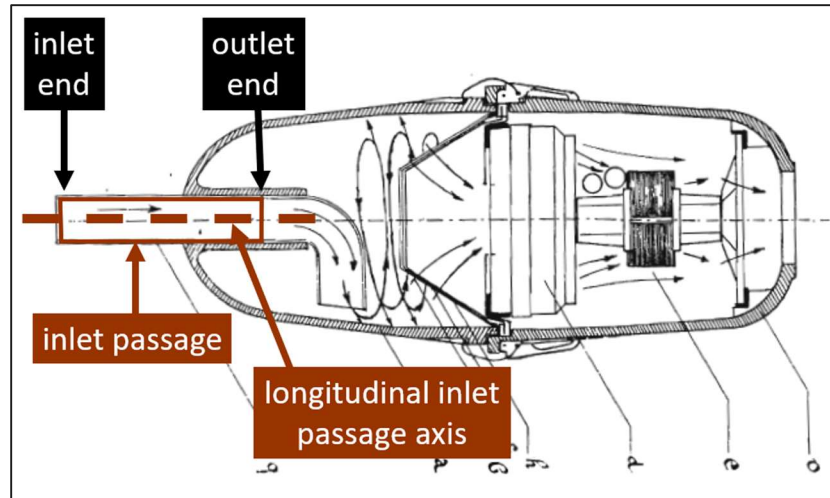
Tsukuji and Martelliere each teach that the inlet passage extends longitudinally between an inlet end and an outlet end and has a longitudinal passage

axis. Ex1002 ¶¶295-96. Tsukuji's **intake tube passage** extends longitudinally between an **inlet end** and an **outlet end** and has a **longitudinal intake tube passage axis**:



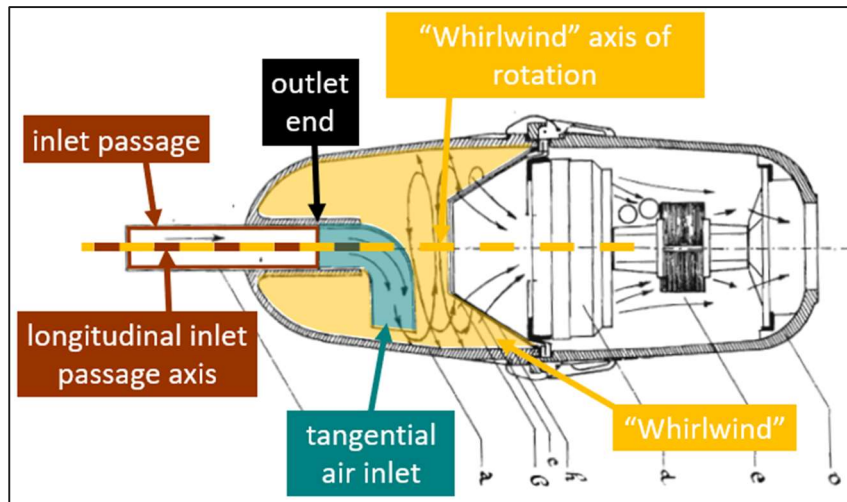
Ex1007, 3, Fig. 1; Ex1002 ¶295.

A POSA would have understood that Martelliere's **inlet passage** also extends longitudinally between an **inlet end** and an **outlet end** and has a **longitudinal inlet passage axis**:



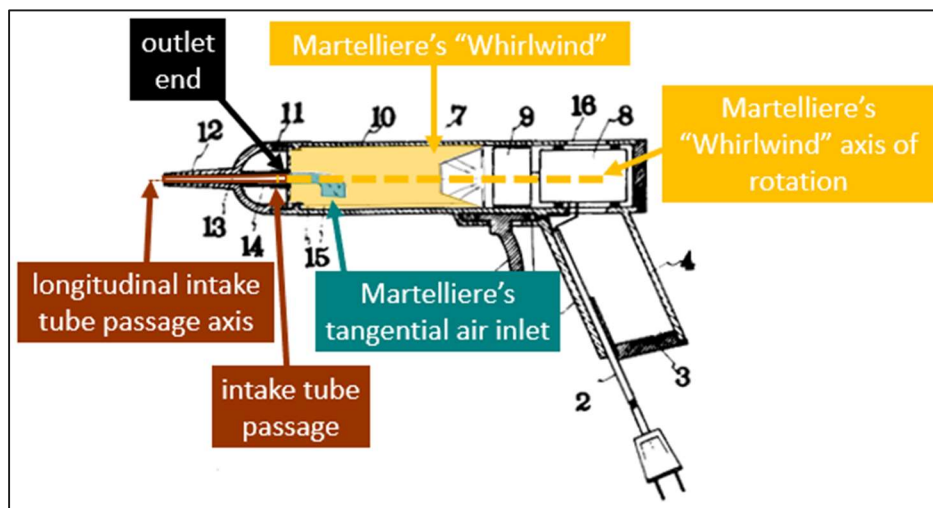
Ex1009, 1, Fig. 1; Ex1002 ¶296.

Martelliere teaches that the longitudinal passage axis is coaxial with the cyclone axis and the outlet end communicates with the cyclone air inlet. Ex1002 ¶297. Martelliere's **longitudinal inlet passage axis** is coaxial with the “**Whirlwind**” **axis** (cyclone axis), and the **outlet end** communicates with the “**tangential[]**” **air inlet** (cyclone air inlet):



Ex1009, 1, Fig. 1; Ex1002 ¶297.

A POSA would have been motivated to combine Tsukuji and Martelliere and would have reasonably expected success. Ground 3, §1. These limitations are also met when Tsukuji's handle teachings are incorporated into Martelliere's cleaner, for the same reasons discussed above. Ex1002 ¶298. Further, the combined teachings also meet these limitations when Martelliere's cyclonic-filtration teachings are incorporated into Tsukuji's cleaner:

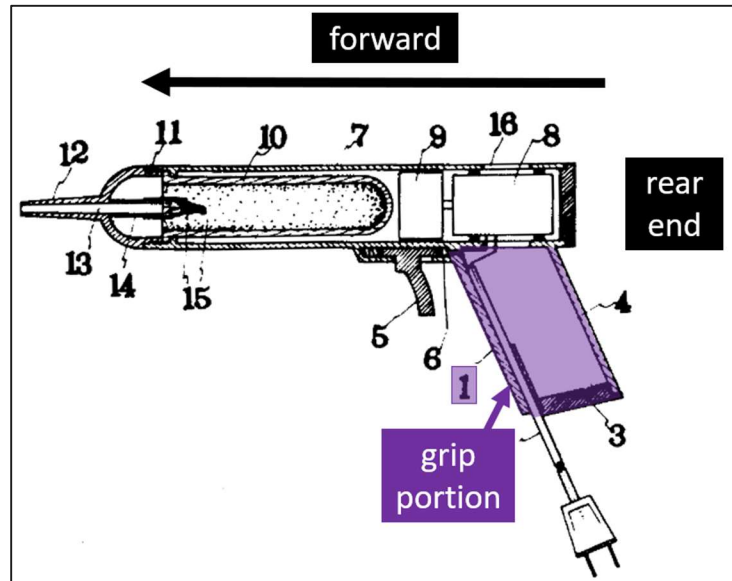


Ex1007, Fig. 1(modified); Ex1009, Fig. 1(modified); Ex1002 ¶298.

