

Petition for *Inter Partes* Review of U.S. Patent No. 10,117,550

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. IPR2024-00690

U.S. PATENT NO. 10,117,550

PETITION FOR *INTER PARTES* REVIEW

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1003	<i>Curriculum Vitae</i> of Robert Giachetti
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1005	PCT Publication No. 2007/084543 to Butler et al. (“Butler”)
1006	Swiss Patent No. CH203,675 to Peter (“PeterCH”)
1007	Certified English translation of Swiss Patent No. CH203,675 to Peter (“Peter”)
1008	U.S. Patent Publication No. 2008/0189901 to Jansen (“Jansen”)
1009	French Patent No. 1,094,603 to Martelliere (“MartelliereFR”)
1010	Certified English translation of French Patent No. 1,094,603 to Martelliere (“Martelliere”)
1011	U.S. Patent No. 4,473,923 to Neroni et al. (“Neroni”)
1012	U.S. Patent Publication No. 2006/0026788 to Fischer et al. (“Fischer”)
1013	Patent Owner’s Infringement Contentions regarding the ’550Patent
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1015	U.K. Patent No. GB482,938 to British Thomson-Houston Company Limited (“BTHCL”)
1016	Plaintiffs’ Infringement Contentions in <i>SharkNinja Operating LLC v. Dyson, Inc.</i> , No. 1:23-cv-12372 (D. Mass.)
1017	The Parties’ Revised Proposed Schedule in <i>SharkNinja Operating LLC v. Dyson, Inc.</i> , No. 1:23-cv-12372 (D. Mass.)

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1018	https://www.uscourts.gov/sites/default/files/data_tables/fcms_na_distprofile1231.2023.pdf
1019	Petitioners' Stipulation
1020	U.S. Patent No. 6,829,804 to Sepke ("Sepke")

LIST OF CHALLENGED CLAIMS

Reference Number	Claim Limitation
Claim 1	
[1pre]	A surface cleaning apparatus comprising:
[1a]	(a) a hand vacuum cleaner comprising:
[1a.1]	(i) a hand vacuum cleaner body comprising a bottom, a handle, the hand vacuum cleaner body housing a suction motor and fan assembly, the suction motor and fan assembly having a suction motor axis of rotation, the handle having a hand grip portion that extends upwardly and forwardly when the hand vacuum cleaner body is positioned with the bottom on a horizontal surface; and,
[1a.2]	(ii) a cyclone unit provided at a front end of the hand vacuum cleaner body, the cyclone unit comprising a cyclone chamber having a cyclone axis of rotation, a front end of the cyclone unit having a hand vacuum cleaner air inlet and a rear end wherein the hand vacuum cleaner air inlet is provided in a centre of the front end of the cyclone unit; and,
[1a.3]	(iii) an electrical connector provided on the front end of the cyclone unit wherein electrical cables extend rearwardly from the electrical connector through a central portion of the cyclone unit toward the suction motor and fan assembly,
[1b]	(b) a surface cleaning head having a front end, a rear end, a dirt air inlet and a cleaning head air outlet; and,
[1c]	(c) a rigid air flow conduit extendable between the cleaning head air outlet and the hand vacuum cleaner air inlet, the rigid air flow conduit having a longitudinally extending conduit axis which is parallel to the cyclone axis of rotation when the rigid air flow conduit extends between the cleaning head air outlet and the hand vacuum cleaner air inlet,
[1d]	wherein the hand vacuum cleaner is removably mountable to a downstream end of the rigid air flow conduit and when the hand vacuum cleaner is mounted to the downstream end of the rigid air flow conduit, and the rigid air flow conduit extends between the surface cleaning head and the hand vacuum cleaner, the handle is a driving handle for the surface cleaning apparatus.
Claim 2	
[2]	The surface cleaning apparatus of claim 1 wherein the cyclone axis of rotation is rearward of the longitudinally extending conduit axis

Reference Number	Claim Limitation
	when the hand vacuum cleaner is mounted to the rigid air flow conduit and the rigid air flow conduit extends generally vertically upwardly from the surface cleaning head.
Claim 3	
[3]	The surface cleaning apparatus of claim 2 wherein a projection of the longitudinally extending conduit axis intersects the hand grip portion when the hand vacuum cleaner is mounted to the rigid air flow conduit.
Claim 4	
[4]	The surface cleaning apparatus of claim 2 wherein the suction motor axis of rotation is generally parallel to the longitudinally extending conduit axis.
Claim 5	
[5]	The surface cleaning apparatus of claim 1 wherein a projection of the longitudinally extending conduit axis intersects the hand grip portion when the hand vacuum cleaner is mounted to the rigid air flow conduit.
Claim 6	
[6]	The surface cleaning apparatus of claim 1 wherein the suction motor axis of rotation is generally parallel to the longitudinally extending conduit axis.
Claim 7	
[7]	The surface cleaning apparatus of claim 1 wherein the cyclone unit has an outlet conduit and the outlet conduit extends in a direction that is generally parallel to the cyclone axis of rotation.
Claim 8	
[8]	The surface cleaning apparatus of claim 1 wherein the rigid air flow conduit is removably attachable to the hand vacuum cleaner air inlet.
Claim 9	
[9]	The surface cleaning apparatus of claim 8 wherein the hand vacuum cleaner air inlet comprises a hand vacuum cleaner inlet passage that is generally parallel to the longitudinally extending conduit axis and the cyclone axis of rotation, the hand vacuum cleaner inlet passage having an inlet end and an outlet end, the outlet end communicating with a cyclone chamber air inlet and the electrical cables extend rearwardly adjacent the hand vacuum cleaner inlet passage.

Reference Number	Claim Limitation
Claim 10	
[10]	The surface cleaning apparatus of claim 9 wherein the cyclone chamber air inlet comprises a tangential air inlet provided at the outlet end of the hand vacuum cleaner inlet passage.
Claim 11	
[11]	The surface cleaning apparatus of claim 9 wherein the hand vacuum cleaner inlet passage is coaxial with the longitudinally extending conduit axis.
Claim 12	
[12pre]	A surface cleaning apparatus comprising:
[12a]	(a) hand vacuum cleaner comprising:
[12a.1]	(i) a hand vacuum cleaner body comprising a bottom, a handle, the hand vacuum cleaner body housing a suction motor and fan assembly, the suction motor and fan assembly having a suction motor axis of rotation; and,
[12a.2]	(ii) an air treatment member provided at a front end of the hand vacuum cleaner body, the air treatment member having a front end of the air treatment member and a rear end, a hand vacuum cleaner air inlet and the rear end having an air treatment member air outlet whereby air exits the air treatment member in a rearward direction, wherein the hand vacuum cleaner air inlet is provided in a centre of the front end of the air treatment member; and,
[12a.3]	(iii) an electrical connector provided on the front end of the air treatment member wherein electrical cables extend rearwardly from the electrical connector through a central portion of the air treatment member toward the suction motor and fan assembly,
[12b]	(b) a surface cleaning head having a front end, a rear end, a dirt air inlet and a cleaning head air outlet; and,
[12c]	(c) a rigid air flow conduit extendable between the cleaning head air outlet and the hand vacuum cleaner air inlet, the rigid air flow conduit having a longitudinally extending conduit axis which is parallel to the rearward direction when the rigid air flow conduit extends between the cleaning head air outlet and the hand vacuum cleaner air inlet and when the hand vacuum cleaner is mounted to a downstream end of the rigid air flow conduit, the handle is a driving handle for the surface cleaning apparatus.

Claim 13	
[13]	The surface cleaning apparatus of claim 12 wherein the air treatment member air outlet comprises an outlet conduit having an outlet conduit axis that is generally parallel to longitudinally extending conduit axis.
Claim 14	
[14]	The surface cleaning apparatus of claim 12 wherein the outlet conduit axis is rearward of the longitudinally extending conduit axis when the hand vacuum cleaner is mounted to the rigid air flow conduit and the rigid air flow conduit extends generally vertically upwardly from the surface cleaning head.
Claim 15	
[15]	The surface cleaning apparatus of claim 14 wherein a projection of the longitudinally extending conduit axis intersects a hand grip portion of the handle when the hand vacuum cleaner is mounted to the rigid air flow conduit.
Claim 16	
[16]	The surface cleaning apparatus of claim 15 wherein the suction motor axis of rotation is generally parallel to the longitudinally extending conduit axis.
Claim 17	
[17]	The surface cleaning apparatus of claim 12 wherein the suction motor axis of rotation is generally parallel to the longitudinally extending conduit axis.
Claim 18	
[18]	The surface cleaning apparatus of claim 12 wherein the rigid air flow conduit is removably attachable to the hand vacuum cleaner air inlet and the hand vacuum cleaner air inlet comprises a hand vacuum cleaner inlet passage that is generally parallel to the longitudinally extending conduit axis when the rigid air flow conduit is attached to the hand vacuum cleaner air inlet, the hand vacuum cleaner inlet passage having an inlet end and an outlet end, the outlet end communicating with an air treatment member air inlet and the electrical cables extend rearwardly adjacent the hand vacuum cleaner inlet passage.
Claim 19	
[19]	The surface cleaning apparatus of claim 18 wherein the hand vacuum cleaner inlet passage is coaxial with the longitudinally extending conduit axis.

Claim 20	
[20pre]	A surface cleaning apparatus comprising:
[20a]	(a) a hand vacuum cleaner comprising:
[20a.1]	(i) a hand vacuum cleaner body comprising a handle, the hand vacuum cleaner body housing a suction motor and fan assembly, the suction motor and fan assembly having a suction motor axis of rotation; and,
[20a.2]	(ii) a cyclone unit provided at a front end of the hand vacuum cleaner body, the cyclone unit comprising a cyclone chamber having a cyclone axis of rotation, a front end of the cyclone unit having a hand vacuum cleaner air inlet and a rear end wherein the hand vacuum cleaner air inlet is provided in a centre of the front end of the cyclone unit; and,
[20a.3]	(iii) an electrical connector provided on the front end of the cyclone unit,
[20b]	(b) a surface cleaning head having a front end, a rear end, a dirt air inlet and a cleaning head air outlet; and,
[20c]	(c) a rigid air flow conduit extendable between the cleaning head air outlet and a hand vacuum cleaner air inlet, the rigid air flow conduit having a longitudinally extending conduit axis which is parallel to the cyclone axis of rotation when the rigid air flow conduit extends between the cleaning head air outlet and the hand vacuum cleaner air inlet,
[20d]	wherein the hand vacuum cleaner is removably mountable to a downstream end of the rigid air flow conduit and when the hand vacuum cleaner is mounted to the downstream end of the rigid air flow conduit, the handle is a driving handle for the surface cleaning apparatus, and
[20e]	wherein when the rigid air flow conduit extends between the cleaning head air outlet and the hand vacuum cleaner air inlet, the hand vacuum cleaner air inlet comprises a hand vacuum cleaner inlet passage that is generally coaxial with the longitudinally extending conduit axis and the cyclone axis of rotation, the hand vacuum cleaner air inlet passage is positioned inside the cyclone unit and the electrical cables extend rearwardly from the electrical connector through the cyclone unit adjacent the hand vacuum cleaner inlet passage towards the suction motor and fan assembly.

Claim 21	
[21]	The surface cleaning apparatus of claim 20 wherein the hand vacuum cleaner body comprises a suction motor and fan assembly housing and the handle extends from a sidewall of the suction motor and fan assembly housing.
Claim 22	
[22]	The surface cleaning apparatus of claim 1 wherein the hand vacuum cleaner inlet passage has an inlet axis and a projection of each of the inlet axis and the cyclone axis intersects the suction motor.
Claim 23	
[23]	The surface cleaning apparatus of claim 12 wherein the hand vacuum cleaner air inlet comprises a hand vacuum cleaner inlet passage that has an inlet axis, and when the rigid air flow conduit extends between the cleaning head air outlet and the hand vacuum cleaner air inlet, the inlet axis is generally parallel to the longitudinally extending conduit axis and a projection of each of the inlet axis and an outlet conduit axis of the air treatment member intersects the suction motor.
Claim 24	
[24]	The surface cleaning apparatus of claim 20 wherein the hand vacuum cleaner comprises a hand vacuum cleaner inlet passage that has an inlet axis, and when the rigid air flow conduit extends between the cleaning head air outlet and the hand vacuum cleaner air inlet, the inlet axis is generally parallel to the longitudinally extending conduit axis and a projection of each of the inlet axis and the cyclone axis intersects the suction motor.
Claim 25	
[25]	The surface cleaning apparatus of claim 1, wherein when the hand vacuum cleaner is mounted to the downstream end of the rigid air flow conduit and the rigid air flow conduit is in an upright storage position, the handle is at an upper end of the surface cleaning apparatus and a portion of the handle is rearward of the wand axis.
Claim 26	
[26]	The surface cleaning apparatus of claim 12, wherein when the hand vacuum cleaner is mounted to the downstream end of the rigid air flow conduit and the rigid air flow conduit is in an upright storage position, the handle is at an upper end of the surface cleaning apparatus and a portion of the handle is rearward of the wand axis.

Claim 27	
[27]	The surface cleaning apparatus of claim 20, wherein when the hand vacuum cleaner is mounted to the downstream end of the rigid air flow conduit and the rigid air flow conduit is in an upright storage position, the handle is at an upper end of the surface cleaning apparatus and a portion of the handle is rearward of the wand axis.
[28pre]	A surface cleaning apparatus comprising:
[28a]	(a) a hand vacuum cleaner comprising:
[28a.1]	(i) a hand vacuum cleaner body comprising a bottom, a handle, a suction motor and fan assembly, the suction motor and fan assembly having a suction motor axis of rotation, the handle having a hand grip portion that extends upwardly and forwardly when the hand vacuum cleaner is positioned with the bottom on a horizontal surface;
[28a.2]	(ii) a cyclone unit provided at a front end of the hand vacuum cleaner body, the cyclone unit comprising a cyclone chamber having a cyclone axis of rotation, a centre of the front end of the cyclone unit having a hand vacuum cleaner air inlet; and,
[28a.3]	(iii) a cyclone unit electrical connector provided at the front end of the cyclone unit at a location adjacent the hand vacuum cleaner air inlet, wherein electrical cables extend rearwardly from the electrical connector through a central portion of the cyclone unit toward the suction motor and fan assembly,
[28b]	(b) a surface cleaning head having a front end, a rear end, a dirt air inlet and a cleaning head air outlet; and,
[28c]	(c) a rigid air flow conduit extendable between the cleaning head air outlet and the hand vacuum cleaner air inlet, the rigid air flow conduit having a longitudinally extending conduit axis, and when the rigid air flow conduit is extending between the cleaning head air outlet and the hand vacuum cleaner air inlet conduit axis is parallel to the cyclone axis of rotation and a rigid air flow conduit electrical connector that is aligned with and connected to the cyclone unit electrical connector when the hand vacuum cleaner is mounted to the rigid air flow conduit,
[28d]	wherein the hand vacuum cleaner is removably mountable to a downstream end of the rigid air flow conduit and when the hand vacuum cleaner is mounted to the downstream end of the rigid air flow conduit, the handle is a driving handle for the surface cleaning apparatus.

I. INTRODUCTION

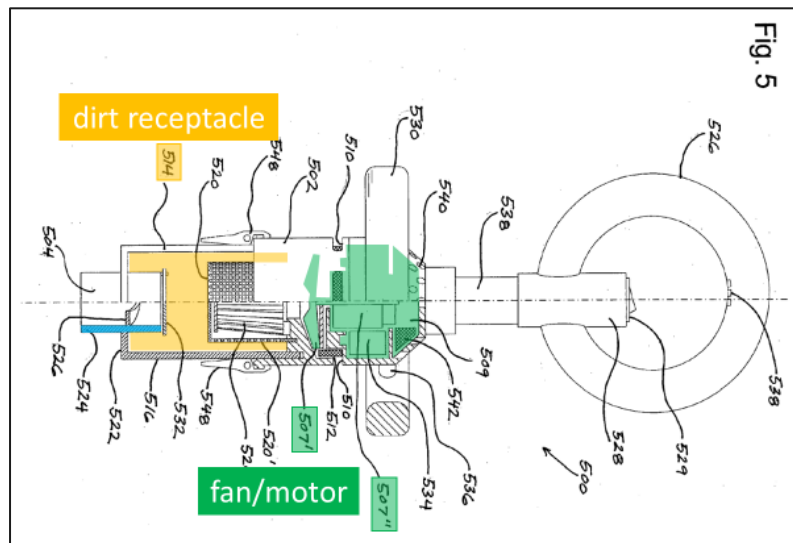
The '550Patent “relates to the field of surface cleaning apparatus[es],” and, specifically, to a hand/stick vacuum cleaner configuration. Ex1001, 1:18-22.

The '550Patent identifies “limited dirt collection capacity” as a problem with existing handvacs and purports to solve this with a “supplemental bin” to “provide enhanced dirt collection capacity.” However, the '550Patent’s claims do not relate to dirt-collection capacity, but instead cobble together well-known configurations and features of vacuum cleaners, none of which 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’ products accused in co-pending district court litigation.

During prosecution, the purportedly novel claimed feature identified by the Examiner relates to the positioning of electrical cables: “an electrical connector provided on the front end of the cyclone unit wherein electrical cables extend rearwardly from the electrical connector through a central portion of the cyclone unit toward the suction motor and fan assembly,” in combination with the remaining claim elements. Ex1004, 268–69.¹ But this feature too—in

¹ Ex1004 is an excerpted version of the '550Patent’s 3,440-page prosecution history.

combination with the others claimed—was well-known. For example, PCT Application No. 2007/084543 (“Butler”) teaches this configuration, including using “**power leads** ... provided to connect the powered attachment to the electric circuit,” passing rearwardly “through the **dirt receptacle**” “compris[ing] a cyclone separator” (including its central portion) and toward the “**fan/motor 507**”:



Ex1005, 22:5-13, Claim 11, Fig. 5.²

Butler likewise teaches the remaining claim elements and thus anticipates. The prior art also renders obvious all claims—PO’s mish-mash of claimed features was well-known, as early as the 1930s.

None of these references were disclosed to the Patent Office. They anticipate or render obvious every claim of the ’550Patent.

² All annotations added unless otherwise noted.

II. STANDING (§42.104(A))

Petitioners certify that the '550 Patent is available for IPR, and that Petitioners are not barred or estopped from requesting IPR to challenge the claims on the grounds herein.

III. RELIEF REQUESTED (§42.104(B))

Petitioners respectfully request review and cancellation under §311 of claims 1-28 as follows³:

Prior Art	Publication	Basis
PCT Publication 2007/084543 ("Butler")	07/26/2007	AIA 102(a)(1), 102(a)(2)
Swiss Patent 203,675 ("Peter")	06/16/1939	
U.S. Patent 4,473,923 ("Neroni")	10/02/1984	
French Patent 1,094,603 ("Martelliere")	05/23/1955	
U.S. Patent Publication 2008/0189901 ("Jansen")	08/14/2008	

³ Petitioners do not concede that any claims satisfy other requirements for patentability that cannot be raised in IPR, including §§101 and 112.

Grounds	Claims	Basis
1	1-28	§102; Butler
2	1-28	§103; Butler
3	1-28	§103; Peter and Neroni
4	1-28	§103; Peter, Neroni, Martelliere, and/or Jansen

IV. OVERVIEW OF THE '550PATENT

The '550Patent issued from U.S. Application No. 16/021,152, filed 06/28/2018, and claims priority to 12/17/2014. Ex1001, Cover.

A. The Specification

The '550Patent's 160-page, 47-column, 127-figure specification identifies “limited dirt collection capacity” as a problem with existing handvacs, which it purports to solve with a “supplemental bin” to “provide enhanced dirt collection capacity.” Ex1001, 1:34-55. However, the '550Patent does not claim a supplemental bin or any other purported dirt-collection-capacity solution; it claims a mix-and-match of well-known, interchangeable features and configurations. Ex1001, Claims. These well-known features include a “cyclone unit” “at a front end of the hand vacuum cleaner body,” “an electrical connector provided on the front end of the cyclone unit” (or “air treatment member”), “a surface cleaning head,” and a removable “rigid air flow conduit”—the combination of which solves no purported problem.

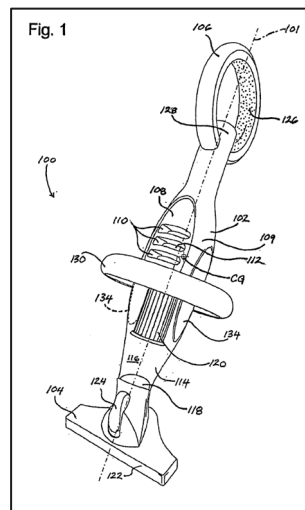
B. The Prosecution History

During prosecution, the Applicant overwhelmed the Examiner with 500+ references, yet failed to disclose Butler or the other art in this Petition. Ex1004. All claims issued without rejection, with the Examiner finding the art of record failed to teach an “electrical connector provided on the front end of the cyclone unit wherein electrical cables extend rearwardly from the electrical connector through a central portion of the cyclone unit toward the suction motor and fan assembly” in combination with the other claimed elements. *Id.*, 3282-3290.

V. OVERVIEW OF PRIOR ART

A. Butler

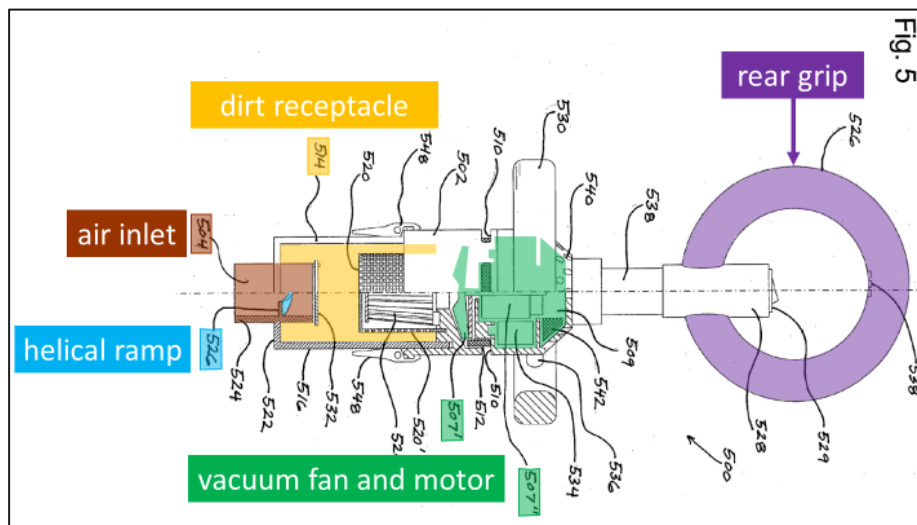
Butler is a 2007 PCT publication for “an improved vacuum cleaner for cleaning raised and vertical surfaces” including stairs:



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

Butler is a single vacuum cleaner system that is reconfigurable and optimizable. Butler's various components, including handles, grips, dirt receptacles, air filters, and cleaning tools, "may be interchangeable with one another to provide the user with various cleaning options," and the arrangement of these components may be "used individually or in various other inventive combinations." *Id.*, 16:25-29, 43:29-44:3; *see also id.*, 4:17-28, 18:22-28, 19:9-15, 34:12-13.

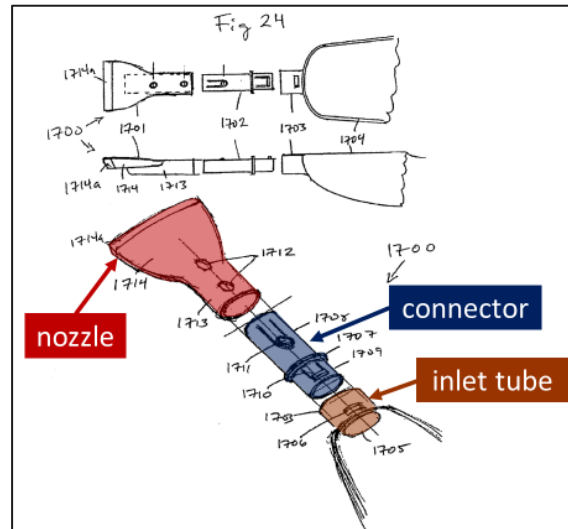
Butler's cleaner comprises a "housing with a longitudinal axis," an "**air inlet**," a "**helical ramp 526**" "establish[ing] a cyclonic airflow pattern within the **dirt receptacle**," a "**vacuum fan and a motor**," and a "**rear grip**":



Ex1005, 3:20-28, 22:14-22, Fig. 5, Claim 11, Ex1002 ¶¶56–57.

Butler also teaches a “**connector 1702**,” comprising an upstream “inlet portion 1708,” which is “telescopically received within the **nozzle 1701**,” and a

downstream “outlet portion 1709,” which is “telescopically received within or around the **inlet tube 1703**”:

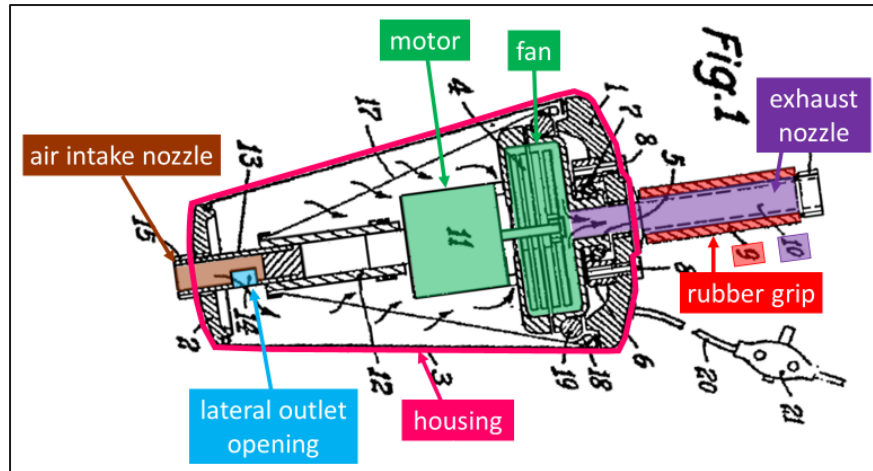


Ex1005, 41:19-29, Fig. 24; Ex1002 ¶58.

B. Peter⁴

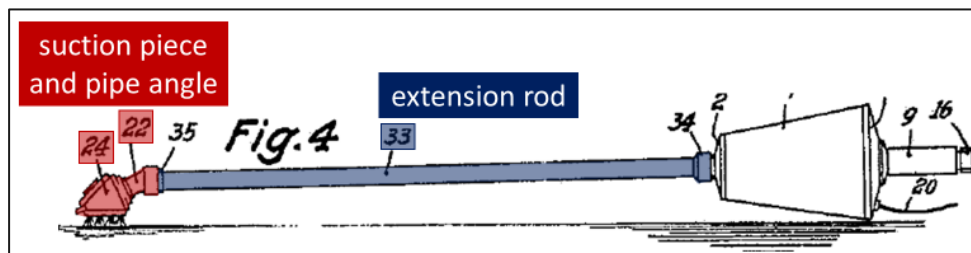
Peter is a 1939 Swiss patent for a “vacuum cleaner” for cleaning “areas that are difficult to access.” Ex1007, 1. Peter’s vacuum has an “**air intake nozzle 13**” with a “**lateral outlet opening 14**” at the front end that creates cyclonic airflow within the conical “**housing,**” a “**fan**” and “**motor 11,**” and an “**exhaust nozzle 10**” with a “**rubber grip 9**” at the rear end:

⁴ Ex1007 is a certified English translation of Ex1006, originally published in German. Citations to Ex1007 are to the page, as the English translation does not include column or line numbers.



Ex1007, 2, Fig. 1; Ex1002 ¶¶59–60.

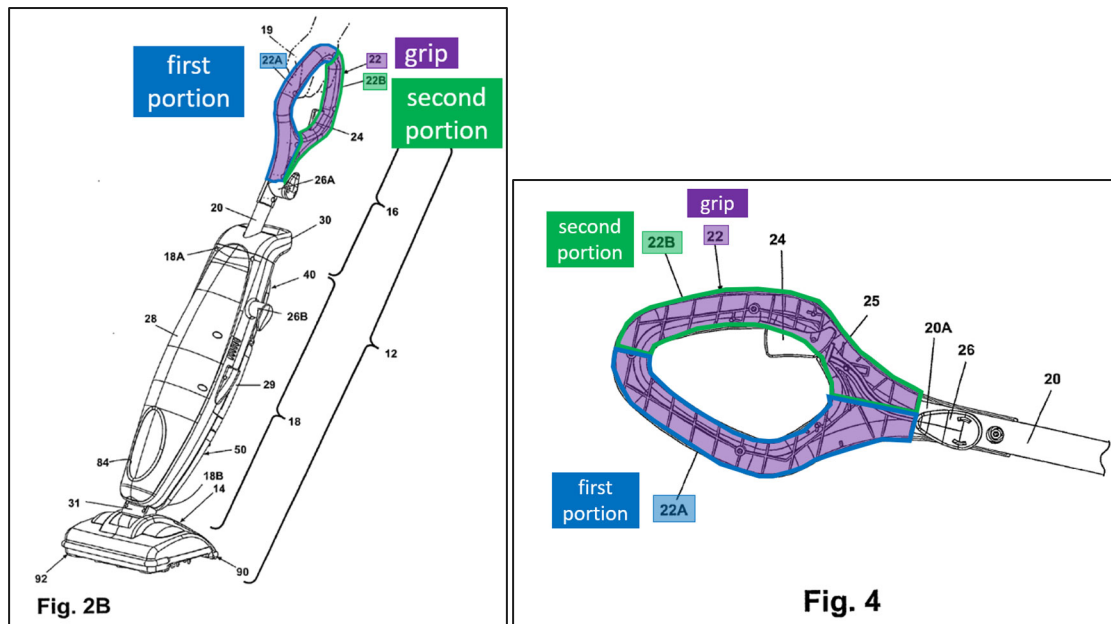
Further, Peter teaches a “**suction piece 24**” connected to a “**pipe angle 22**,” and an “**extension rod 33**” “between the vacuum cleaner housing and the pipe angle”:



Ex1007, 2-3, Fig. 4; Ex1002 ¶61.

C. Jansen

Jansen is a 2008 U.S. patent publication for a bi-directional “bare floor cleaner” with a “**bi-directional grip 22**” with two portions for bi-directional cleaning: “**first portion 22A**” and “**second portion 22B**”:

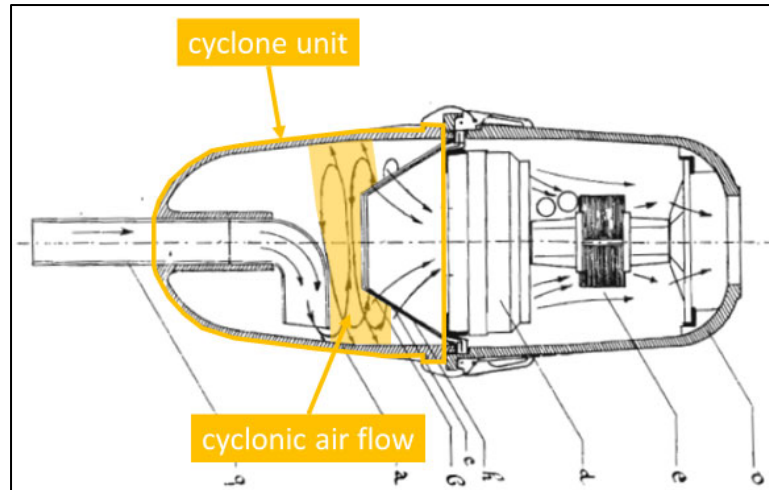


Ex1008 ¶¶30, 65-66, Figs. 2B, 4; Ex1002 ¶¶62-63.

D. Martelliere⁵

Martelliere is a 1955 French patent for “[i]mproved dust vacuums” that employ “the ‘Whirlwind’ principle” (i.e., a cyclone) to separate dust from air:

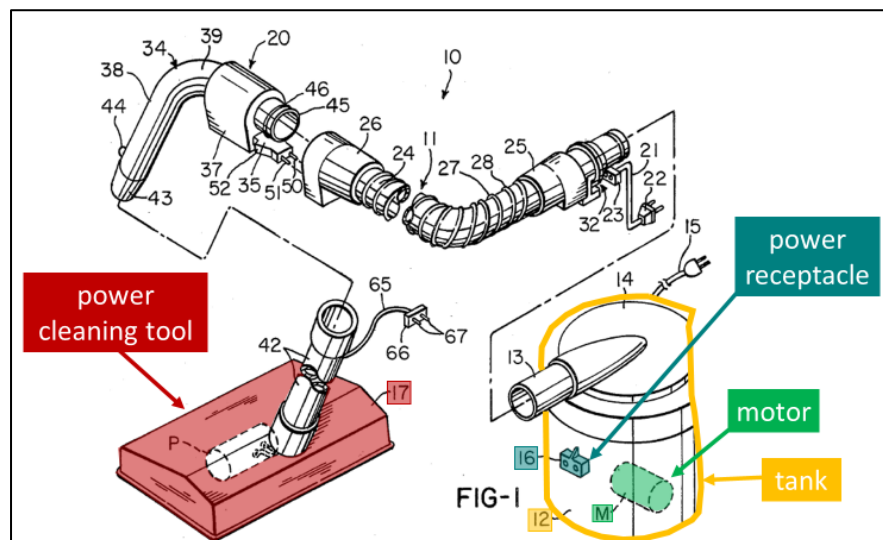
⁵ Ex1010 is a certified English translation of Ex1009, originally published in French. Citations to Ex1010 are to the page, as the English translation does not include column or line numbers.



Ex1010, 1, Fig. 1; Ex1002 ¶¶64–65.

E. Neroni

Neroni is a 1984 U.S. patent for a vacuum cleaner with a powered cleaning tool. To power the “**power cleaning tool 17**,” Neroni’s vacuum runs electricity from the power cleaning tool to power “**receptacle 16A**, and to **motor M**,” located in separation “**tank 12**”:



Ex1011, 3:34-42, 6:42-45, Fig. 1; Ex1002 ¶¶66–67.

VI. LEVEL OF ORDINARY SKILL IN THE ART

A POSA would have had a bachelor's degree in mechanical engineering or a similar field and 2-3 years of experience in fluid dynamics and/or machine design for devices related to fluid dynamics, such as vacuum cleaners. Additional education could offset less experience and vice versa, and a POSA could have also obtained similar knowledge and experience through other means.

VII. CLAIM CONSTRUCTION

Petitioners are unaware of any “prior claim construction determination” related to the '550Patent. 37 C.F.R. §42.100(b). “[C]laim terms need only be construed to the extent necessary to resolve the controversy.” *Wellman, Inc. v. Eastman Chem. Co.*, 642 F.3d 1355, 1361 (Fed. Cir. 2011) (internal citation omitted). 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.⁶

⁶ Petitioners reserve all rights to raise claim construction arguments and other arguments in litigation.

VIII. THE CHALLENGED CLAIMS ARE UNPATENTABLE

A. Ground 1: Butler Anticipates Claims 1-28

1. [1]/[12]/[20]/[28]

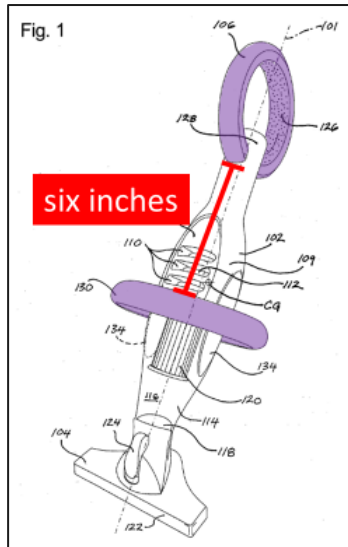
a. [1pre]/[12pre]/[20pre]/[28pre]⁷

To the extent the preambles are limiting, Butler teaches them. Ex1002 ¶¶73–74. Butler teaches a “vacuum cleaner” for cleaning surfaces, including “floors and carpets,” “horizontal surfaces,” and “vertical surfaces.” Ex1005, Title, 7:2-5.

b. [1a]/[12a]/[20a]/[28a]

Butler teaches these limitations. Ex1002 ¶¶75–78. Butler’s “vacuum cleaner” is designed to be used by hand and is a hand vacuum cleaner (“handvac”). Ex1005, Title, Fig. 1. Butler’s cleaner includes 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:

⁷ See LIST OF CHALLENGED CLAIMS.



Ex1005, 15:5-6, 26:1-10, Fig. 1; Ex1002 ¶76.

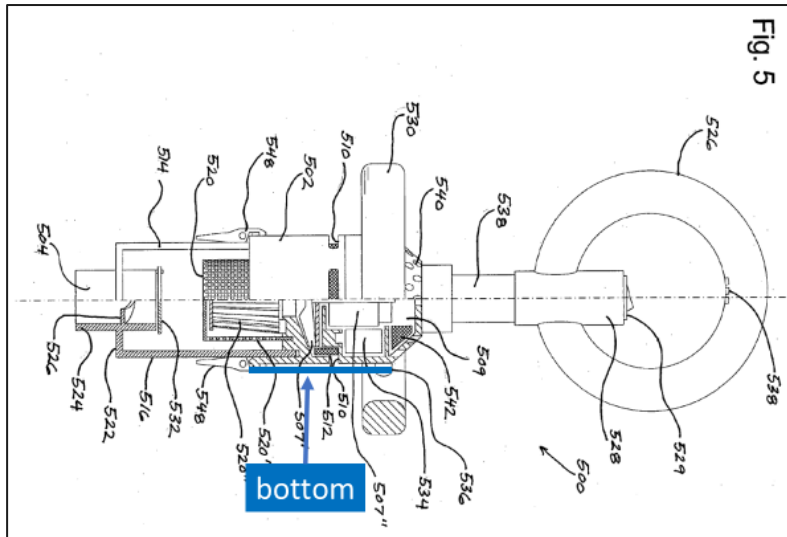
Butler’s “compact” and “maneuver[able]” design is “adapted for cleaning ... stairwells and other confined spaces,” and Butler teaches telescoping handgrip members and extension tubes to reach the floor. Ex1005, Abstract, 1:2-3, 26:1-5, 27:12-29. Moreover, Butler’s cleaner is designed with an optimal “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 handvac. Ex1002 ¶¶77–78.

c. [1a.1]/[12a.1]/[20a.1]/[28a.1]

Butler teaches these limitations. Ex1002 ¶¶79–101.

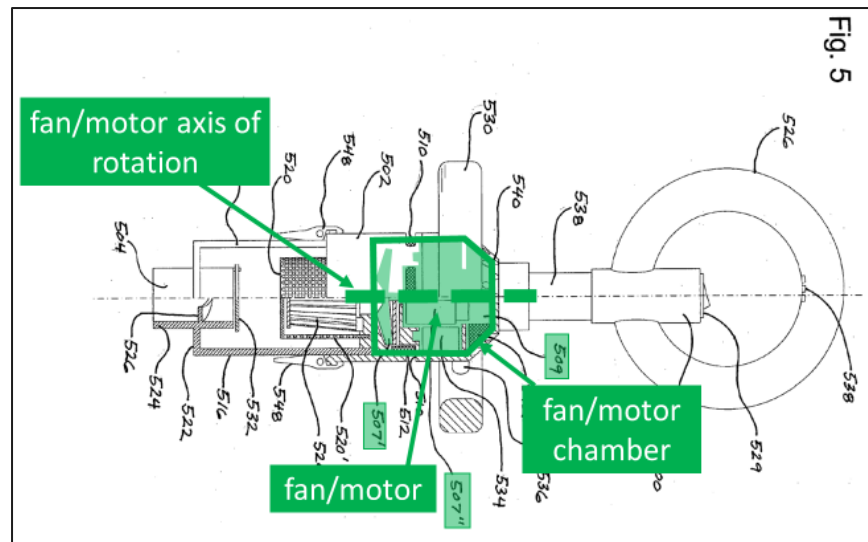
Butler's cleaner has a body comprising a bottom. Ex1002 ¶¶82–83.

Butler’s “vacuum cleaner” has a body with a **bottom**:



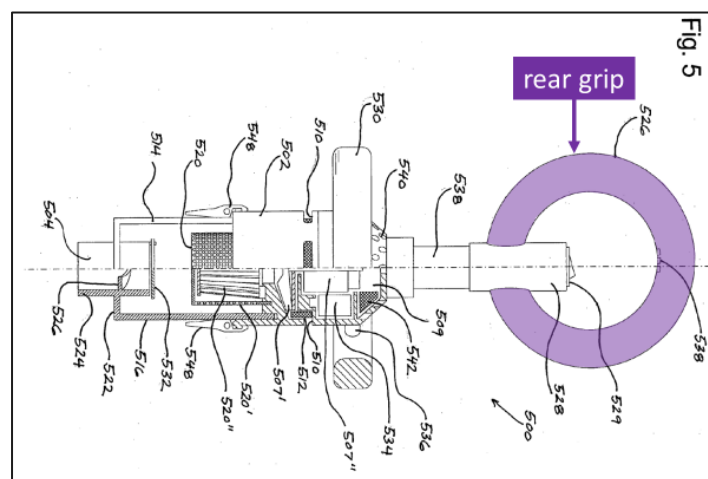
Ex1005, Fig. 5; *see also id.*, 21:19-23, 35:4-26, Fig. 15; Ex1002 ¶¶82–83. Butler’s body includes a “generally cylindrical housing 502 with a circular or looped rear grip 506, and a circular or looped foregrip 530.” Ex1005, 20:4-6. Butler’s body, including its “cylindrical housing” is a handvac body with a bottom, including the portion identified above. Ex1002 ¶¶84–87.