12. [15]

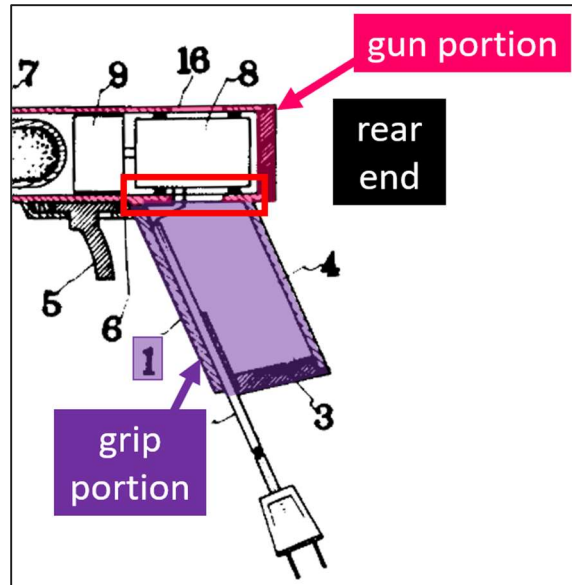
Tsukuji in combination with Martelliere teaches claim 1. Ground 3, [1]. Tsukuji teaches and renders obvious, and the Tsukuji-Martelliere combinations teach and render obvious, the remaining limitations of this claim. Ex1002 ¶¶299-312.

Tsukuji teaches that the handle is forward of a rear end of the hand vacuum cleaner body. Ex1002 ¶¶300-11. Tsukuji’s “**grip portion 1**” (handle) is **forward** of a **rear end** of the hand vacuum cleaner body:



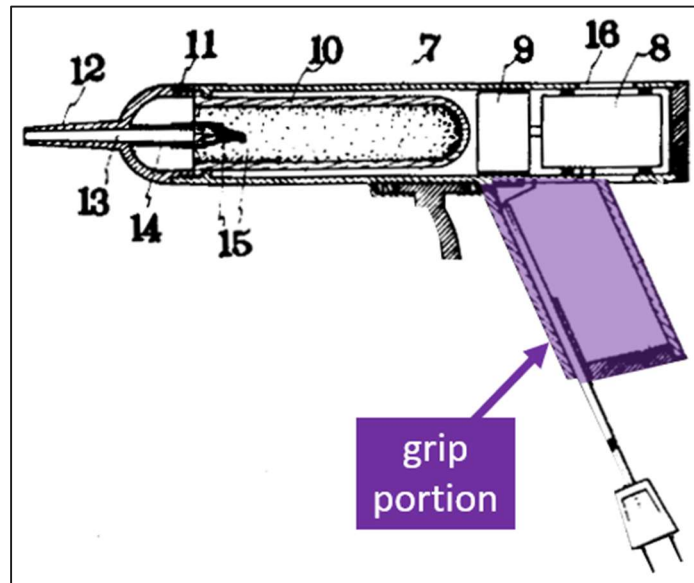
Ex1007, 3, Fig. 1; Ex1002 ¶300.

A POSA would have understood that Tsukuji’s “**grip portion 1**” is forward of a **rear end** of the hand vacuum cleaner body, including because it is attached to the “**gun portion 7**” at a **location** forward of the **rear end**:



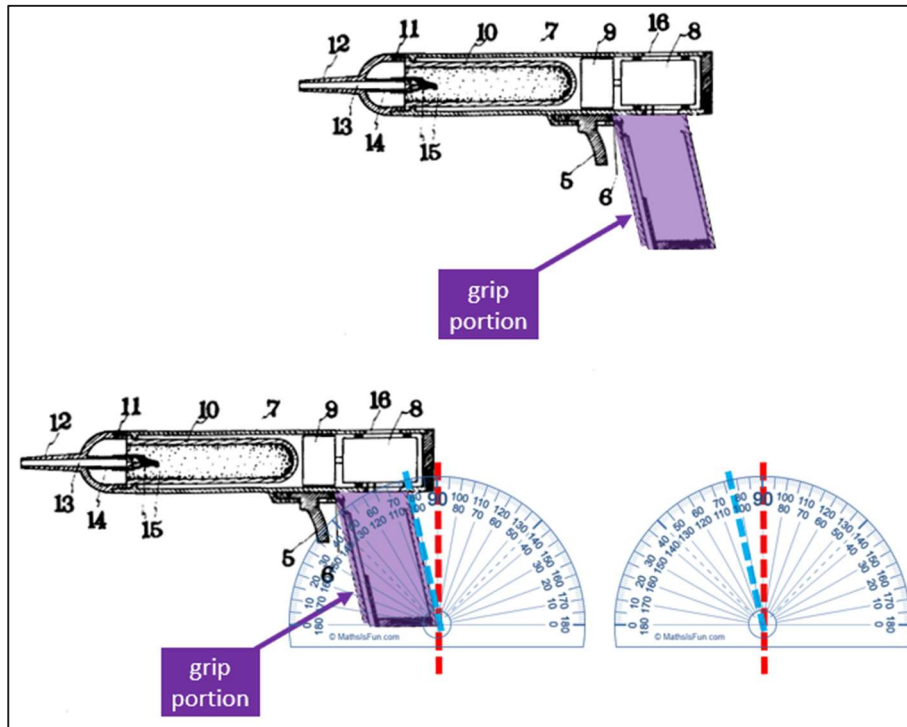
Ex1007, 3, Fig. 1; Ex1002 ¶301.

To the extent PO argues Tsukuji's handle is not forward of a rear end of the hand vacuum cleaner body, a POSA would have been motivated to move Tsukuji's “**grip portion 1**” further forward:



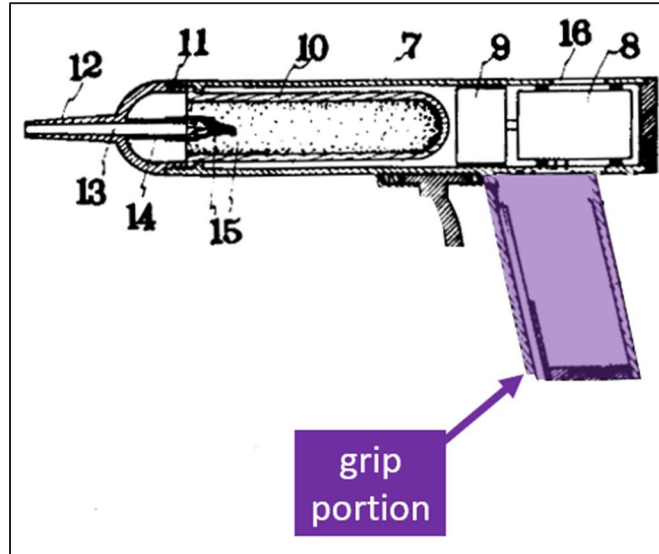
Ex1007, Fig. 1(modified); Ex1002 ¶302.

Also, a POSA would have been motivated to change the angle of Tsukuji's “grip portion 1” to be more vertical, e.g., approximately 12 degrees from a vertical axis:



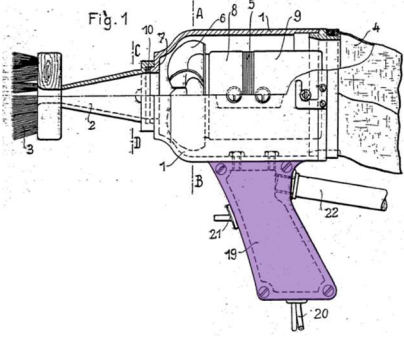
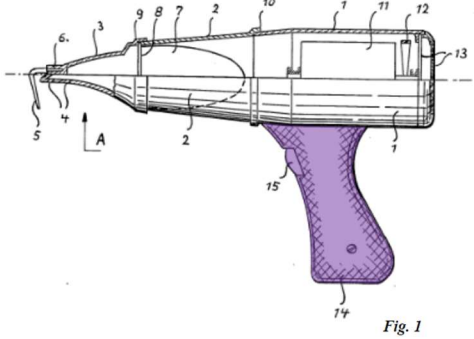
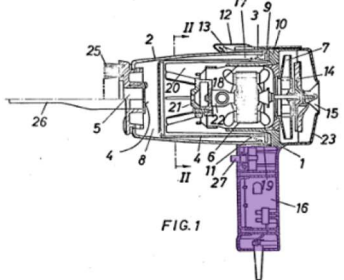
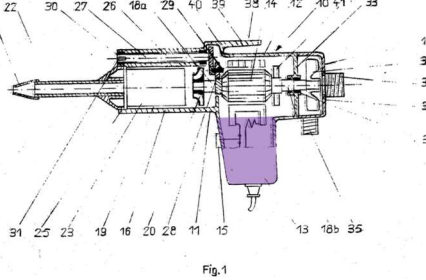
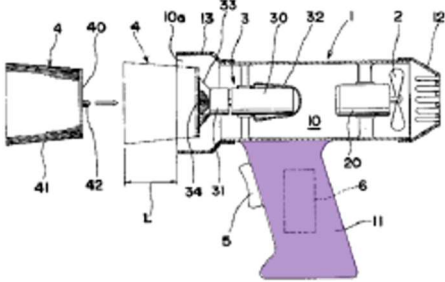
Ex1007, Fig. 1(modified); Ex1002 ¶303.

Further, a POSA would have been motivated to move Tsukuji's “grip portion 1” forward and angle it more vertically:



Ex1007, Fig. 1; Ex1002 ¶304.

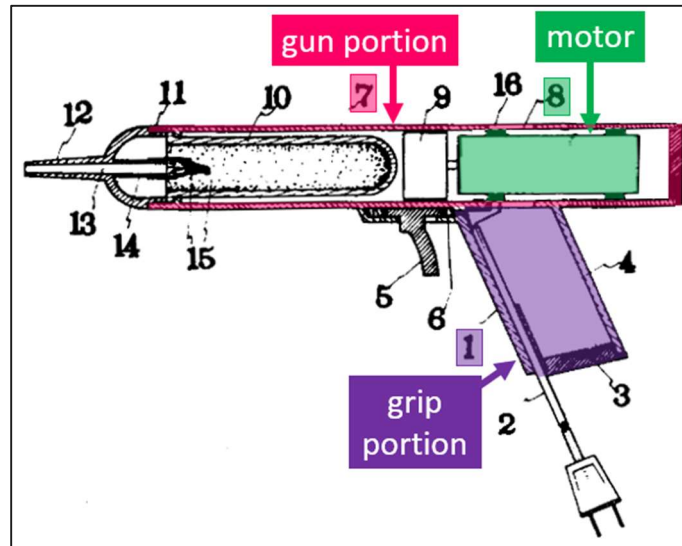
A POSA would have been motivated to modify Tsukuji’s “grip portion 1” as shown to accommodate different user hand sizes and preferences, and would result in a favorable weight balance and ergonomics, and make it easier for different users to “reliably grasp[]” “grip portion 1,” which is one of Tsukuji’s stated objectives. Ex1007, 5; Ex1002 ¶305. A POSA would have been further motivated to modify Tsukuji’s handle positioning because hand vacuums having **handles** positioned forward of a rear end of the hand vacuum cleaner body and at varying angles have been known in the art for nearly 70 years:

Ex1014, Fig. 1 (1955)	Ex1025, Fig. 1 (1966)
	
Ex1027, Fig. 1 (1970)	Ex1016, Fig. 1 (1971)
	
Ex1029, Fig. 1 (1998)	
[Figure 1] 	

Ex1002 ¶306.

A POSA would have reasonably expected success modifying Tsukuji as shown and described above because it would have involved a straightforward relocation and/or re-angling of Tsukuji's handle. Ex1002 ¶307.