Butler’s handvac body houses a suction motor and fan assembly having a suction motor axis of rotation. Ex1002 ¶¶88–89. Butler’s 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; Ex1002 ¶¶88–89.

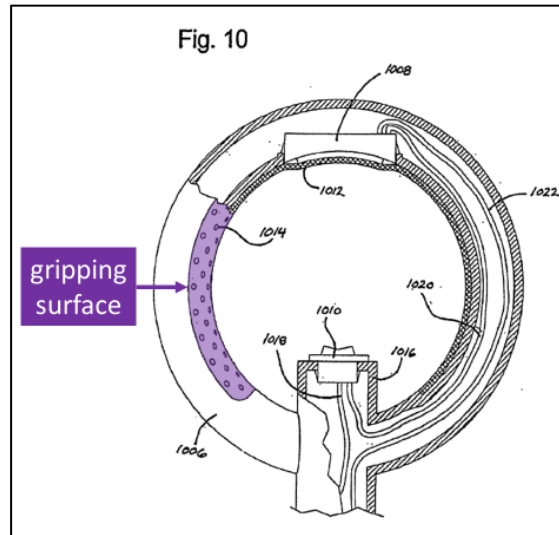
Butler’s cleaner (and cleaner body) includes a handle, for example, “a circular or looped **rear grip 506**”:



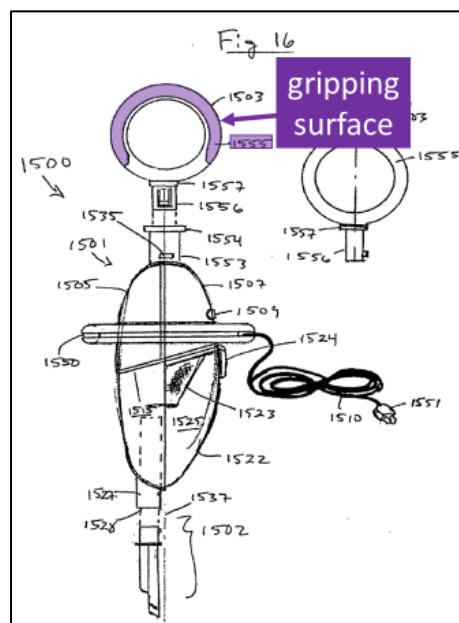
Ex1005, 20:4-6, Fig. 5; Ex1002 ¶¶90–91.

Butler’s handle includes a hand grip portion. Ex1002 ¶¶92–97. Butler teaches that a “gripping surface” may be placed on any or all portions of any of Butler’s disclosed handles: “**rear grip** ... may be made from any suitable material”

and “include[s] one or more **gripping surfaces** ... comprising a material that is more particularly adapted to provide a favorable tactile feel and/or enhanced gripping friction,” such as “dimples, checkering, ridges or bumps”:



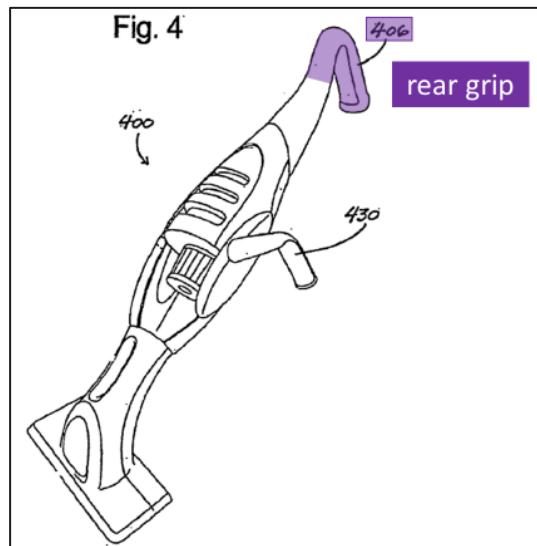
Ex1005, 11:3-11, Fig. 10; Ex1002 ¶¶92–93. “The rear grip ... comprises a generally toroidal shaped **gripping surface 1555**”:



Ex1005, 38:25-28, Fig. 16; Ex1002 ¶¶94–96.

Butler’s grips are interchangeable and versatile—they “may have any shape suitable for” “maneuver[ing] the back of the vacuum cleaner,” and “may be replaced by any combination of rear grip and foregrip that provide the user with hand positions to ergonomically maneuver the device.” Ex1005, 10:17-19; 19: 9-12.

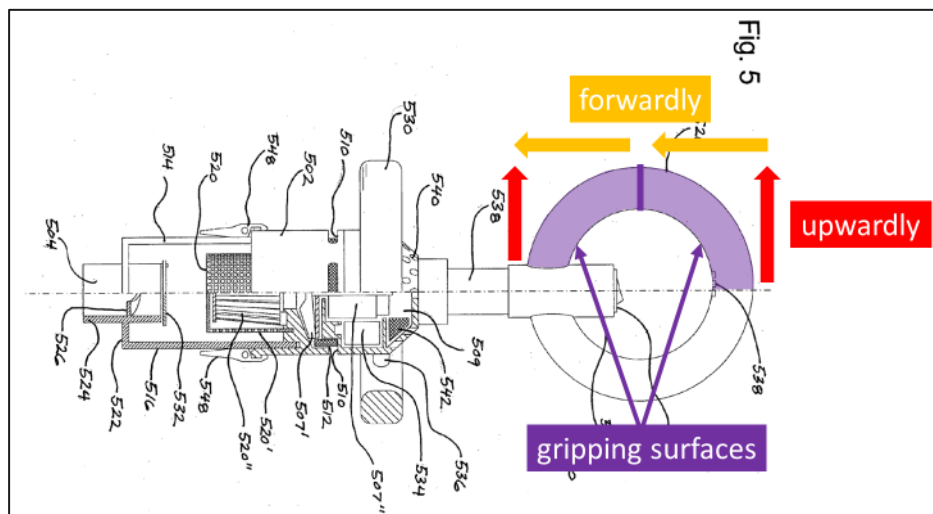
Butler further teaches that “a pistol-grip style **rear grip 406**, and pistol-grip style foregrips 430” may also be used, and “[t]he foregrips 330, 430 also may be provided with joints or pivots to allow them to be articulated into more desirable positions” to “allow greater flexibility and control”:



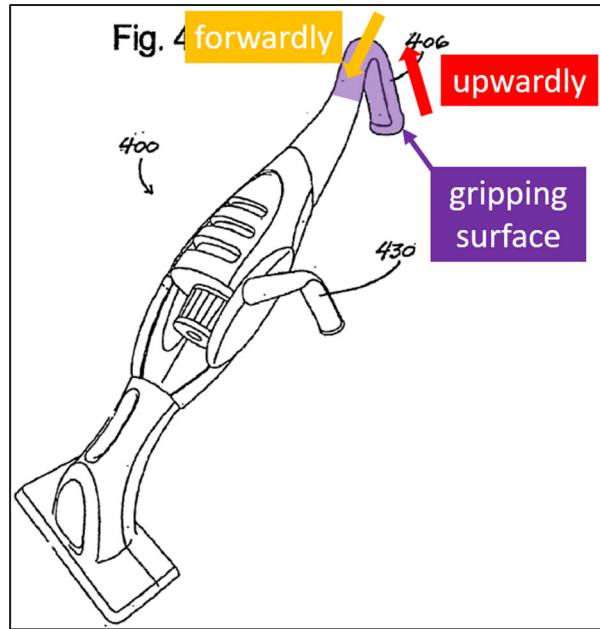
Ex1005, 19:22-20:2, Fig. 4; Ex1002 ¶¶96–97.

Butler’s interchangeable “**circular ... rear grip**” and “pistol-grip style **rear grip**” are handles and Butler’s “**gripping surfaces**,” which a user grips with their hand, are handgrip portions. Ex1002 ¶97.

Butler's handle includes a handgrip portion that extends upwardly and forwardly when the handvac body is positioned with the bottom on a horizontal surface. Ex1002 ¶¶98–101. The '550Patent'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, the below two portions of Butler's “circular ... rear grip” each include “gripping surfaces” that extend **upwardly** and **forwardly**:

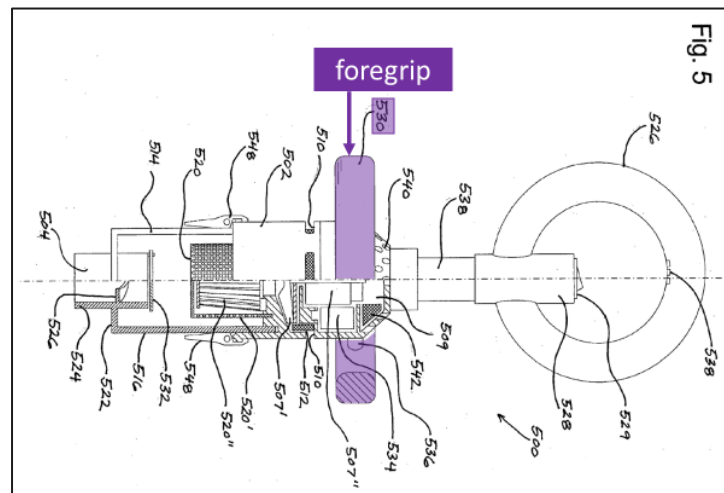


Ex1005, 10:19-21, 34:21-22, Fig. 5, *see also* Fig. 16; Ex1002 ¶¶98. So, too, does Butler’s “pistol-grip style rear grip”:



Id., 19:22-24, Fig. 4; Ex1002 ¶¶99–100.

Regarding Limitation [20a.1], Butler also teaches “a circular or looped **foregrip 530**,” which is also a handle:

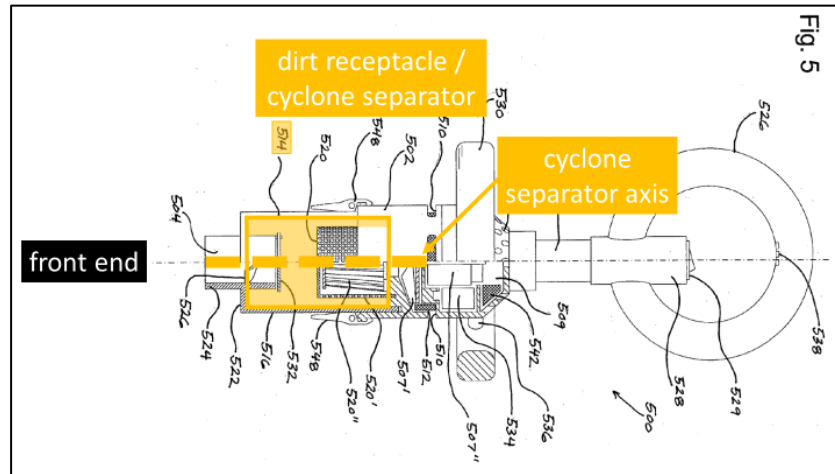


Ex1005, 20:4-11, Fig. 5; Ex1002 ¶¶101.

d. [1a.2]/[12a.2]/[20a.2]/[28a.2]

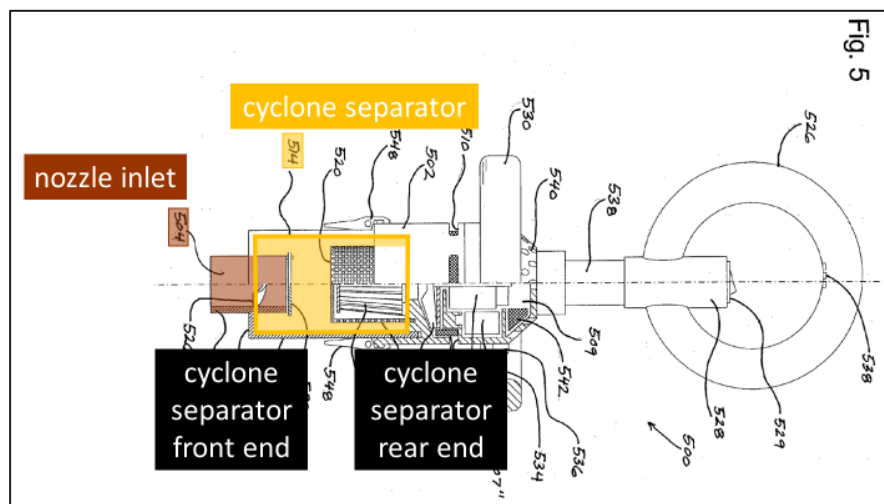
Butler teaches these limitations. Ex1002 ¶¶102–111.

Butler teaches a “**dirt receptacle** compris[ing] a **cyclone separator**” at the front end of the handvac body, which a POSA would understand is a cyclone unit including a cyclone chamber with a **cyclone separator axis** of rotation:



Ex1005, Claim 11, Fig. 5; Ex1002 ¶105.

Butler teaches a front end of the cyclone unit having a handvac air inlet. Ex1002 ¶¶106–110. In Butler, air enters the cleaner via “**nozzle inlet 504**,” which “comprises an entry tube 524 that passes through the dirt receptacle bottom wall 522”:



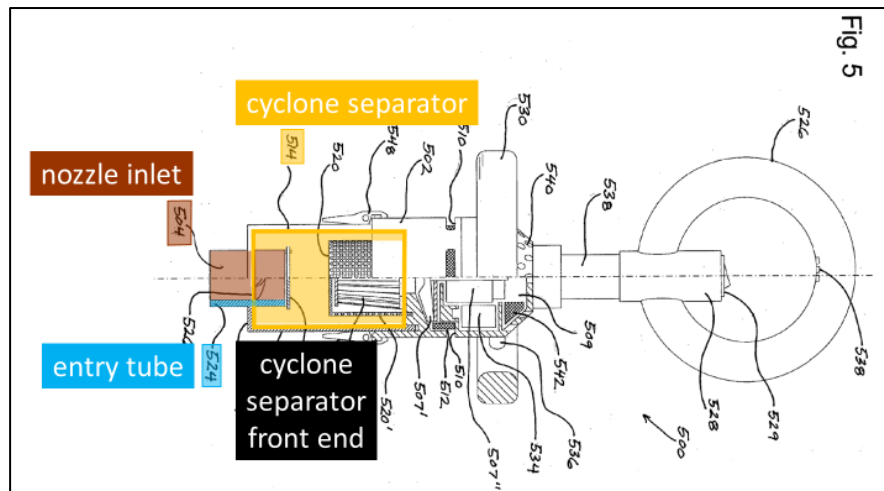
Ex1005, 22:5-6, Fig. 5; Ex1002 ¶109. Butler’s “cyclone separator” has a front and rear end as identified above, and the handvac air inlet is provided in a center of the front end of the cyclone unit. Ex1002 ¶110.

Regarding Limitation [12a.2], Butler’s cyclone unit is an air treatment member because it treats the air by separating dirt. Ex1002 ¶111; *see also* Ex1005, 22:23-25. Further, Butler teaches an air treatment member air outlet, e.g., the “filter 520,” whereby air exits the air treatment member in a rearward direction. Ground 1, Claim 7; Ex1002 ¶111.

e. [1a.3]/[12a.3]/[20a.3]/[28a.3]

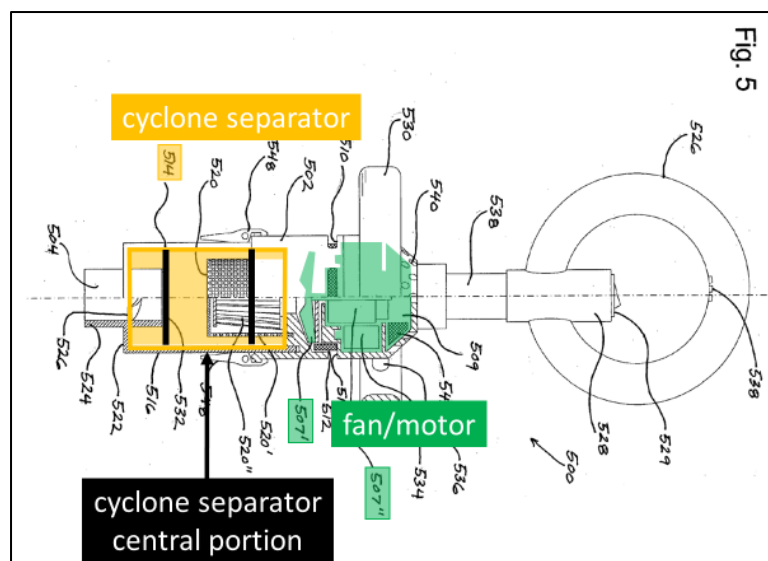
Butler teaches these limitations. Ex1002 ¶¶112–123.

Butler teaches an electrical connector provided on the front end of the cyclone unit. Ex1002 ¶116. Butler’s “**nozzle inlet 504** ... comprises an **entry tube 524** that passes through the dirt receptacle bottom wall 522.” Ex1005, 22:5-11. “[A]ny type of cleaning device may be attached to the **entry tube 524**,” and “[o]f course, if a powered attachment is provided, suitable power leads can be provided to connect the powered attachment to the electric circuit”:



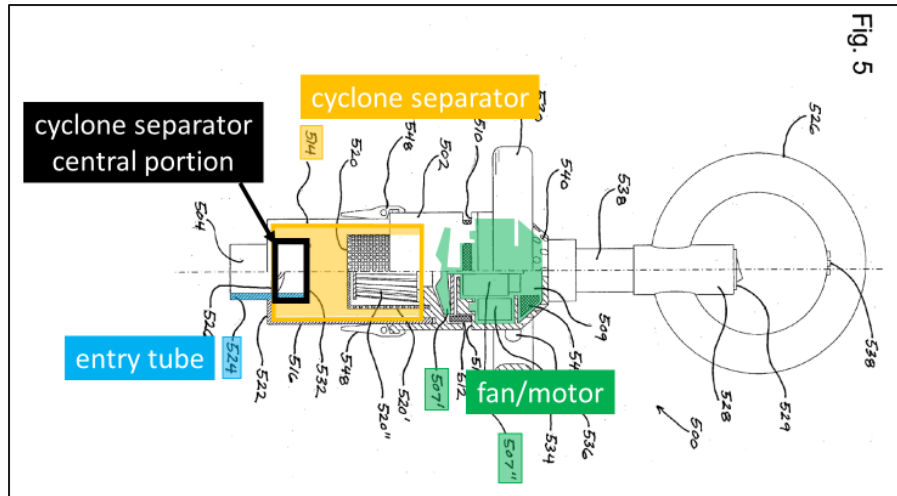
Id., 22:5-11, Fig. 5; Ex1002 ¶116. Butler’s “**entry tube**” includes an electrical connector provided on the front end of the cyclone separator to connect to “power leads” and power Butler’s powered attachment. Ex1005, 22:6-11; Ex1002 ¶117.

Butler teaches the electrical cables extend rearwardly from the electrical connector through a central portion of the cyclone unit toward the suction motor and fan assembly. Ex1002 ¶118. In Butler, “power leads” pass from the “powered attachment” “through the **dirt receptacle**” and toward the “**fan/motor 507**”:



Ex1005, 22:6-13, Fig. 5; Ex1002 ¶¶118–19; *see also* Ex1005, 9:18-21 (the fan/motor can provide power to the powered attachment). Butler’s “power leads” are electrical cables that extend rearwardly through a central portion of the cyclone separator because power leads that attach at the inlet end and extend “through the dirt receptacle” of the cyclone separator extend rearwardly through a central portion of the cyclone separator toward the fan/motor assembly, as shown above. Ex1002 ¶120. The claims do not limit “a central portion” to any particular orientation (e.g., central from left-to-right, or radially central), and one central portion of Butler’s cyclone unit (Butler’s “dirt receptacle”/“cyclone separator”) is the portion identified above. Ex1002 ¶121. Butler further teaches that its electrical cables extend rearwardly through “a central portion” that is radially central⁸:

⁸ The claims do not require that “a central portion” has any required depth; all that is required is that the electrical cables extend through any “portion” of the cyclone unit that is “central.”