In addition, a POSA would have been motivated to modify Tsukuji's “**gun portion 7**” to extend further rearward so that Tsukuji could accommodate a larger “**motor 8**”:

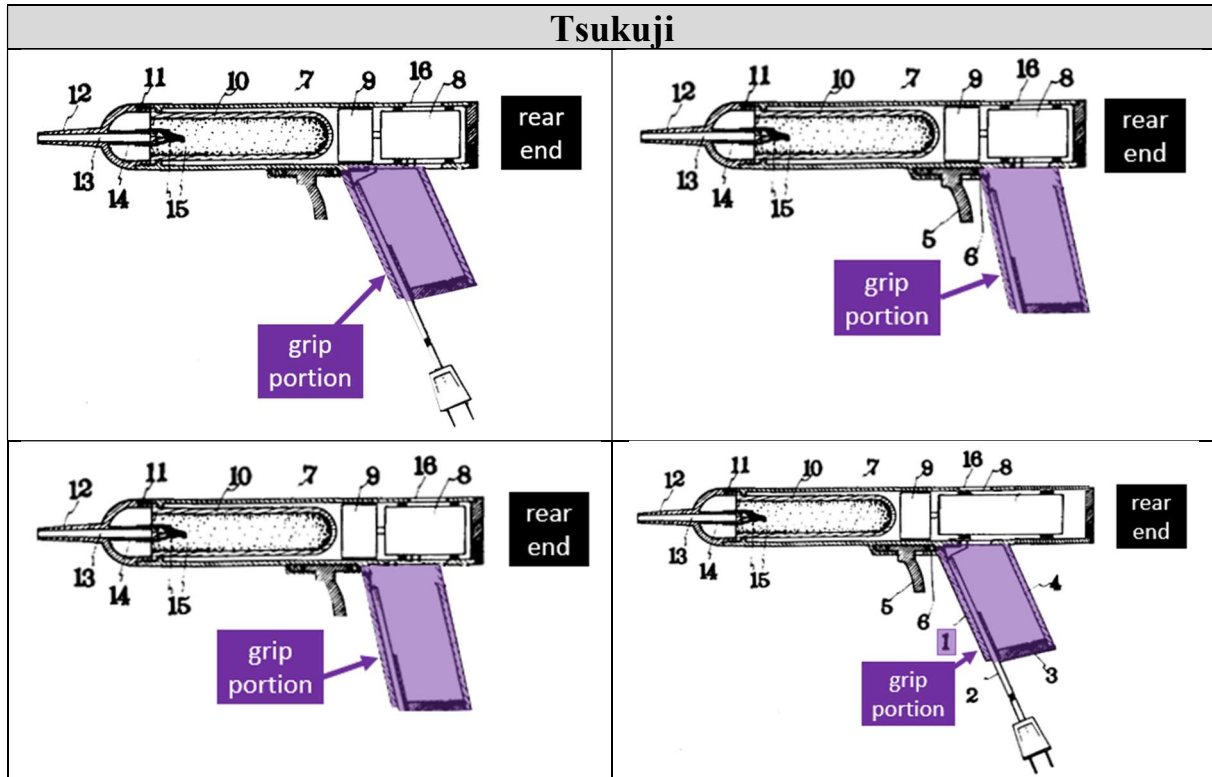


Ex1007, 3, Fig. 1(modified); Ex1002 ¶308.

A POSA would have motivated to modify Tsukuji as shown because such modification would provide well-known benefits, including improved suction power, and enhanced cleaning efficiency and performance. Ex1002 ¶309. A POSA would have reasonably expected success because it would have involved the simple modification of Tsukuji's existing parts. Ex1002 ¶309.

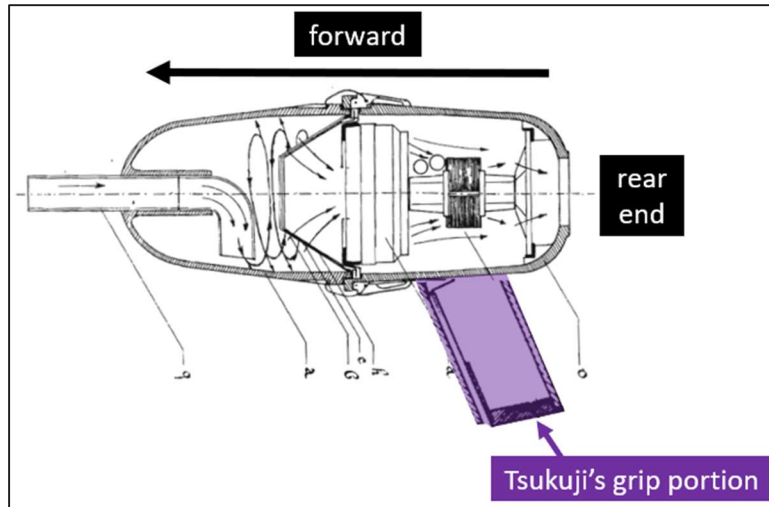
Thus, modifying Tsukuji as shown would have been at least obvious to try, particularly given Tsukuji's teachings of a “grip portion 1” that a user may “reliably grasp[];” easy to implement, using nearly 70-year-old teachings; and would yield the predictable result of a “small electric vacuum cleaner” that “may be used while being

oriented in a direction that is not vertical,” which is one of Tsukuji’s stated objectives. Ex1007, 2-5. When so modified, Tsukuji’s “**grip portion 1**” is forward of a rear end of the hand vacuum cleaner body:



Ex1007, Fig. 1(modified); Ex1002 ¶¶310-11.

A POSA would have been motivated to combine Tsukuji and Martelliere and would have reasonably expected success. Ground 3, §1. These limitations are also met when Martelliere’s cyclonic-filtration teachings are incorporated into Tsukuji’s cleaner, for the same reasons discussed above. Ex1002 ¶312. Further, when Tsukuji’s “**grip portion 1**” is incorporated into Martelliere’s cleaner, it is **forward** of a **rear end** of Martelliere’s hand vacuum cleaner body:

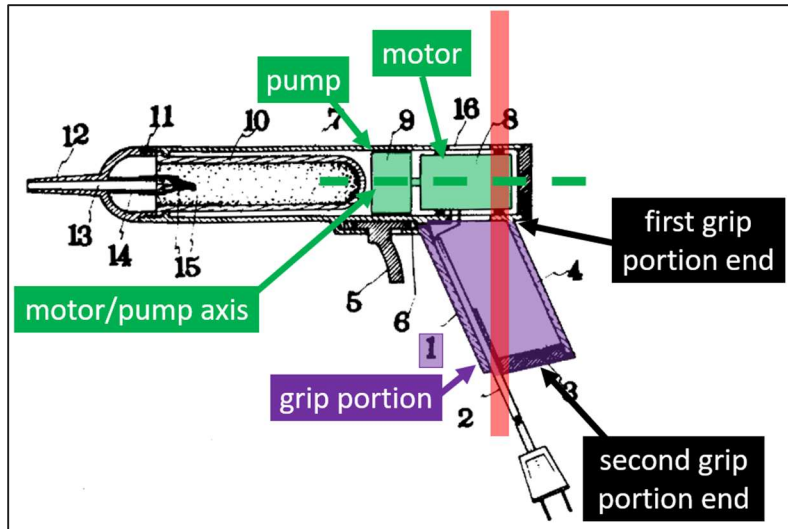


Ex1007, Fig. 1(modified); Ex1009, Fig. 1(modified); Ex1002 ¶312.