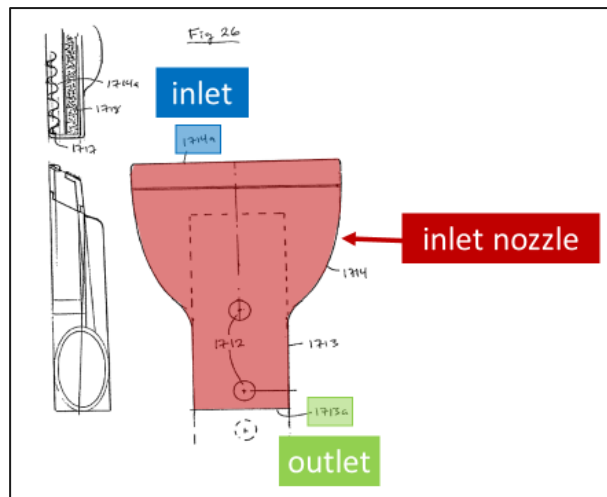
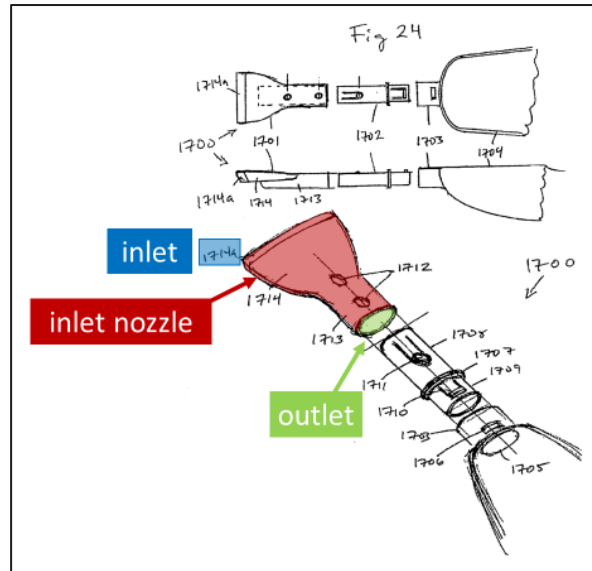
Ex1005, Fig. 5; Ex1002 ¶121. Butler’s “power leads” extend rearwardly from “entry tube 524,” which is in the radially central portion of Butler’s “cyclone separator,” shown above. Ex1002 ¶122.

Regarding Limitation [28a.3], a POSA would understand that Butler’s electrical connector is provided at a location adjacent the handvac air inlet, shown above. Ex1002 ¶123; *see also* Ex1005, 22:5-6, Fig. 5.

f. [1b]/[12b]/[20b]/[28b]

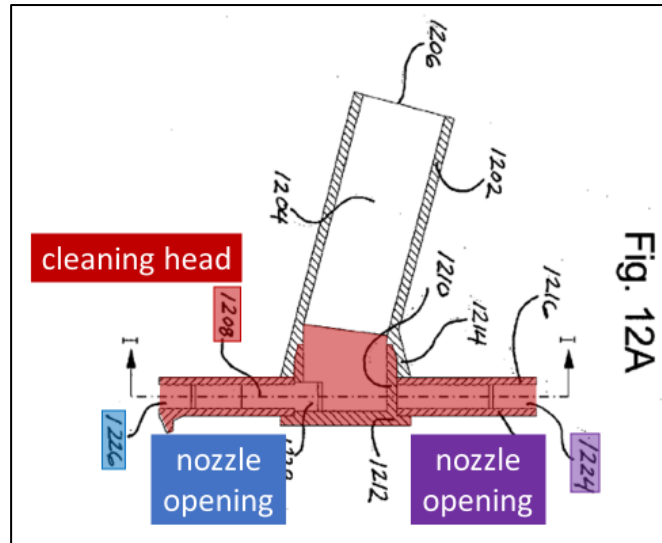
Butler teaches these limitations. Ex1002 ¶¶124–34.

Butler teaches a surface cleaning head having a front end and a rear end. Ex1002 ¶125. Butler teaches “inlet nozzle 1701” having “inlet 1714a” and “outlet 1713a”:



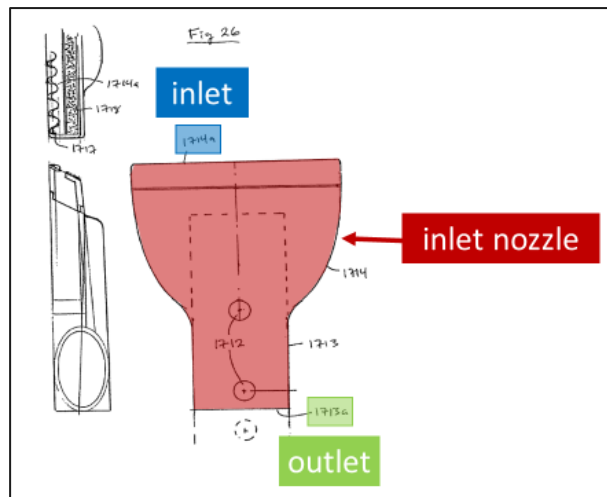
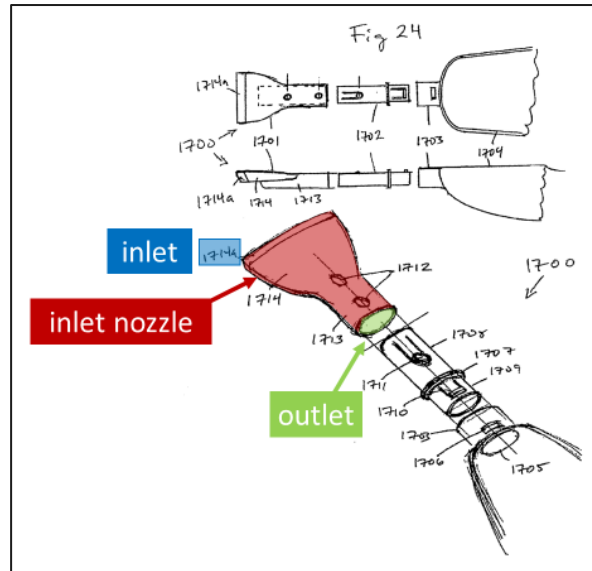
Ex1005, 42:6-9, Figs. 24, 26; Ex1002 ¶125. Butler’s “**inlet nozzle**” is a surface cleaning head, “**inlet**” is at a front end, and “**outlet**” is at a rear end. Ex1002 ¶126.

Further, Butler teaches “**cleaning head 1208**” with “**nozzle opening 1226**” and “**nozzle opening 1224**”:



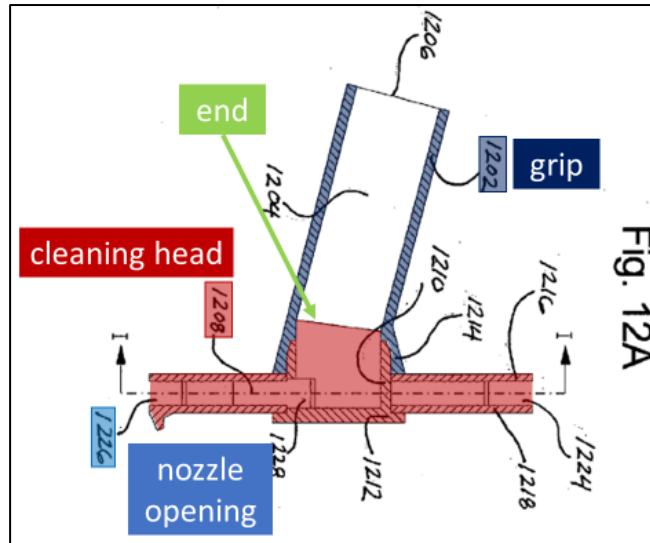
Ex1005, 31:24-27, Fig. 12A; Ex1002 ¶127. Butler’s “**cleaning head**” is also a surface cleaning head, “**nozzle opening**” is at a front end and “**nozzle opening**” is at a rear end. Ex1002 ¶¶128–30. Butler’s surface cleaning heads are interchangeable: “Any type of cleaning device may be attached,” including “powered attachment[s]” such as Butler’s “inlet nozzle 1100 compris[ing]” a “motor” that “drive[s] the brushroll.” Ex1005, 22:6-9; 30:7-13.

Butler teaches a surface cleaning head having a dirt air inlet and a cleaning head air outlet. Ex1002 ¶131. Butler teaches that air flows into “**inlet nozzle 1701**” at “**inlet 1714a**” and exits “outlet duct 1713” at “**outlet 1713a** for the **inlet nozzle 1701**”:



Ex1005, 42:6-9, Figs. 24, 26; Ex1002 ¶131. Butler’s “**inlet**” is a dirt air inlet and Butler’s “**outlet**” is a cleaning head air outlet. Ex1002 ¶132.

Further, Butler teaches that air flows into “**nozzle opening 1226**,” which “comprises an air passage” and is “placed in communication with the vacuum passage 1204” and the “**grip 1202**,” and air exits the “**cleaning head 1208**” at an “**end** to a cleaning head 1208” that is “attach[ed]” to “grip 1202”:

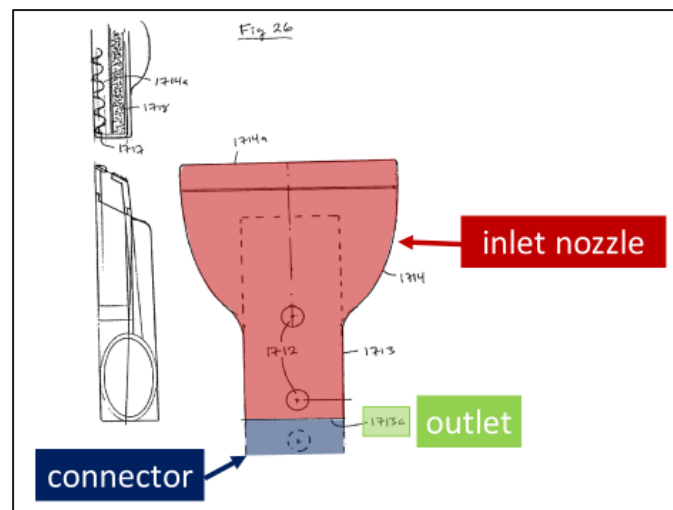
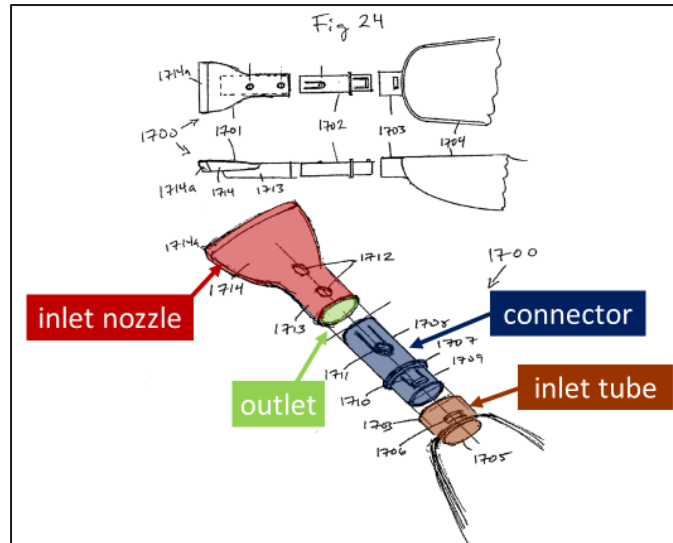


Ex1005, 31:6-27, Fig. 12A; Ex1002 ¶133. Butler’s “**nozzle opening**” is also a dirt air inlet and Butler’s “**end**” is also a cleaning head air outlet. Ex1002 ¶134.

g. [1c]/[20c]

Butler teaches these limitations. Ex1002 ¶¶135–43.

Butler teaches a rigid airflow conduit extendable between the cleaning head air outlet and the handvac air inlet. Ex1002 ¶136. In Butler, “**nozzle connector 1702**” extends between “the **outlet 1713a** for the **inlet nozzle 1701**” and “**inlet tube 1703** located on the housing”:



Ex1005, 41:8-11, 42:7-8, Figs. 24, 26; Ex1002 ¶¶136–37.

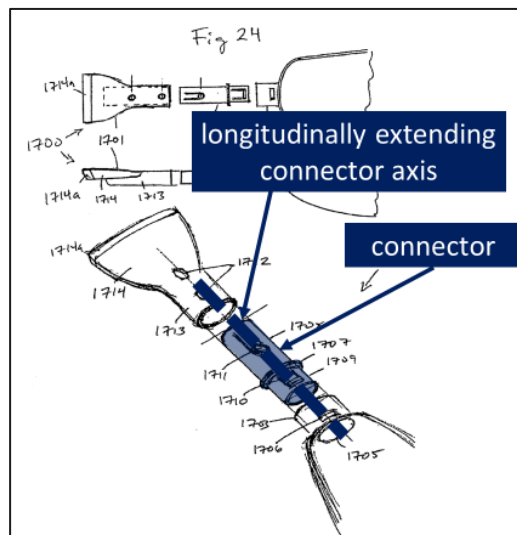
Butler’s “**inlet tube**” is “integrally formed with the housing 1704 and provides fluid communication between the vacuum dust receptacle (not shown) and the rest of the nozzle assembly 1700.” Ex1005, 41:15-18.

Butler’s “**connector 1702** is a hollow tube” “divided into two portions by a collar 1707:” an upstream “inlet portion 1708,” which is “telescopically received

within the **nozzle 1701**,” and a downstream “outlet portion 1709,” which is “telescopically received within or around the **inlet tube 1703**.” *Id.*, 41:19-29.

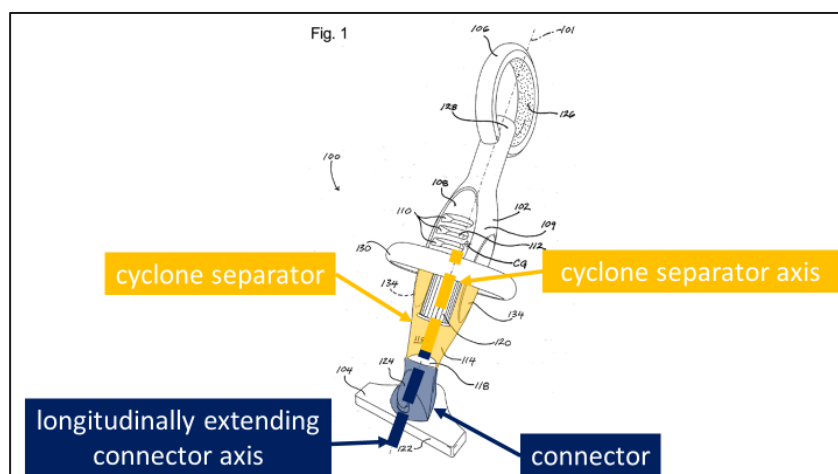
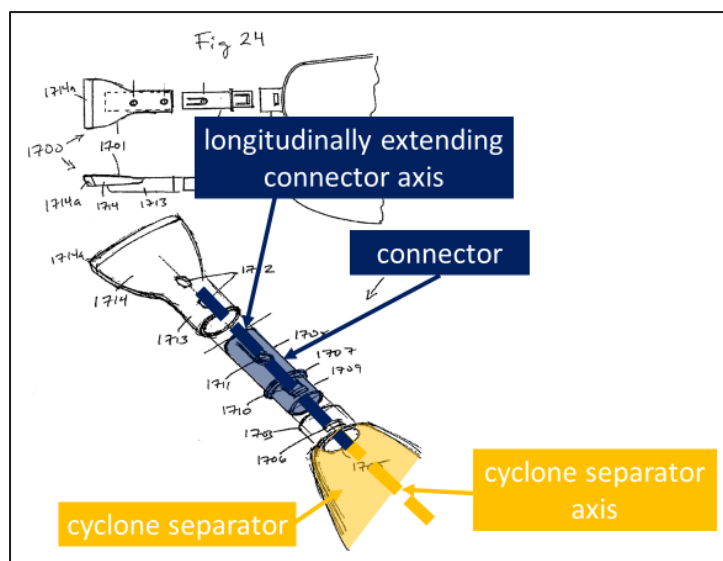
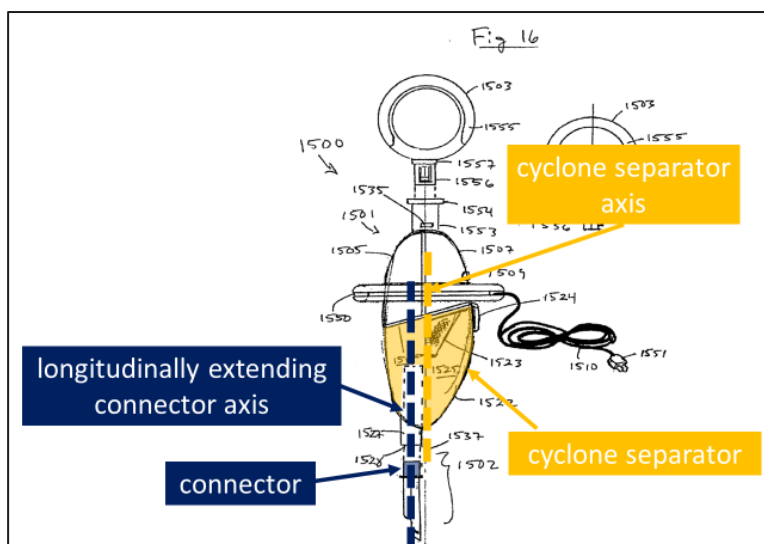
Butler’s “connector” is a rigid airflow conduit; “inlet nozzle” is a surface cleaning head; “outlet” is a cleaning head air outlet; “inlet tube” is a handvac air inlet; and Butler teaches a rigid airflow conduit extendable between the cleaning head air outlet and the handvac air inlet. Ex1002 ¶¶138–39.

Further, Butler's **connector** has a **longitudinally extending connector axis**, which is a longitudinally extending conduit axis:



Ex1005, Fig. 24; Ex1002 ¶¶140–41.

Butler's **connector's axis** is parallel to the **cyclone separator's axis of rotation** when the **connector** extends between the “outlet” and the “inlet tube”:



Ex1005, Figs. 16, 24, 1; Ex1002 ¶142.

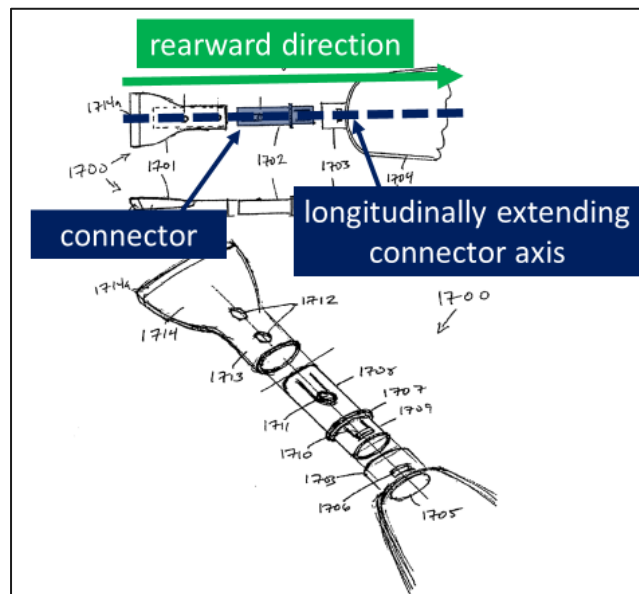
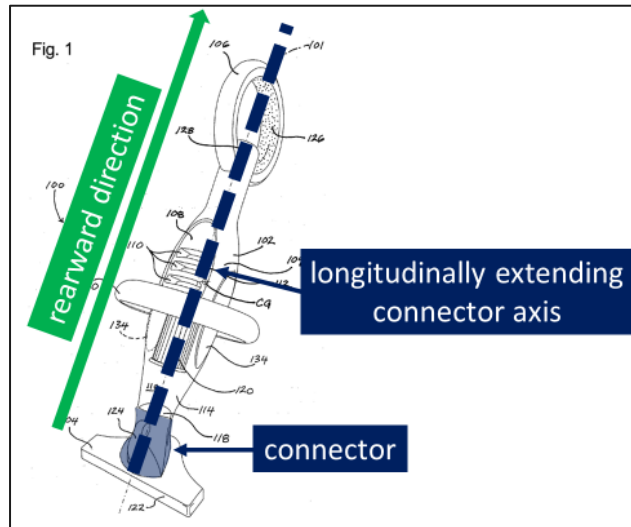
Butler's Fig. 16 depicts a parallel and offset longitudinally extending connector axis and cyclone separator axis. Ex1002 ¶143. To the extent Butler's longitudinally extending connector axis and cyclone separator axis are depicted as co-axial in Figs. 24 and 1, a POSA would understand that these axes are parallel because they extend in the same direction and maintain the same (zero) distance between them. Ex1002 ¶143. PO contends co-axial axes meet this limitation in PO's infringement contentions. Ex1013 (Ex A-2), 15-17. Further, Claim 11, which depends from Claim 9, requires a "hand vacuum cleaner inlet passage [that] is *coaxial* with the longitudinally extending conduit axis," while Claim 9 requires "a hand vacuum cleaner inlet passage that is *generally parallel* to the longitudinally extending conduit axis." *Compare* Ex1001, Claim 11 *with id.*, Claim 9. Claim 11's dependency on Claim 9 further indicates that "generally parallel" includes "co-axial."

h. [12c]

Butler teaches this limitation. Ex1002 ¶¶144–48.