13. [16]

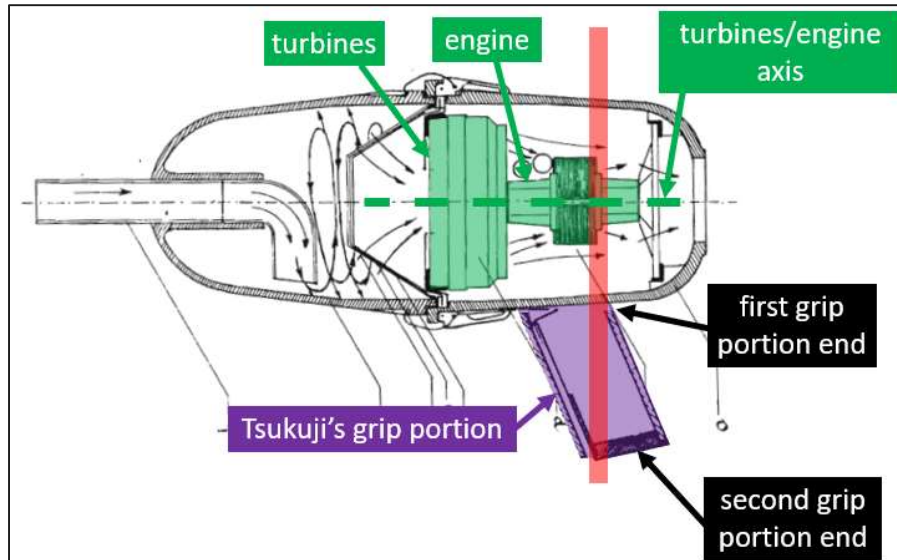
Tsukuji in combination with Martelliere teaches claim 1. Ground 3, [1]. Tsukuji teaches, and the Tsukuji-Martelliere combinations teach, the remaining limitations of this claim. Ex1002 ¶¶313-15.

Tsukuji teaches that a plane that is perpendicular to the motor axis extends through the handle from the first handle end to the second handle end. Ex1002 ¶314. A **plane** that is perpendicular to Tsukuji's **motor/pump axis** extends through the “**grip portion 1**” from the **first grip portion end** to the **second grip portion end**:



Ex1007, 3, Fig. 1; Ex1002 ¶314.

A POSA would have been motivated to combine Tsukuji and Martelliere and would have reasonably expected success. Ground 3, §1. These limitations are also met when Martelliere’s cyclonic-filtration teachings are incorporated into Tsukuji’s cleaner, for the same reasons discussed above. Ex1002 ¶315. Further, when Tsukuji’s “**grip portion 1**” is incorporated into Martelliere’s cleaner, a **plane** that is perpendicular to Martelliere’s **turbines/engine axis** extends through Tsukuji’s “**grip portion 1**” from the **first grip portion end** to the **second grip portion end**:



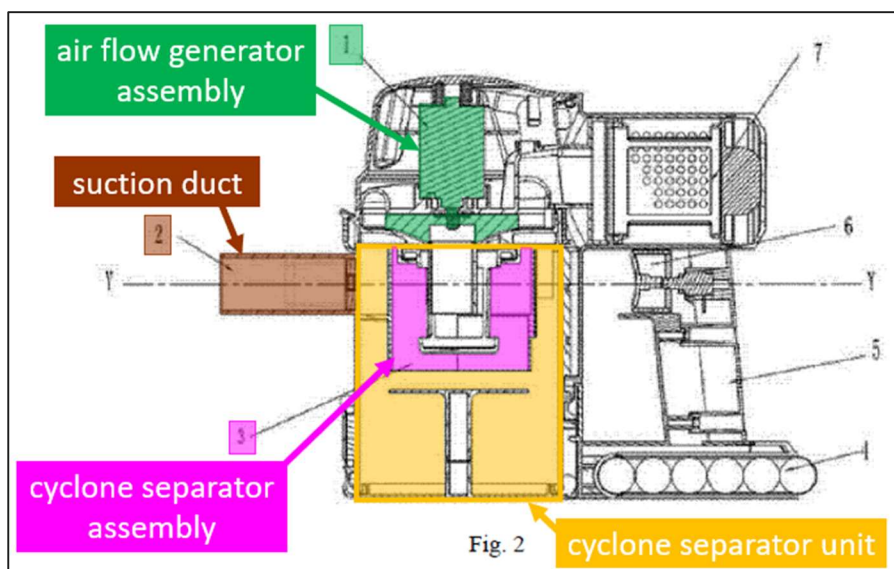
Ex1007, Fig. 1(modified); Ex1009, Fig. 1(modified); Ex1002 ¶315.

D. Ground 4: Martelliere in combination with Tsukuji and Wenjie Renders Obvious Claims 6, 13, and 14

1. A POSA Would Have Combined Martelliere, Tsukuji, and Wenjie

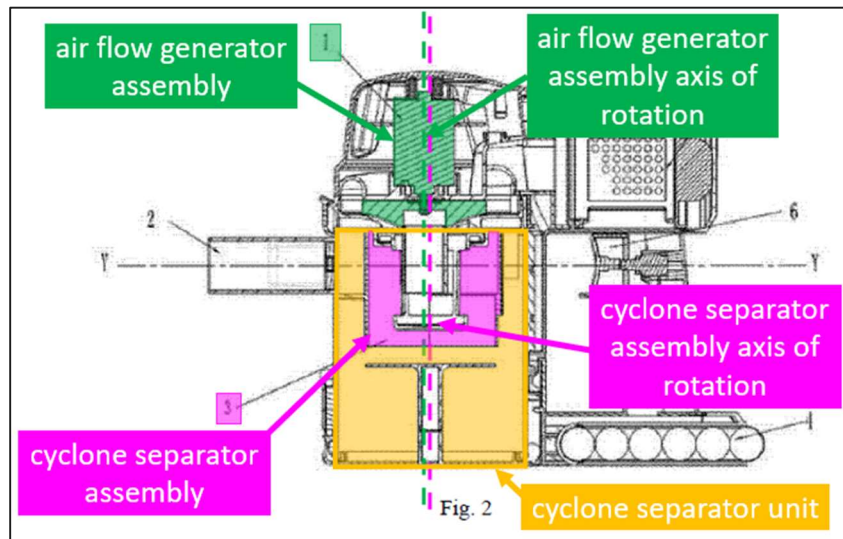
a. Scope and Content of the Prior Art

Wenjie teaches a “hand-held vacuum cleaner includ[ing] an **air flow generator assembly 1**, a **suction duct 2**,” and a **cyclone separator unit** comprising a “**cyclone separator assembly 3**”:



Ex1023 ¶21, Fig. 2; Ex1002 ¶316.

Wenjie's motor has a rotational axis that is slightly offset from the cyclone rotational axis:

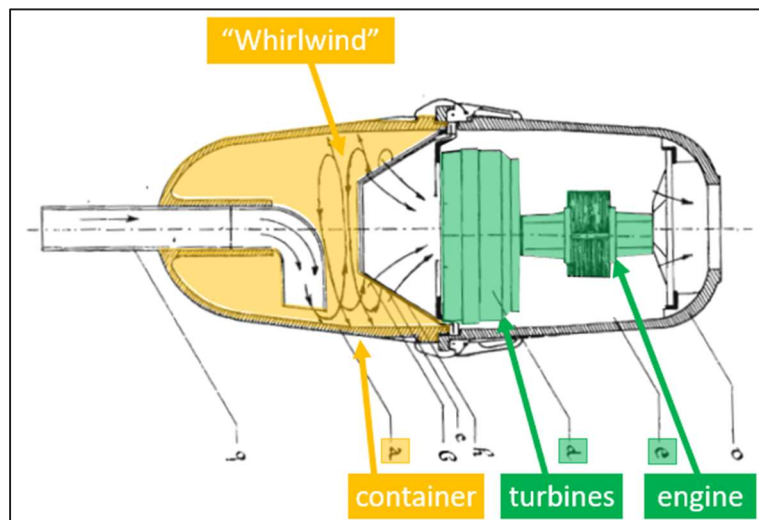


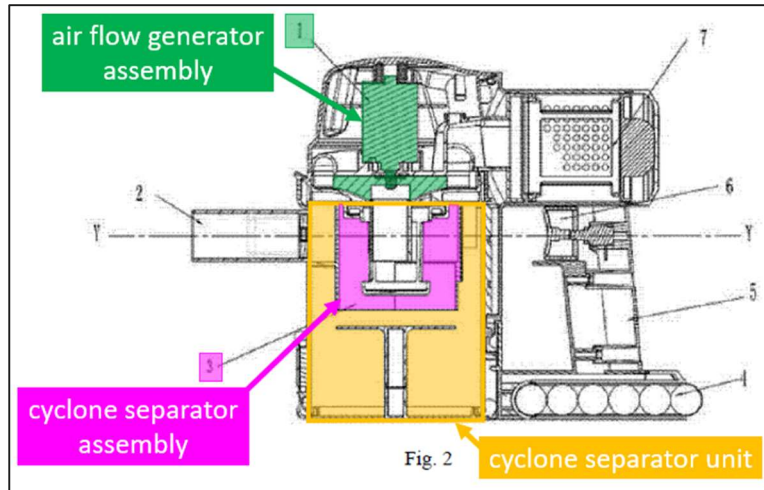
Ex1023, Fig. 2; Ex1002 ¶317.

b. Motivation to Combine

A POSA would have been motivated to combine Martelliere and Tsukuji and would have reasonably expected success. Ground 3, §1. Further, a POSA would have been motivated to modify the combination of Martelliere and Tsukuji to achieve the benefits of the relative orientation of Wenjie's cyclone unit/suction motor and fan assembly, including increased space for packaging other vacuum components. Ex1002 ¶¶318-25. Specifically, a POSA would have been motivated to combine the teachings of Martelliere and Tsukuji with Wenjie as follows:

A POSA would have modified Martelliere's "turbines *d*" and "engine *e*" to be slightly offset from, and thus "below," the "container" comprising a "Whirlwind," as Wenjie teaches with its "air flow generator assembly 1" and cyclone separator unit comprising a "cyclone separator assembly 3":

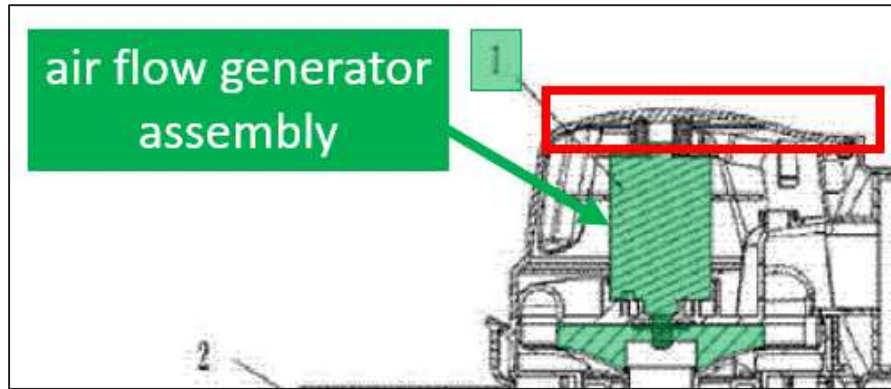




Ex1009, 1, Fig. 1(modified); Ex1023 ¶21, Fig. 2; Ex1002 ¶319.

A POSA would have been motivated to modify Martelliere in view of Wenjie as described. Ex1002 ¶¶320-25. **First**, Martelliere, Tsukuji, and Wenjie are analogous art. Ex1002 ¶320. Like Martelliere, which teaches a compact, cyclonic vacuum cleaner with the cyclone unit (“container” comprising a “Whirlwind”) and suction motor and fan assembly (“engine *e*”/“turbines *d*”) arranged in series, Ex1009, 1, Fig. 1, Wenjie teaches a “hand-held vacuum cleaner” with a cyclone unit (“cyclone separator assembly 3”) and suction motor and fan assembly (“air flow generator assembly 1”) arranged in series, Ex1023 ¶21, Fig. 2.

Second, a POSA would have understood that Wenjie’s offset “cyclone separator assembly 3”/“air flow generator assembly 1” orientation allowed for different exterior shapes, such as an **asymmetrical downward slope** enabled by its offset motor:



Ex1023, Fig. 2; Ex1002 ¶321.

A POSA would have been motivated to slightly lower Martelliere's motor to accommodate different exterior shapes of its vacuum. Ex1002 ¶322.

Further, a POSA would have understood that offsetting the motor, as taught by Wenjie, would allow room for other vacuum components that are too large to accommodate on either side of the motor when it is centered, such as wires and electronics, and would have been motivated to offset Martelliere's motor to accommodate modern electronics used to control modern motors. Ex1023, Fig. 2; Ex1002 ¶323.