Butler teaches a rigid airflow conduit extendable between the cleaning head air outlet and the handvac air inlet, the rigid airflow conduit having a longitudinally extending conduit axis. Ground 1, Limitation [1c]; Ex1002 ¶145.

Butler's **longitudinally extending conduit axis** (Butler's “**connector**”'s axis) is parallel to the **rearward direction** when oriented as claimed:



Ex1005, Figs. 1, 24; Ex1002 ¶146. Butler's “**connector**”'s “outlet portion 1709” is the downstream end. Ex1002 ¶147.

Further, when Butler's handvac is mounted to a downstream end of the rigid airflow conduit, the handle is a driving handle for the surface cleaning apparatus

for the reasons explained for Limitation [1d]. Ground 1, Limitation [1d]; Ex1002 ¶148.

i. [28c]

Butler teaches this limitation. Ex1002 ¶¶149–51.

Butler teaches a rigid airflow conduit extendable between the cleaning head air outlet and the handvac air inlet, the rigid airflow conduit having a longitudinally extending conduit axis, and when the rigid airflow conduit is extending between the cleaning head air outlet and the handvac air inlet the conduit axis is parallel to the cyclone axis of rotation. Ground 1, Limitation [1c]; Ex1002 ¶¶149–50.

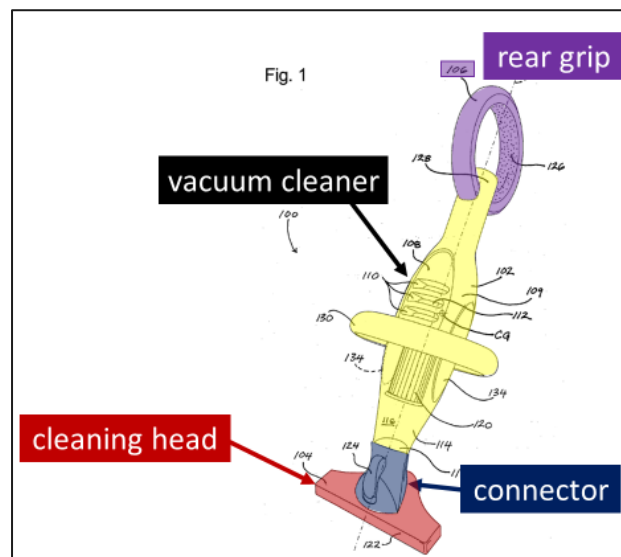
As discussed and illustrated in Limitation [1a.3], Butler teaches a rigid airflow conduit electrical connector that is aligned with and connected to the cyclone unit electrical connector when the handvac is mounted to the rigid airflow conduit. Ground 1, Limitation [1a.3]; Ex1002 ¶151. A POSA would understand that Butler’s cleaner includes a rigid airflow conduit electrical connector to provide power to a powered surface cleaning head, and that the rigid airflow conduit electrical connector would be aligned with and connected to the cyclone unit electrical connector to provide such power. *Id.*; Ex1002 ¶151.

j. [1d]/[20d]/[28d]

Butler teaches these limitations. Ex1002 ¶¶152–58.

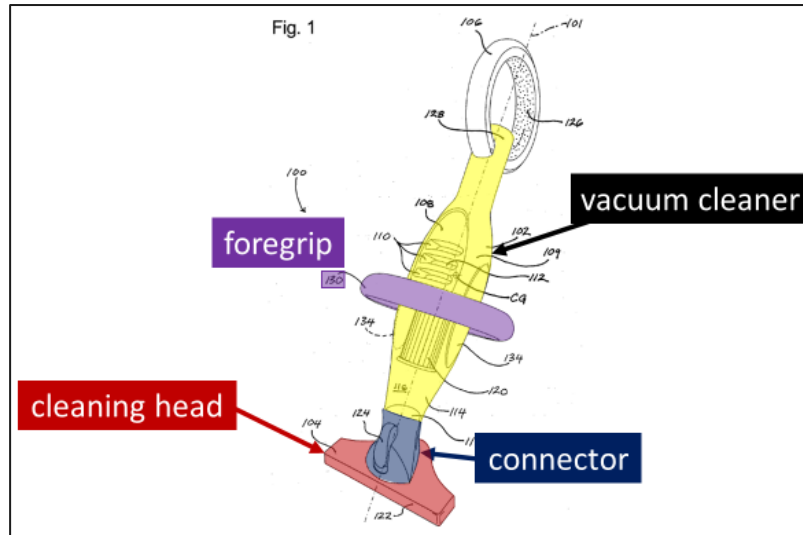
Butler's handvac is removably mountable to a downstream end of the rigid airflow conduit, and the rigid airflow conduit extends between the surface cleaning head and the handvac. Ground 1, Limitation [1c]; Ex1002 ¶155.

When Butler's handvac is so mounted, the handle is a driving handle for the surface cleaning apparatus. Ex1002 ¶¶156–57. Butler's “**rear grip 106**” “is used to support and maneuver the back of the vacuum cleaner 100” during use:



Ex1005, 10:17-19, Fig. 1; Ex1002 ¶156. Butler's “rear grip” is a driving handle because the user uses the handle to drive the cleaner. Ex1002 ¶157.

Further, Butler's “foregrip 530,” which “provides improved flexibility in handling the device,” is also a driving handle:



Ex1005, 12:3-10, Fig. 1; Ex1002 ¶158.

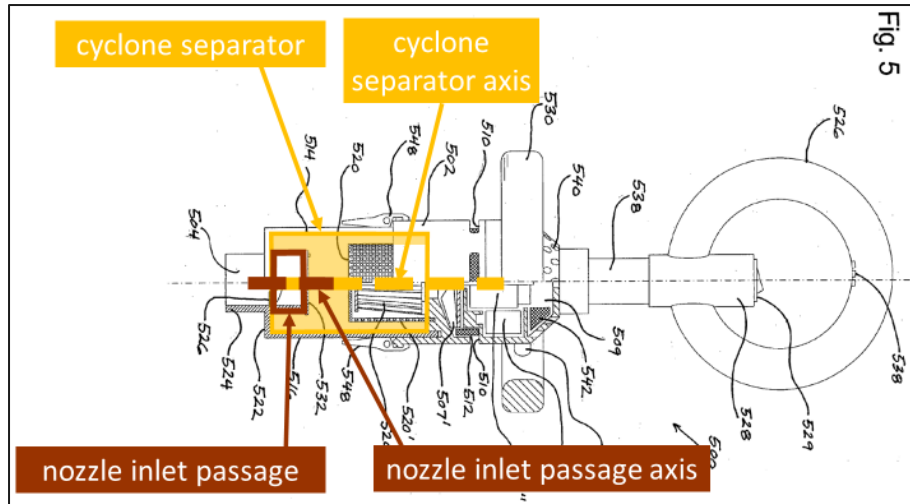
k. [20e]

Butler teaches this limitation. Ex1002 ¶¶159–67.

When Butler's rigid airflow conduit extends between the cleaning head air outlet and the handvac air inlet, the handvac air inlet comprises a handvac inlet passage that is generally coaxial with the longitudinally extending conduit axis.

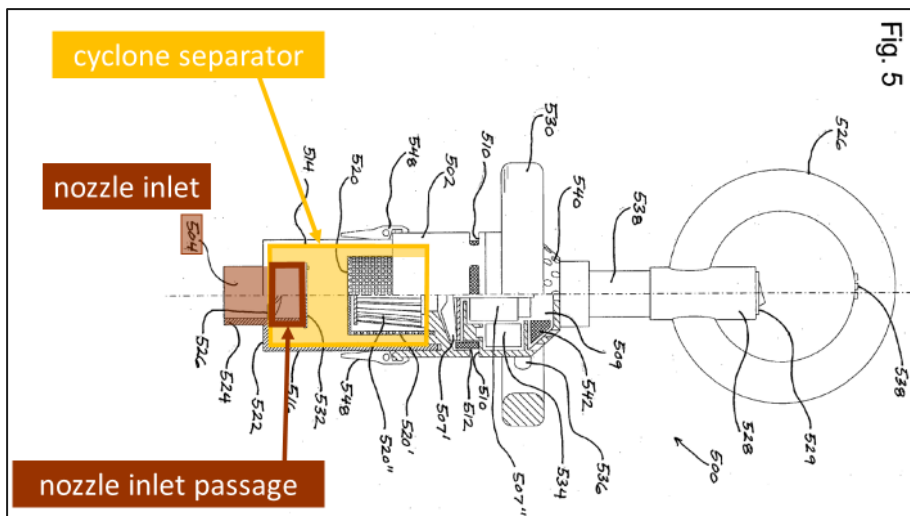
Ground 1, Limitation [1c], Claim 9.

Butler's handvac inlet passage is also generally coaxial with the cyclone axis of rotation. Ex1002 ¶¶160–62. Butler's **nozzle inlet passage** is generally coaxial with the **cyclone separator axis** of rotation:



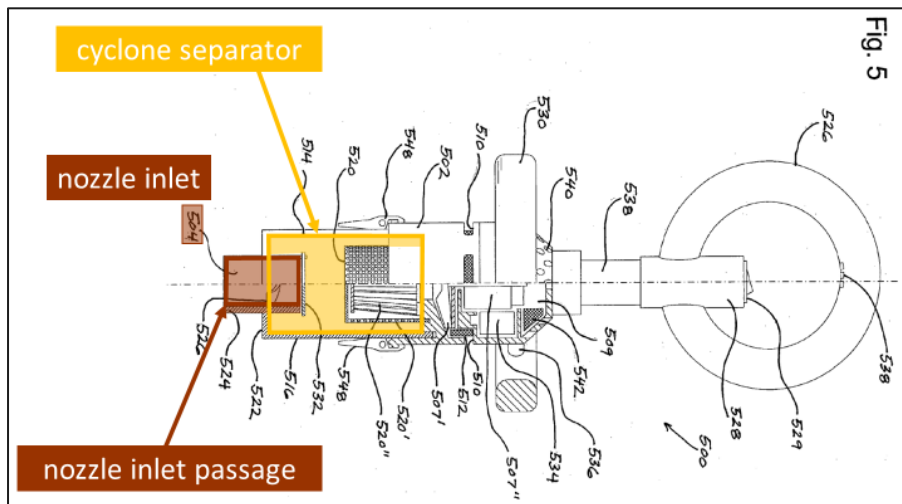
Ex1005, Fig. 5; Ex1002 ¶161. This limitation is also met when Butler’s inlet passage extends the length of Butler’s “**nozzle inlet 504**.” Ex1002 ¶162.

Butler’s handvac air inlet passage is positioned inside the cyclone unit. Ex1002 ¶163. Butler’s “**nozzle inlet 504** ... comprises an entry tube 524 that passes *through* the dirt receptacle bottom wall 522” and into the **cyclone separator**:



Ex1005, 22:5-6, Fig. 5; Ex1002 ¶163. Butler's nozzle inlet passage is positioned inside the cyclone separator as depicted above. Ex1002 ¶163.

Further, the claimed "inlet passage" is also met by Butler's air passage extending the entire length of "**nozzle inlet 504**," which "comprises an **entry tube 524** that passes through the dirt receptacle bottom wall 522":



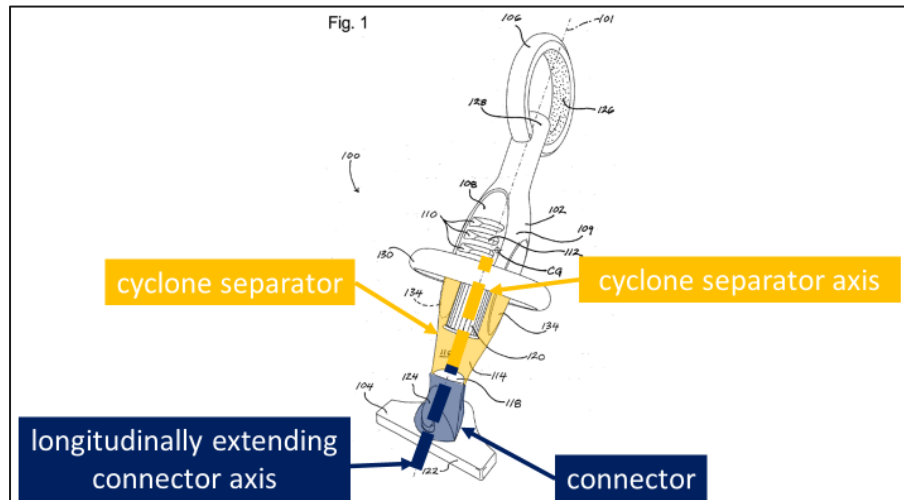
Ex1005, 22:5-6, Figs. 16, 5; Ex1002 ¶165. As depicted above, Butler's "**nozzle inlet**" is positioned inside Butler's **cyclone separator**. Ex1005, Fig. 5; Ex1002 ¶166.

For the reasons stated for Limitation [1a.3], Butler teaches the electrical cables extend rearwardly from the electrical connector through the cyclone unit adjacent the handvac inlet passage towards the suction motor fan and assembly. Ground 1, Limitation [1a.3]; Ex1002 ¶167.

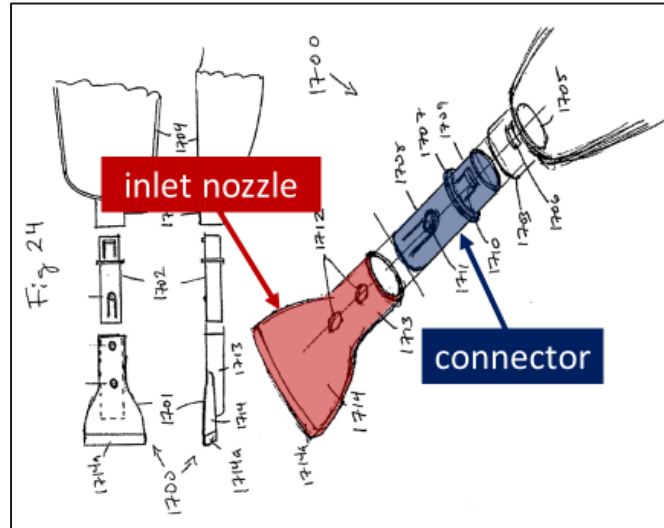
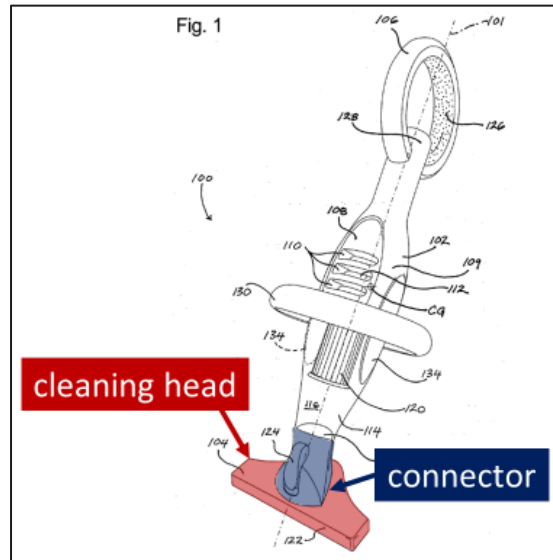
2. [2]

Butler anticipates claim 2. Ex1002 ¶168–71.

Butler's cyclone axis of rotation is rearward of the longitudinally extending conduit axis when the handvac is mounted to the rigid airflow conduit. Ex1002 ¶170. Butler's **cyclone separator axis** is rearward of the **longitudinally extending connector axis** when the handvac is mounted to the **connector 1702**:



Butler's rigid airflow conduit extends generally vertically upwardly from the surface cleaning head. Ex1002 ¶171. Butler's **connector** extends generally vertically upwardly from the **cleaning head 1208** and from **inlet nozzle 1701**:

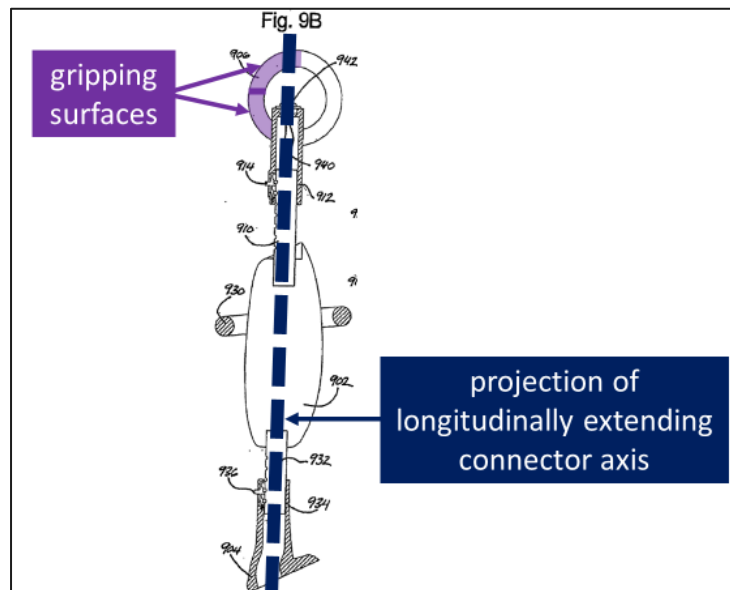
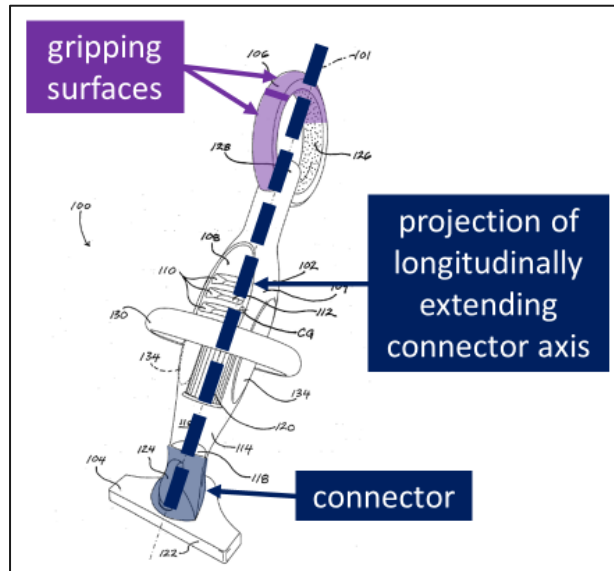


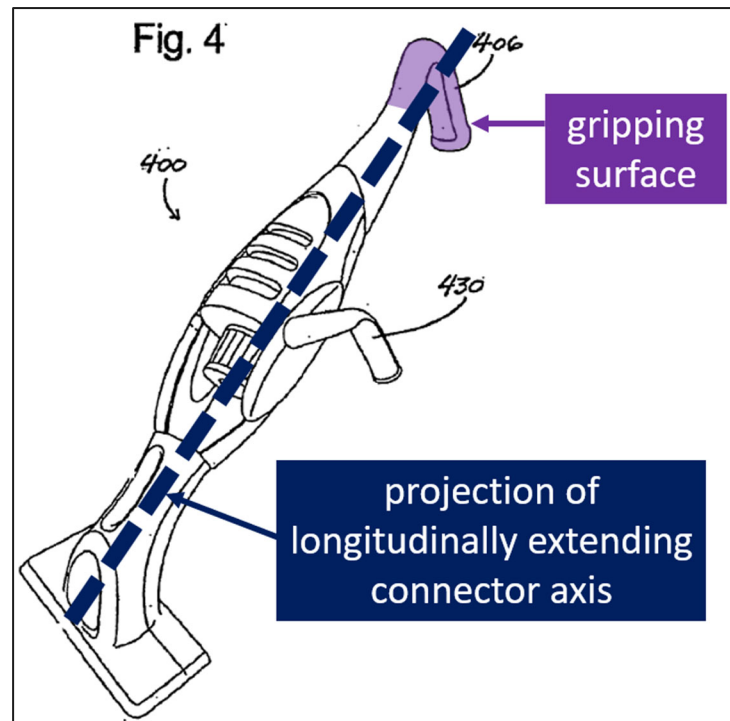
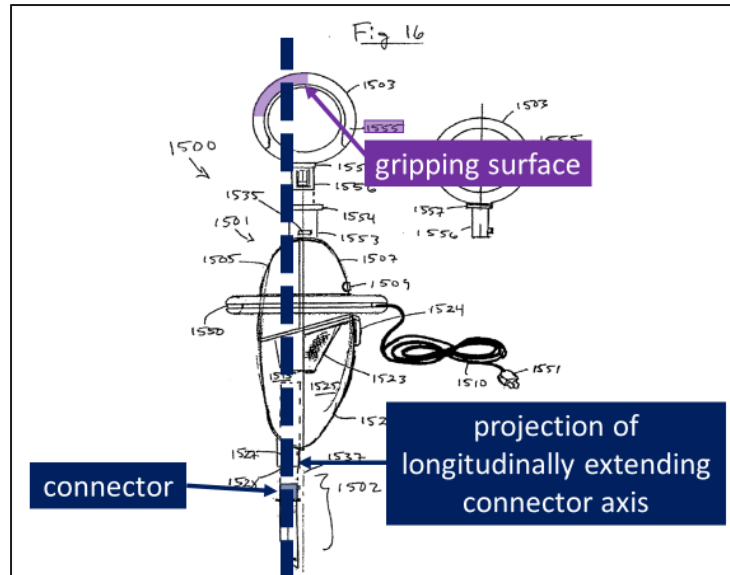
Ex1005, Figs. 1, 24; Ex1002 ¶171; *see also* Ground 1, Limitations [1c]/[1d].

3. [3]/[5]/[15]

Butler anticipates claims 3/5/15. Ex1002 ¶¶172–77.

Butler's **projection of the longitudinally extending connector axis** intersects the **gripping surface** when the handvac is mounted to the **connector**:





Ex1005, Figs. 1, 4, 9b, 16; Ex1002 ¶176; *see also* Ground 1, Limitation [1a.1]. As depicted above, this is true for each Butler rear grip identified for Claims 1, 2, and 14. Butler’s “gripping surfaces” can be applied to any portion of Butler’s rear grip, including portions that extend upwardly and forwardly. Ground 1, Limitation

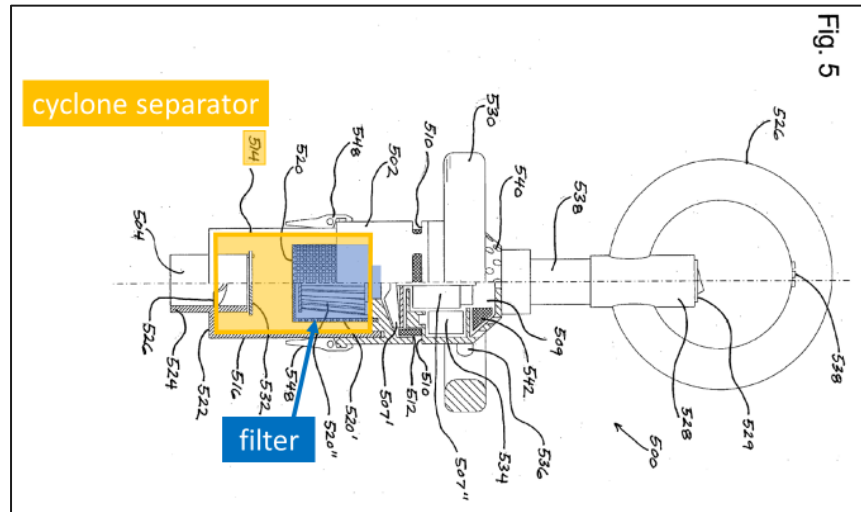
Butler's **fan/motor axis** is generally parallel to the **longitudinally extending connector axis**:

Ex1005, Fig. 16; Ex1002 ¶183; *see also* Ground 1, Limitations [1a.1]/[12a.1].

Butler anticipates claim 7. Ex1002 ¶¶184–91.

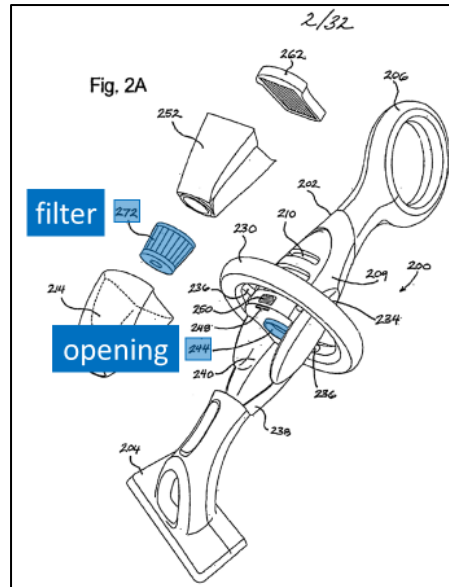
Butler teaches a cyclone unit with a cyclone axis of rotation. Ground 1, Limitation [1a.2].

Butler's cyclone unit has an outlet conduit. Ex1002 ¶¶186–87. In use, air flows into “dirt receptacle 514” comprising a “cyclone separator,” and exits through “filter 520 compris[ing] ... fine filter 520”:



Ex1005, 21:24-28, claim 11, Fig. 5; Ex1002 ¶187.

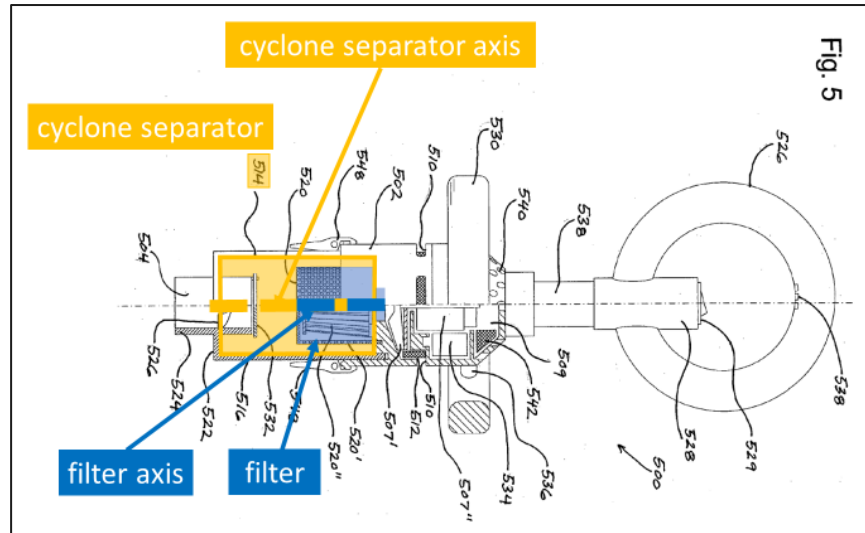
Butler further teaches “frusto-conical filter 272 ... located over the fan/motor inlet opening 244” that “prevent[s] dirt and debris that is not separated by cyclonic action from entering the fan/motor 207”:



Ex1005, 18:10-12, Fig. 2A; Ex1002 ¶188.

Butler’s “**filter 520**,” “**filter 272**,” and “**opening 244**” are, individually and collectively, outlet conduits because air passes through them as it exits Butler’s “cyclone separator.” Ex1002 ¶189.

Butler teaches the outlet conduit extends in a direction that is generally parallel to the cyclone axis of rotation. Ex1002 ¶190. Butler’s “**filter 520**” extends in a direction that is generally parallel to the **cyclone separator axis**:



Ex1005, Fig. 5; Ex1002 ¶¶190–91.

6. [8]

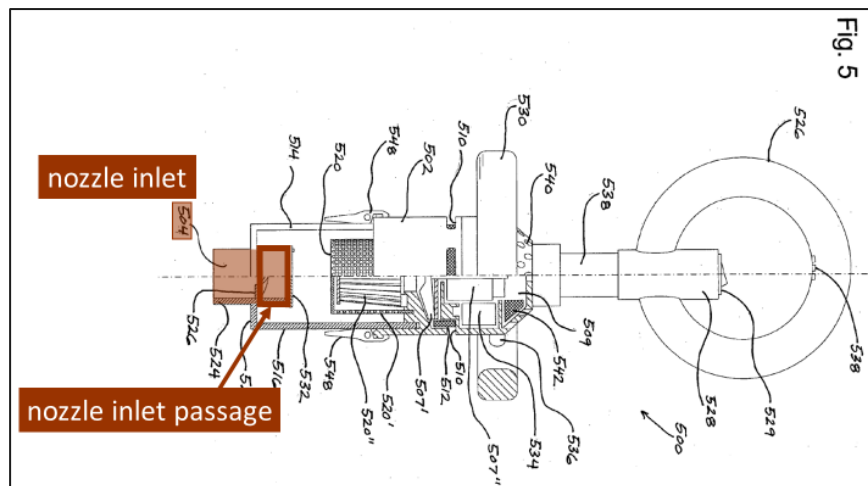
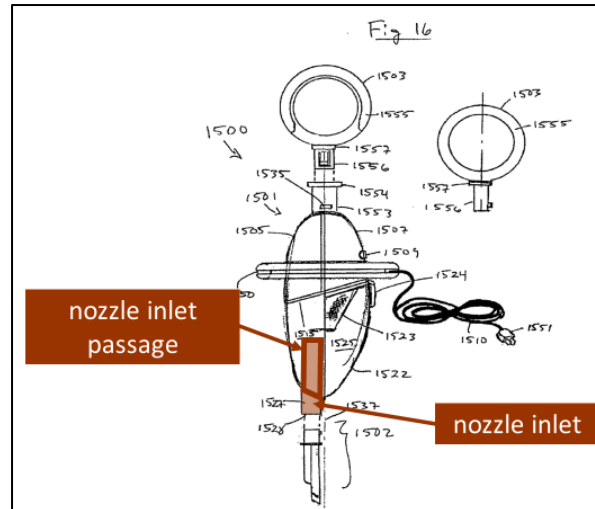
Butler anticipates claim 8. Ex1002 ¶¶192–94.

For the reasons explained for Limitation [1d], Butler’s rigid airflow conduit is removably attachable to the handvac air inlet. Ground 1, Limitation [1d]; Ex1002 ¶194.

7. [9]/[11]/[18]/[19]

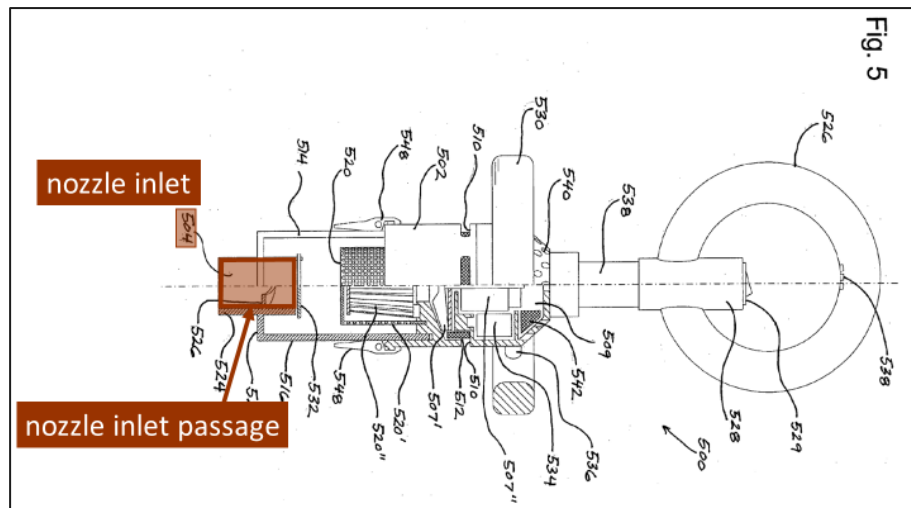
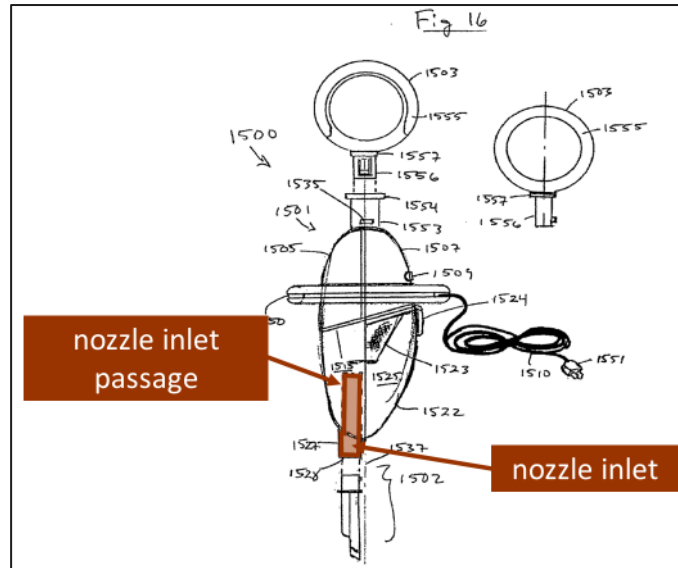
Butler anticipates claims 9/11/18/19. Ex1002 ¶¶195–211.

Butler teaches a handvac air inlet comprising a handvac inlet passage. Ex1002 ¶193. Butler’s “**nozzle inlet 504**” comprises a **nozzle inlet passage**:



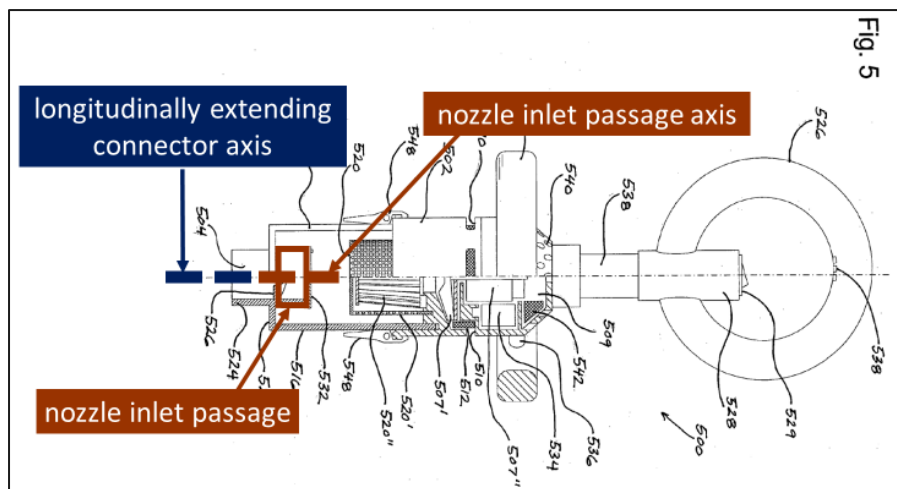
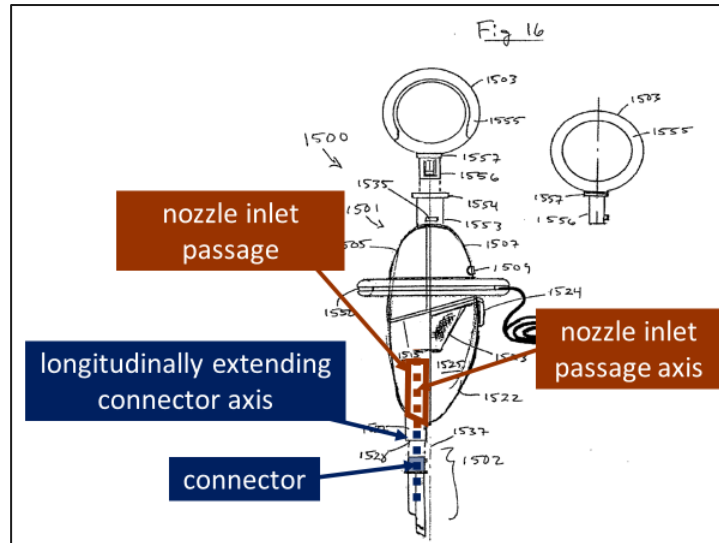
Ex1005, Figs. 16, 5; Ex1002 ¶200.

Alternatively, Butler's handvac inlet passage is the air passage that extends the entire length of “**nozzle inlet 504**,” which “comprises an **entry tube 524** that passes through the dirt receptacle bottom wall 522”:



Ex1005, 22:5-6, Figs. 16, 5; Ex1002 ¶201.

Butler teaches that the handvac inlet passage is generally parallel to the longitudinally extending conduit axis. Ex1002 ¶202. Butler's **nozzle inlet passage** is generally parallel to the **longitudinally extending connector axis**:

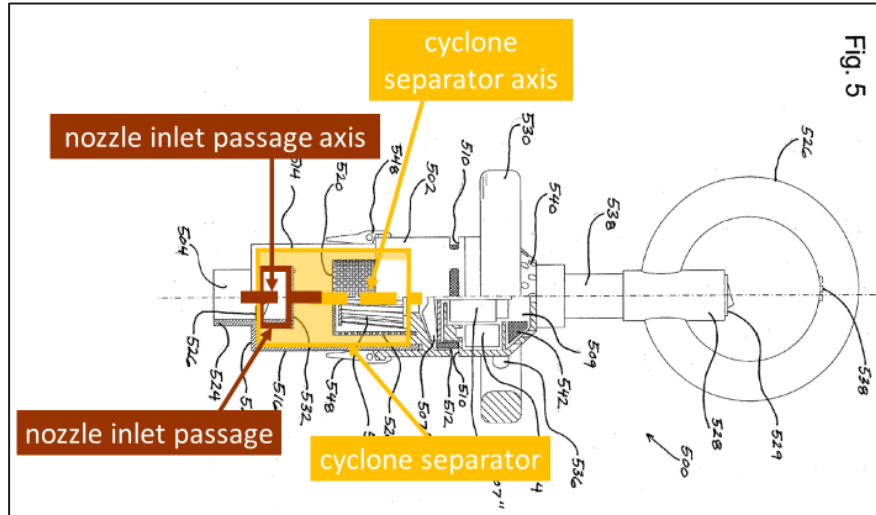
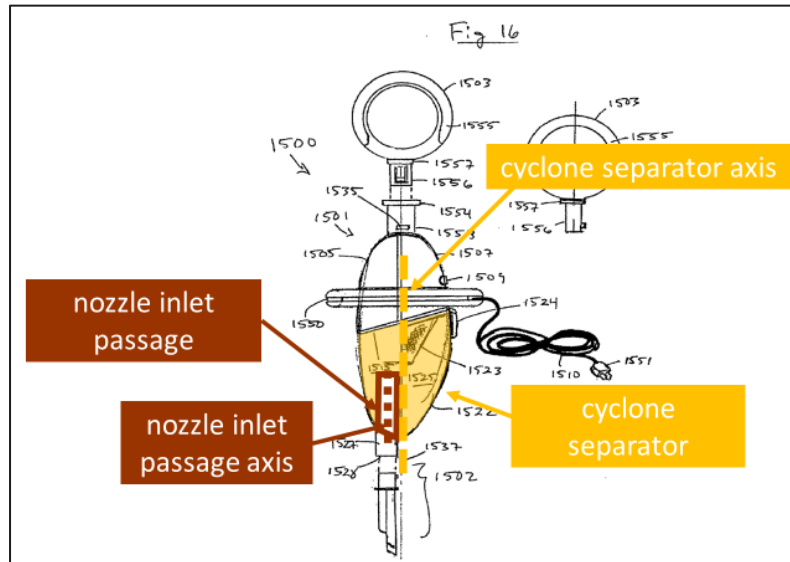


Ex1005, Figs. 16, 5; Ex1002 ¶¶202–03.

Regarding Claims 11/19, Butler’s handvac inlet passage is coaxial with the longitudinally extending conduit axis, as shown above. Ex1002 ¶204.

Regarding Claim 18, Butler’s handvac inlet passage is generally parallel to the longitudinally extending conduit axis when the rigid airflow conduit is attached to the handvac air inlet, as shown above. Ex1002 ¶205; *see also* Ground 1, Limitation [1c].