Third, a POSA would have been motivated to slightly lower Martelliere's motor to improve weight balance, because a POSA would have understood that locating heavy components, such as the suction motor, closer to the user's hand would reduce strain on the user's wrist during operation and increase vacuum maneuverability. Ex1002 ¶324.

Fourth, it would have been at least obvious to try this modification. Ex1002 ¶325. There were a finite number of identified cyclone unit/suction motor and fan assembly orientations, including coaxial alignment (as Martelliere teaches), and offset alignment (as Wenjie teaches), and it would have been obvious to try to achieve the known benefits described above. Ex1002 ¶325.

c. Reasonable Expectation of Success

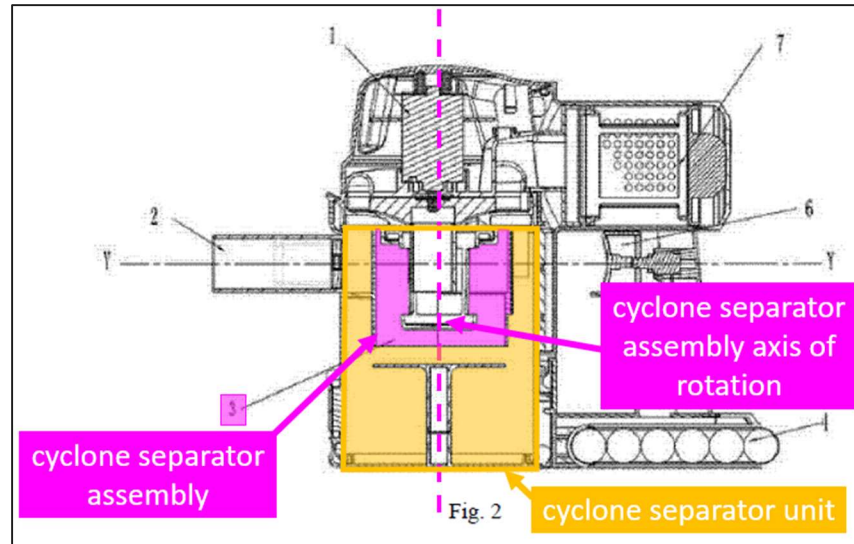
A POSA would have reasonably expected success modifying Martelliere in view of Wenjie. Ex1002 ¶326. A POSA would have understood that these two cyclone unit/suction motor and fan assembly orientations could be used interchangeably, and would have further expected success for the reasons stated above, including because such modification involves a simple relocation of Martelliere's existing elements performing similar functions in similar ways, and because of the express motivations in Martelliere and Wenjie to perform such modification. Ex1002 ¶326.

2. [6]/[13]

Martelliere combined with Tsukuji teaches claims 1/11, Ground 3, [1]/[11], and the Martelliere-Tsukuji-Wenjie combination teaches them for the same reasons. Ex1002 ¶¶327-33. Wenjie renders the remaining limitations of these claims obvious. Ex1002 ¶¶327-33.

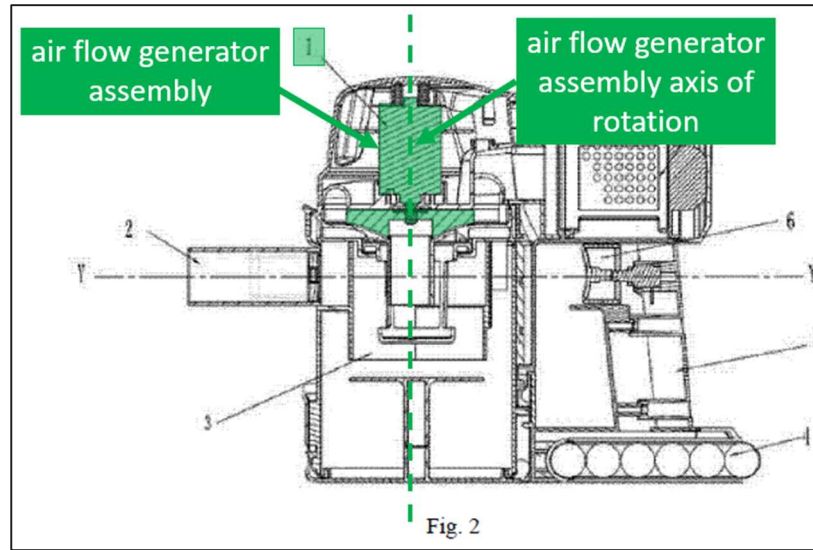
Martelliere in combination with Tsukuji teaches a hand vacuum cleaner lower end, suction motor axis of rotation, and cyclone axis of rotation. Ground 3, [1pre]/[1a]/[1b].

Likewise, Wenjie teaches a cyclone axis of rotation. Ex1002 ¶330. Wenjie's vacuum has a **cyclone separator unit** comprising a “**cyclone separator assembly 3**,” which a POSA would have understood is a cyclone unit comprising a cyclone with a **cyclone separator assembly axis of rotation**:



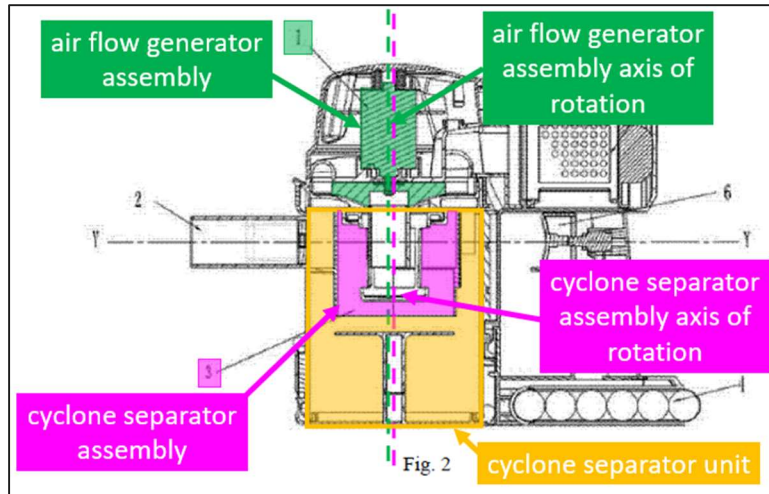
Ex1023 ¶21, Fig. 2; Ex1002 ¶330.