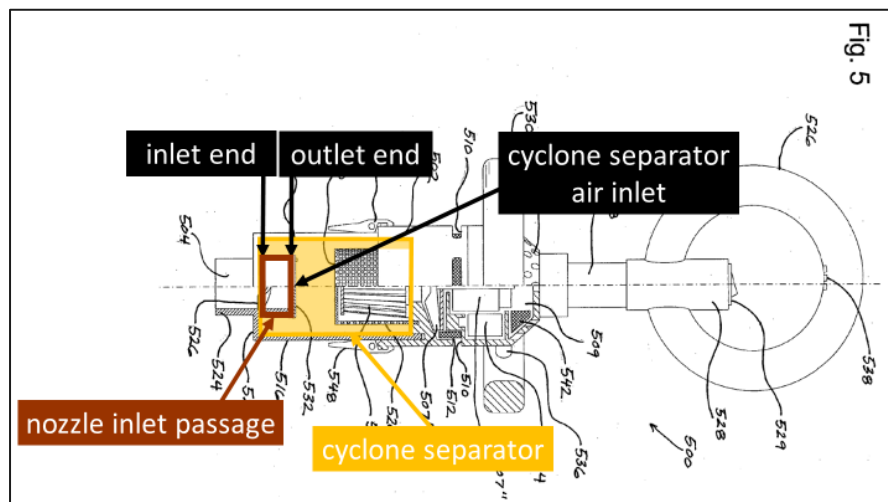
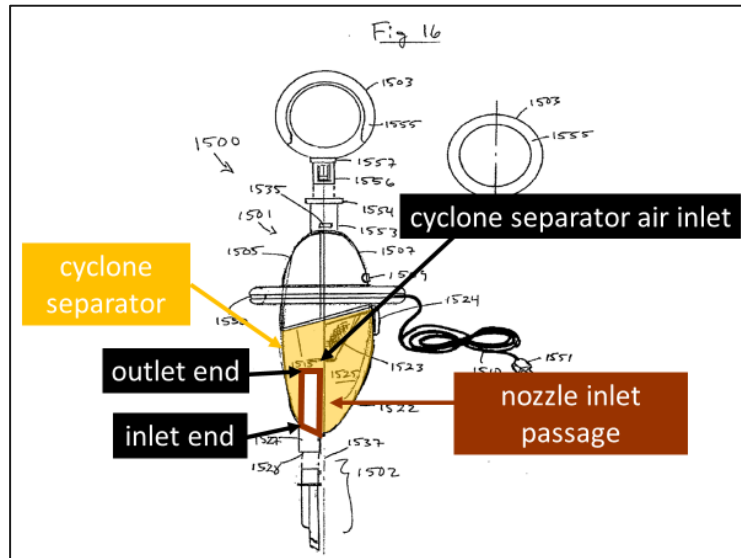
Butler teaches that the handvac inlet passage is generally parallel to the cyclone axis of rotation. Ex1002 ¶206. Butler's **nozzle inlet passage** is generally parallel the **cyclone separator axis**:



Ex1005, Figs. 16, 5; Ex1002 ¶¶206–07.

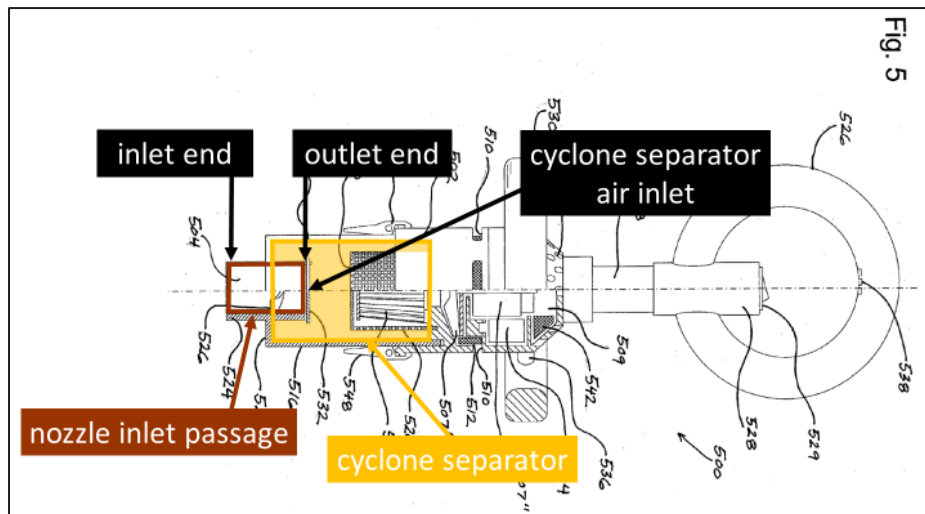
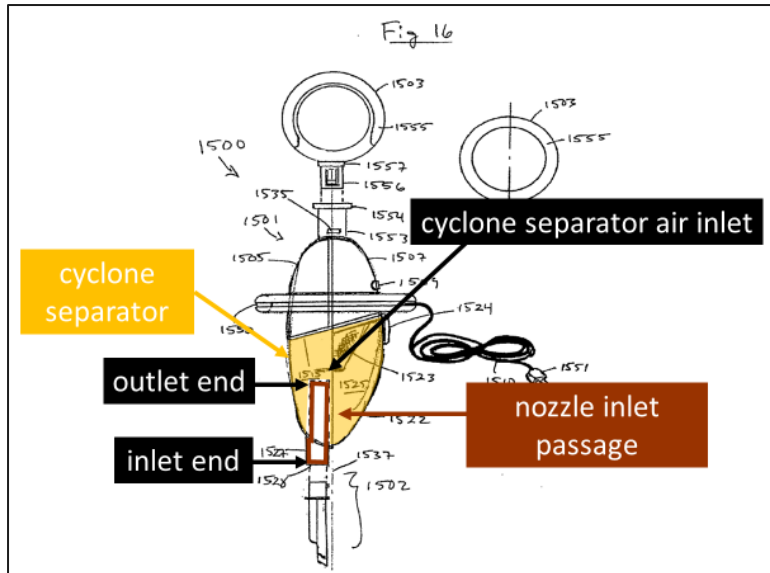
Butler teaches a handvac inlet passage having an inlet end and an outlet end, the outlet end communicating with a cyclone chamber air inlet. Ex1002 ¶208.

Butler's **nozzle inlet passage** has an inlet end and an outlet end, the outlet end communicating with a **cyclone separator air inlet**:



Ex1005, Figs. 16, 5; Ex1002 ¶208.

Further, the claimed “inlet passage” is also met by Butler’s handvac inlet passage extending the entire length of “**nozzle inlet 504**,” which has an inlet end and outlet end as identified below, and where the outlet end communicates with a cyclone chamber air inlet:



Ex1005, Figs. 16, 5; Ex1002 ¶¶209–11.

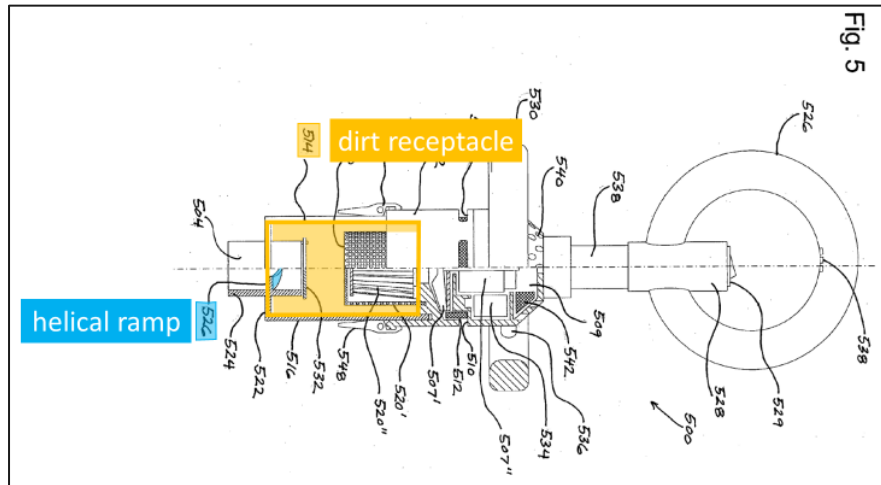
Butler’s electrical cables extend rearwardly adjacent the handvac inlet passage. Ground 1, Limitations [1a.3]/[20e]/[28a.3].

8. [10]

Butler anticipates claim 10. Ex1002 ¶¶212–17.

Butler teaches a handvac air inlet passage with an outlet end and a cyclone chamber air inlet. Ground 1, Claim 9.

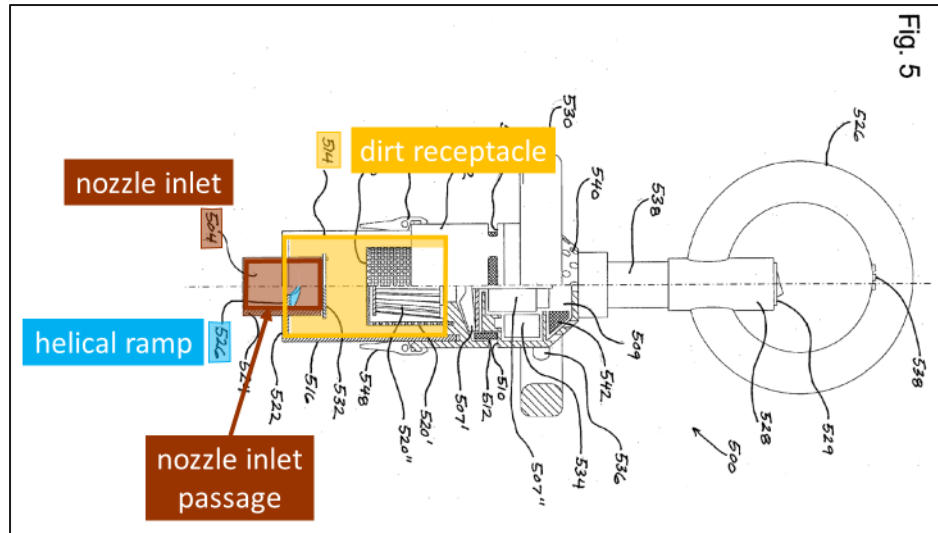
Butler teaches a tangential air inlet: “**helical ramp 526**,” which “block[s] any direct flow of air through the entry tube 524” and “establish[es] a cyclonic airflow pattern within the **dirt receptacle 514**”:



Ex1005, 22:5-22, Fig. 5; Ex1002 ¶215.

Butler teaches the cyclone chamber air inlet comprises a tangential air inlet provided at the outlet end of the handvac inlet passage. Ex1002 ¶216. Butler’s “helical ramp” creates tangential airflow, including tangential airflow at the outlet end of the nozzle inlet passage; that is where air enters Butler’s cyclone separator. Ex1005, 22:5-22, Fig. 5; Ex1002 ¶216. Thus, Butler teaches a tangential air inlet at the outlet end of the handvac inlet passage.

This limitation is also met when Butler’s handvac inlet passage spans the entire length of “**nozzle inlet 504**”; Butler’s “**helical ramp**” likewise creates tangential airflow at the outlet end of the **nozzle inlet passage**:



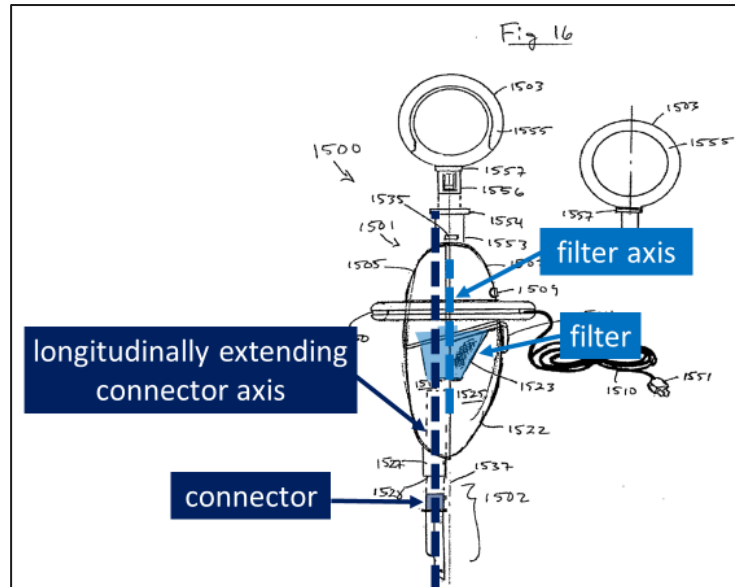
Ex1005, Fig. 5; Ex1002 ¶217.

9. [13]

Butler anticipates claim 13. Ex1002 ¶¶218–21.

Butler's cyclone unit air outlet comprises an outlet conduit. Ground 1,
Claim 7.

Butler’s outlet conduit has an outlet conduit axis that is generally parallel to the longitudinally extending conduit axis. Ex1002 ¶¶220–21. Butler’s “**filter 520**” has a **filter axis** that is generally parallel to the **longitudinally extending connector axis**:

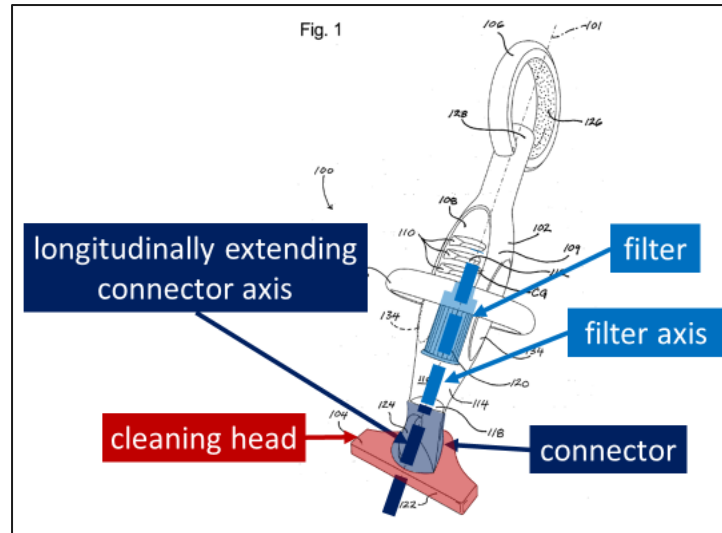


Ex1005, Fig. 5; Ex1002 ¶221.

10. [14]

Butler anticipates claim 14. Ex1002 ¶¶222–24.

Butler's outlet conduit axis is rearward of the longitudinally extending conduit axis when the handvac is mounted to the rigid airflow conduit and the rigid airflow conduit extends generally vertically upwardly from the surface cleaning head. Ex1002 ¶224. Butler's **filter axis** is rearward of the **longitudinally extending connector axis** when the cleaner is mounted to **connector 1702** and **connector 1702** extends generally vertically upwardly from **cleaning head 1208** or **inlet nozzle 1701**:

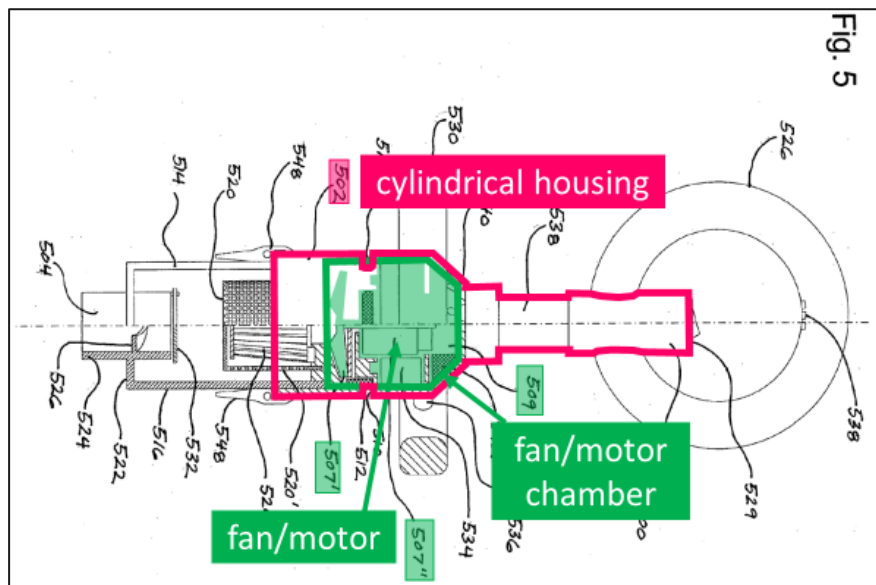


Ex1005, Fig. 1; *see also id.*, Figs. 15, 24; Ex1002 ¶224.

11. [21]

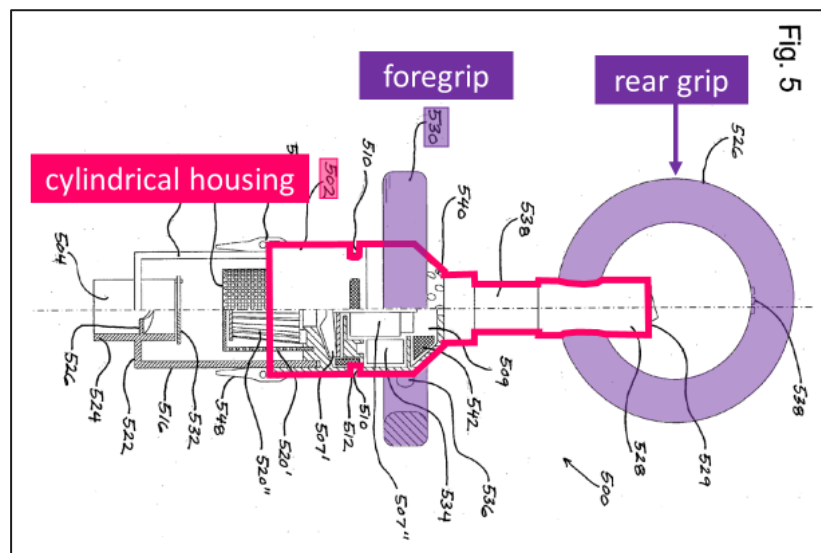
Butler anticipates claim 21. Ex1002 ¶¶225–31.

Butler teaches the handvac body comprises a suction motor and fan assembly housing. Ex1002 ¶227. 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; Ex1002 ¶¶227. A POSA would understand that Butler's "cylindrical housing 502" is a suction motor and fan assembly housing because it houses "fan/motor 507." Ex1002 ¶228.

Butler's handle extends from a sidewall of the suction motor and fan assembly housing. Ex1002 ¶229. Butler's "**cylindrical housing 502** [has] a circular or looped **rear grip 506**, and a circular or looped **foregrip 530**":



Ex1005, 20:4-6, Fig. 5; Ex1002 ¶¶229–30. The "rear grip" extends from a sidewall of "the portion of the housing 502 between the fan/motor chamber 509 and the rear grip 506" (i.e., the "protrusion 528"), and the "foregrip 530 is attached to the housing 502 by a number of radially-extending posts 536." *Id.*, 20:7-11, 20:28-30.

Butler's "cylindrical housing" is a sidewall of the suction motor and fan assembly housing, and Butler's "foregrip" and "rear grip" are each handles that

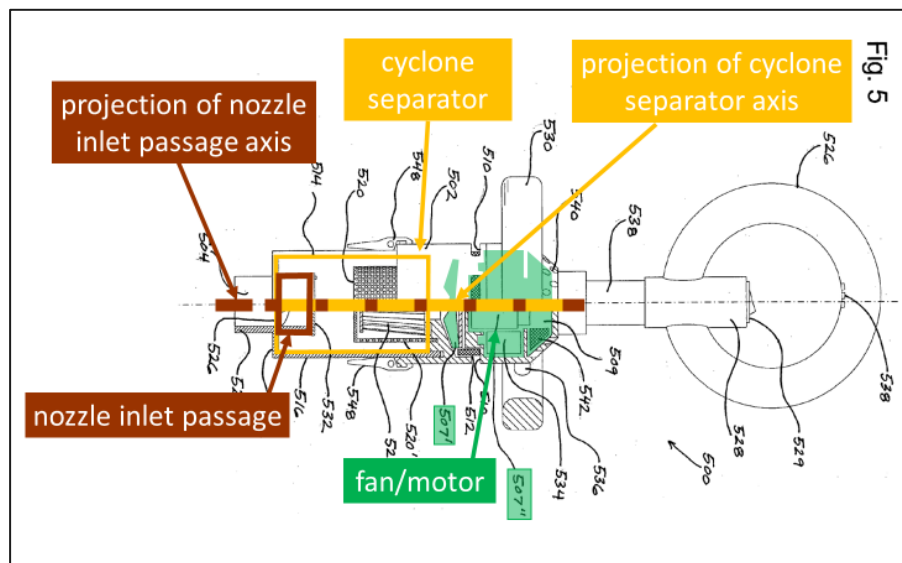
extend from a sidewall of the suction motor and fan assembly housing. Ex1002 ¶231; Ground 1, Limitation [20a.1].

12. [22]

Butler anticipates claim 22. Ex1002 ¶¶232–36.

Butler’s handvac inlet passage has an inlet axis. Ground 1, Claim 9.