Wenjie further teaches a suction motor axis of rotation. Ex1002 ¶331. Wenjie's vacuum has “an **air flow generator assembly 1**,” which a POSA would have understood is a suction motor and fan assembly with an **air flow generator assembly axis of rotation**:



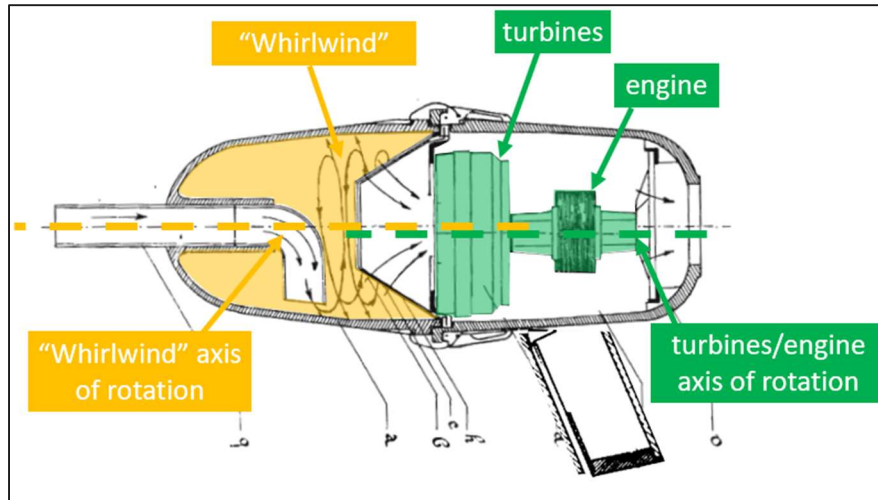
Ex1023 ¶21, Fig. 2; Ex1002 ¶331.

Martelliere combined with Tsukuji and Wenjie renders obvious that when the hand vacuum cleaner is positioned with the lower end of the hand vacuum cleaner on a horizontal surface, the suction motor axis of rotation is positioned below the cyclone axis of rotation. Ex1002 ¶¶332-33. Wenjie teaches an offset suction motor axis of rotation and cyclone axis of rotation: Wenjie's **cyclone separator assembly axis of rotation** is offset relative to Wenjie's **air flow generator assembly axis of rotation**:



Ex1023, Fig. 2; Ex1002 ¶332.

A POSA would have been motivated to combine Martelliere and Tsukuji and would have reasonably expected success. Ground 3, §1. A POSA would have been further motivated to modify Martelliere’s “container”/“engine *e*”/“turbines *d*” orientation as taught by Wenjie and would have reasonably expected success. Ground 4, §1. When so modified and when Martelliere’s vacuum cleaner is positioned as claimed, the **turbines/engine axis of rotation** is positioned below the **“Whirlwind” axis of rotation**:



Ex1007, Fig. 1(modified); Ex1009, Fig. 1(modified); Ex1002 ¶333.

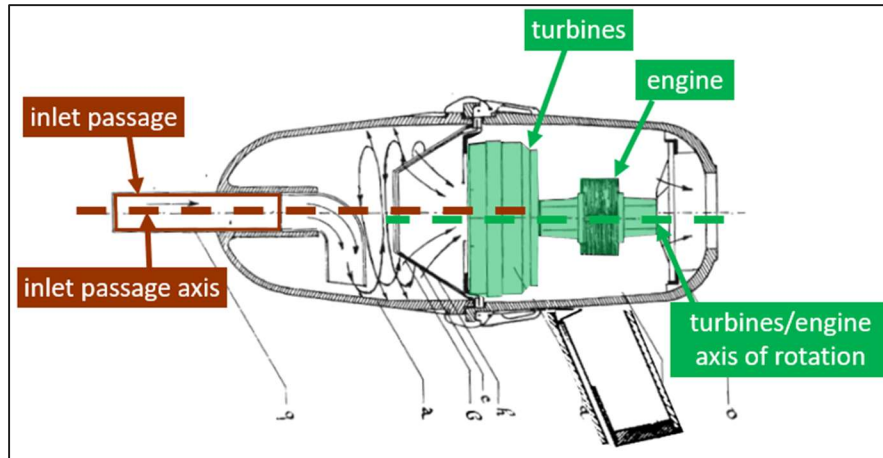
3. [14]

Martelliere combined with Tsukuji teaches claim 11, Ground 3, [11], and the Martelliere-Tsukuji-Wenjie combination teaches claim 11 for the same reasons. Ex1002 ¶¶334-36. Wenjie renders the remaining limitations of this claim obvious. Ex1002 ¶¶334-36.

Martelliere in combination with Tsukuji teaches a suction motor axis of rotation, a passage axis that is coaxial with the cyclone axis, and a hand vacuum cleaner body lower end. Ground 3, [1a], [11]. Further, the combination of Martelliere and Wenjie renders obvious the suction motor axis of rotation is positioned below the cyclone axis of rotation. Ground 4, [6]/[13].

Martelliere combined with Tsukuji and Wenjie renders obvious that the suction motor axis of rotation is position below the passage axis when the hand vacuum cleaner body is positioned with the lower end of the hand vacuum cleaner

on a horizontal surface. Ex1002 ¶336. A POSA would have been motivated to combine Martelliere and Tsukuji and would have reasonably expected success. Ground 3, §1. A POSA would have been motivated to modify Martelliere’s “container”/“engine *e*”/turbines *d*” orientation as taught by Wenjie and would have reasonably expected success. Ground 4, §1. When so modified and when Martelliere’s vacuum cleaner is positioned as claimed, Martelliere’s **turbines/engine axis of rotation** is positioned below the **inlet passage axis**:



Ex1007, Fig. 1(modified); Ex1009, Fig. 1(modified); Ex1002 ¶336.

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 it “does not apply to parallel U.S. International Trade Commission (ITC) proceedings....” USPTO Interim Procedure

For Discretionary Denials In AIA Post-Grant Proceedings With Parallel District Court Litigation, June 21, 2022, 2, 4-5 (the “Guidance”).

B. §325(d)

The §325(d) factors favor institution. The Butler, Tsukuji, Martelliere, and Wenjie references were not previously before the Office, nor are they cumulative. *Advanced Bionics, LLC v. MED-EL Elektromedizinische Geräte GmbH*, IPR2019-01469, Paper 6 at 9-11 (PTAB Feb. 13, 2020) (precedential).

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, *Certain Surface Cleaning Devices and Components Thereof*, Dkt. No. 337-TA-1404 (the “ITC Litigation”), the ’661Patent 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. 10,219,661

Date: August 9, 2024

Respectfully submitted,

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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 13,921 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 Petitioners' 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.
40 King Street West
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A copy was also served via electronic mail and FTP on the attorneys of record in the following related matter, *Certain Surface Cleaning Devices and Components Thereof*, Dkt. No. 337-TA-1404:

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/s/ Sheryl Brongiel
Sheryl A. Brongiel