In Butler, a projection of each of the inlet axis and the cyclone axis each intersect the suction motor. Ex1002 ¶¶234–35. A projection of each of Butler’s **nozzle inlet passage axis** and **cyclone separator axis** each intersect **fan/motor** 507:



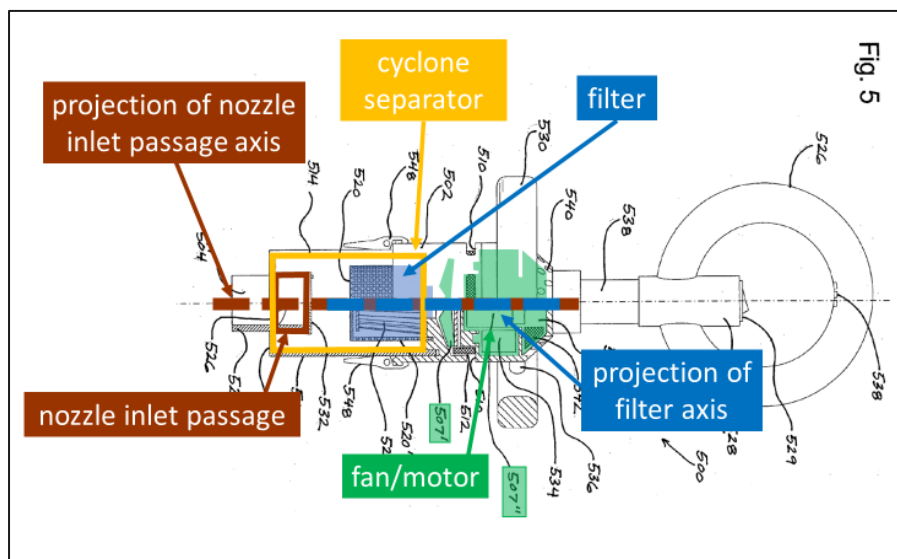
Ex1005, Fig. 5; Ex1002 ¶235. This limitation is also met when Butler’s inlet passage extends the length of Butler’s “**nozzle inlet.**” Ex1002 ¶236.

13. [23]

Butler anticipates claim 23. Ex1002 ¶¶237–41.

Butler's handvac air inlet comprises a handvac inlet passage that has an inlet axis, and when the rigid airflow conduit extends between the cleaning head air outlet and the handvac air inlet, the inlet axis is generally parallel to the longitudinally extending conduit axis. Ground 1, Limitation [1c], Claim 9.

In Butler, a projection of each of the inlet axis and an outlet conduit axis of the air treatment member intersects the suction motor. Ex1002 ¶¶239–40. A projection of each of Butler's **nozzle inlet passage axis** and **filter axis** of the **cyclone separator** intersects **fan/motor 507**:



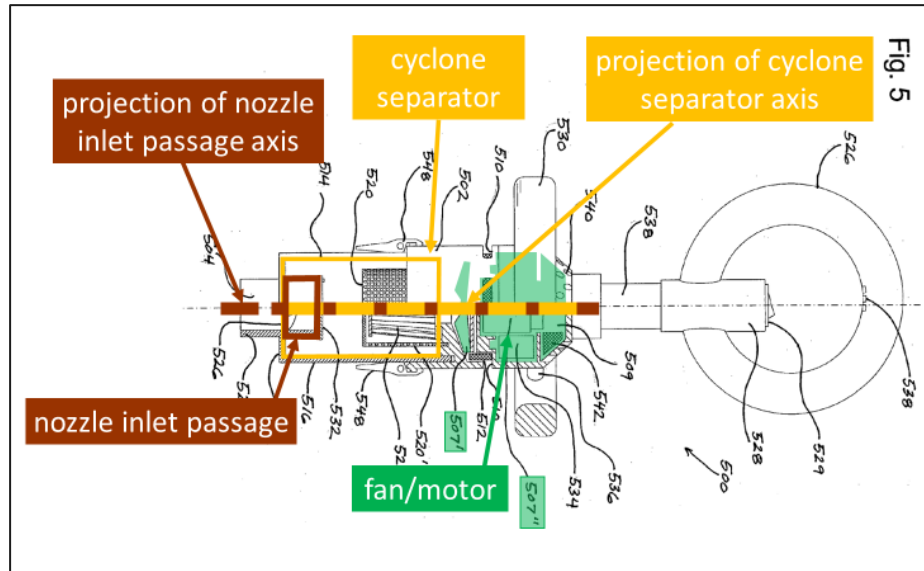
Ex1005, Fig. 5; Ex1002 ¶240. This limitation is also met when Butler's inlet passage extends the length of Butler's “**nozzle inlet**.” Ex1002 ¶241.

14. [24]

Butler anticipates claim 24. Ex1002 ¶¶242–46.

Butler's handvac comprises a handvac inlet passage that has an inlet axis, and when the rigid airflow conduit extends between the cleaning head air outlet and the handvac air inlet, the inlet axis is generally parallel to the longitudinally extending conduit axis. Ground 1, Limitation [1c], Claim 9.

In Butler, a projection of each of the inlet axis and the cyclone axis intersects the suction motor. Ex1002 ¶¶244–45. Butler's **nozzle inlet passage axis** and **cyclone separator axis** intersects **fan/motor 507**:



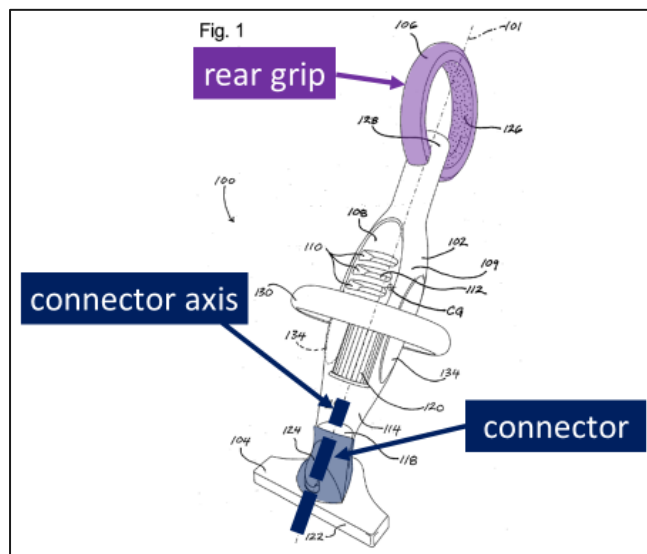
Ex1005, Fig. 5; Ex1002 ¶245. This limitation is also met when Butler's inlet passage extends the length of Butler's “**nozzle inlet**.” Ex1002 ¶246.

15. [25]/[26]/[27]

Butler anticipates claims 25/26/27. Ex1002 ¶¶247–253.

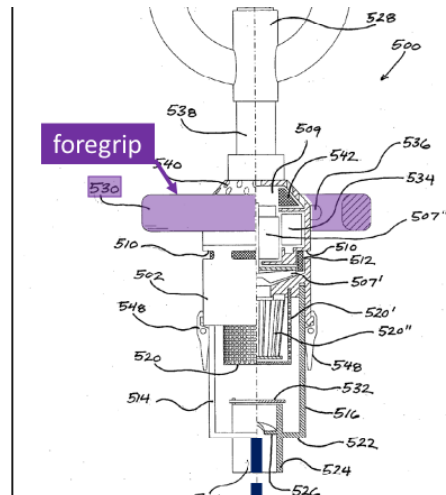
Butler teaches the handvac is mounted to the downstream end of the rigid airflow conduit. Ground 1, Limitation [12c].

Butler teaches storing its vacuum in an upright position. For example, Butler's vacuum may be "hung by the rear grip 506 in a vertical orientation to ... store the device," Ex1005, 21:3-7, and a POSA would further understand that Butler's vacuum would also be stored upright as shown in Fig. 1. *Id.*, Fig. 1; Ex1002 ¶¶251–52. When Butler's rigid airflow conduit is in an upright storage position, the handle is at an upper end of the surface cleaning apparatus and a portion of the handle is rearward of the wand axis. Ex1002 ¶¶251–52. When Butler's **connector** is in an upright storage position, **rear grip 506** is at an upper end of the vacuum 500 and **rear grip 506** is rearward of the **connector axis**:



Ex1005, Fig. 5; Ex1002 ¶252.

Regarding Claim 27, when Butler's **connector** is in an upright storage position, "**foregrip 530**" is at an upper end of the vacuum 500 and is rearward of the **connector axis**:



Ex1005, Fig. 5; Ex1002 ¶253.

B. Ground 2: Butler Renders Claims 1-28 Obvious

To the extent PO argues that Butler does not anticipate claims 1-28, Butler alone also renders them obvious. Ex1002 ¶¶254–76.

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 ¶¶255–64.

Butler teaches that its handvac components are combinable and “may be interchangeable with one another to provide the user with various cleaning options,” *id.*, 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., handvac handles, grips, filters, cleaning tools, 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 handvac housing, and attaching cleaning tools to a handvac air inlet). Ex1002 ¶262. 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 handvac components. Ex1002 ¶262.

A POSA would’ve reasonably expected success, because these simple handvac components were well known, and because Butler expressly teaches that they are interchangeable and that Butler’s handvac can be optimally reconfigured based on use-case. Ex1002 ¶263.

2. Butler Renders Obvious A Handvac (Limitations [1a]/[12a]/[20a]/[28a])

To the extent PO argues that the preambles are limiting and that Butler does not teach “a hand vacuum,” it would’ve been obvious for a POSA to further reduce

Butler's size. Ground 1, Limitations [1a]/[12a]/[20a]/[28a]; Ex1005, Abstract, 1:2-3, 13:1-19, 15:12-18, 26:1-10, 27:12-29; Ex1002 ¶¶265–66. 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 ¶266. A POSA would've 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 handvac. Ex1002 ¶266.

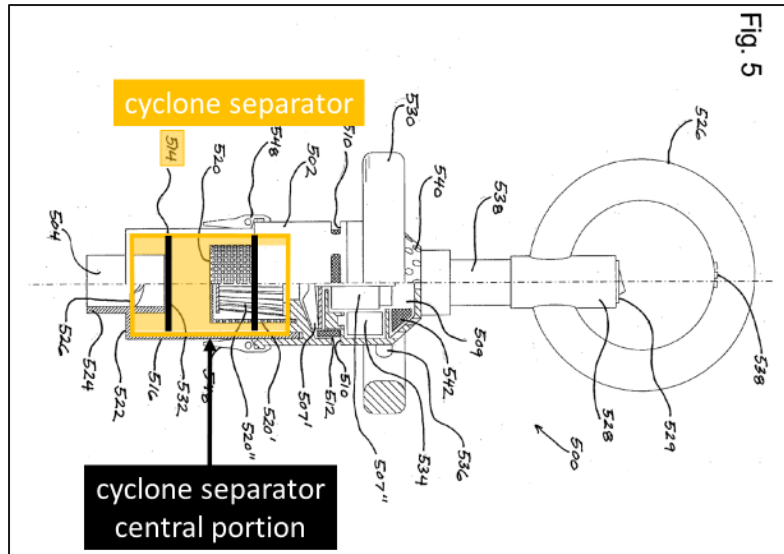
3. Butler Renders Obvious The Electrical Connector And Cable Limitations (Limitations [1a.3]/[12a.3]/[20a.3]/[28a.3], [28c])

To the extent PO argues that Butler does not teach the limitations regarding electrical connectors and cables, Butler renders them obvious. Ex1002 ¶¶267–73. A POSA reading Butler's disclosures that “any type of cleaning device can be attached to the entry tube,” and if a “powered attachment is provided, suitable power leads can be provided to connect the powered attachment to the electric circuit” would've been motivated to place an electrical connector on Butler's entry tube, at a location on the front end of the cyclone separator provided at a location adjacent the handvac air inlet, and aligned with and connected to a rigid airflow conduit electrical connector when the handvac is mounted to the rigid airflow

conduit, which would have a corresponding rigid airflow conduit electrical connector. Ground 1, Limitations [1a.3]/[12a.3]/[20a.3]/[28a.3], [28c]; Ex1005, 22:5-13, Fig. 5; Ex1002 ¶268.

Using an electrical connector was a well-known technique to predictably connect power leads, and it would've been obvious to try, as—if not the only solution—one of a finite number of solutions for doing so. Ex1002 ¶269. Locating the electrical connector at the cyclone unit's front end, adjacent the handvac air inlet would've been obvious as—if not the only location—one of a finite number of identified locations for the connector given Butler's disclosure, and it would've been the most logical location to connect the powered attachment to Butler's power leads, because that is where the powered attachment (and connecting rigid airflow conduit) connects to Butler's cleaner. *See* Ex1005, 22:6-11 (“any type of cleaning device may be attached to the entry tube,” which is located adjacent Butler's handvac air inlet, “nozzle inlet,” and if a “powered attachment is provided, suitable power leads can be provided to connect the powered attachment to the electric circuit”); *id.* Fig. 5 (depicting “entry tube 524” as adjacent to “nozzle inlet 504”); Ex1002 ¶269. A POSA would've reasonably expected success because it would have involved incorporating a well-known feature (an electrical connector) at a location where Butler teaches such a feature should be incorporated. Ex1002 ¶270.

A POSA would've been further motivated by Butler's disclosures to modify Butler to include electrical cables extending rearwardly from the electrical connector through a central portion of the cyclone unit toward the suction motor and fan assembly. Ground 1, Limitations [1a.3]/[12a.3]/[20a.3]/[28a.3], [28c]; Ex1005, 22:5-13, Fig. 5; Ex1002 ¶271. It would've been obvious to have Butler's "power leads" extend rearwardly through the entirety of the cyclone unit, including each "central portion" of the cyclone unit. Ex1002 ¶271. There were a finite number of solutions to implement Butler's teaching that the power leads extend "through the dirt receptacle"—namely, two: through Butler's cyclone unit at or near its radial center, or at or near its inner perimeter, both of which would've been obvious to try, simple to implement using known techniques, would have yielded predictable results of transmitting electricity, and with at least a reasonable expectation of success, and would extend rearwardly through the center (from front-to-back) of Butler's cyclone unit / air treatment member ("cyclone separator"):



Ex1005, 22:5-13, Fig. 5; Ex1002 ¶271.

To the extent PO argues that these Limitations require the electrical cables extend through the cyclone’s entire radial center (they do not), this too would’ve been obvious. Ex1002 ¶272. A POSA would’ve understood that is where there is the least airflow and dirt, thereby minimizing wear and tear on the electrical cables, and that it would’ve been the shortest distance through the cyclone unit, thereby reducing the amount of material needed and reducing costs. Ex1002 ¶272.

A POSA would’ve reasonably expected success in making these routings because they would have involved simply running power leads from one end of Butler’s “cyclone separator” to another, which was routine. Ex1002 ¶273.

4. Butler Renders Obvious A Tangential Air Inlet At The Vacuum Cleaner Inlet Passage’s Outlet End (Claim 10)

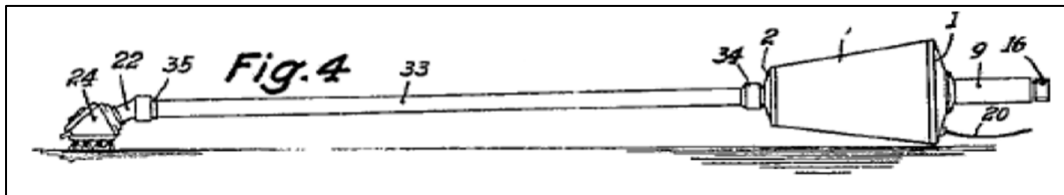
To the extent PO argues that Butler’s tangential air inlet is not located at the “outlet end” of the handvac air inlet passage, it would’ve been obvious to move it

further rearward. Ex1002 ¶¶274–76. A POSA would’ve been motivated by Butler’s disclosures to generate tangential airflow further rearward on “nozzle inlet 504” using Butler’s “helical ramp.” Ground 1, Claim 10; Ex1005, 22:14-22, Fig. 5; Ex1002 ¶275. There were a finite number of positions for Butler’s helical ramp to create cyclonic flow, and it would’ve been obvious to move it rearward towards the cyclone chamber because doing so would continue to create cyclonic flow, would’ve been simple to implement using known techniques, and would have yielded predictable results of initiating a cyclonic airflow within the cyclone chamber, with a reasonable expectation of success as it would continue to function in the same way. Ex1002 ¶275. Further, Butler teaches that “alternative means for initiating cyclonic airflow may be used,” which would’ve motivated a POSA to try alternative locations for Butler’s “helical ramp,” including further rearward. Ex1005, 18:15-16; Ex1002 ¶276.

C. Ground 3: Peter In Combination With Neroni Renders Claims 1-28 Obvious

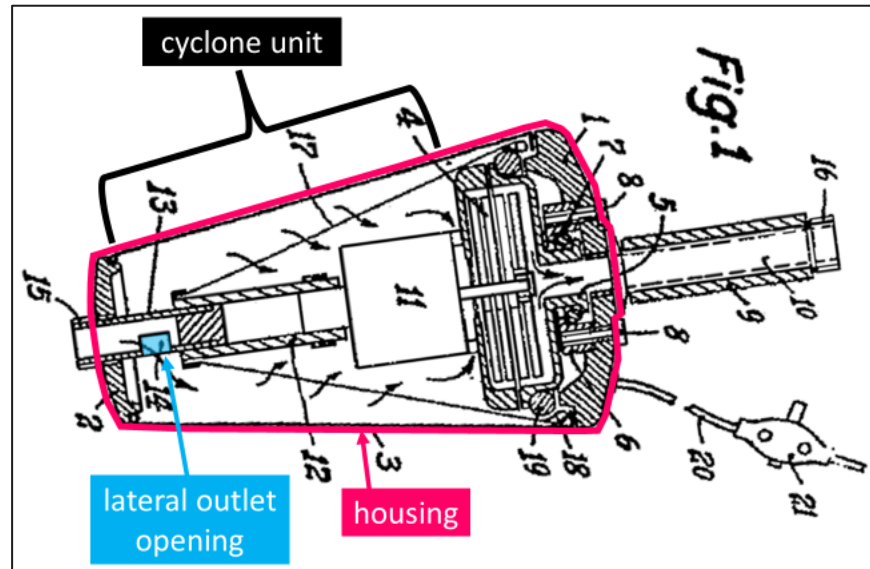
1. Motivation To Combine Peter And Neroni

Peter teaches a hand/stick vacuum cleaner from 1939:



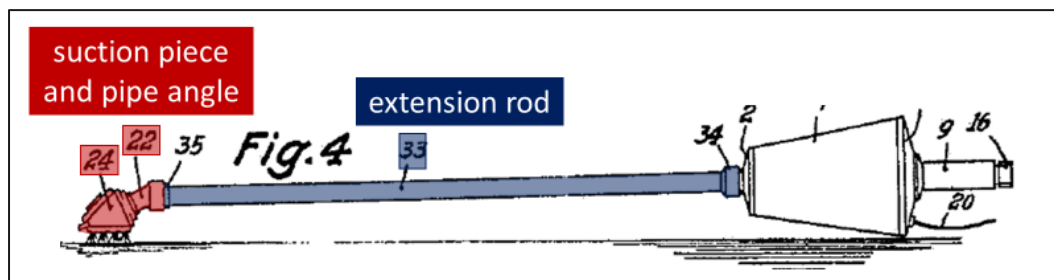
Ex1007, Fig. 4.

Peter's cleaner has a conical "**housing**" with a tangential "**lateral outlet opening 14**," which creates cyclonic airflow within a **cyclone unit**:

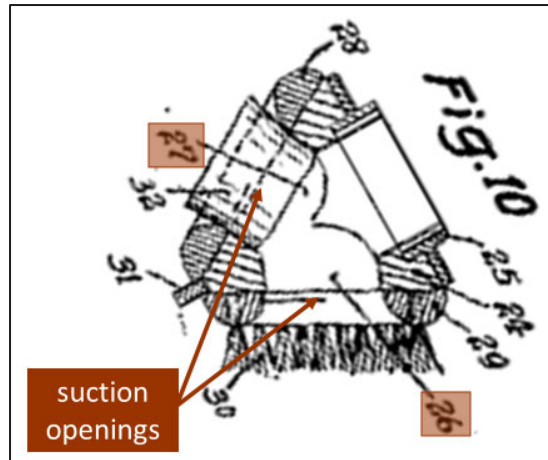


Ex1007, 2, Fig. 1; Ex1002 ¶278.

Peter's cleaner uses "an **extension rod 33**," which can be "inserted between the vacuum cleaner housing and the **pipe angle [22]**," which is "[t]he main accessory of the vacuum cleaner," in conjunction with "**suction piece 24**":

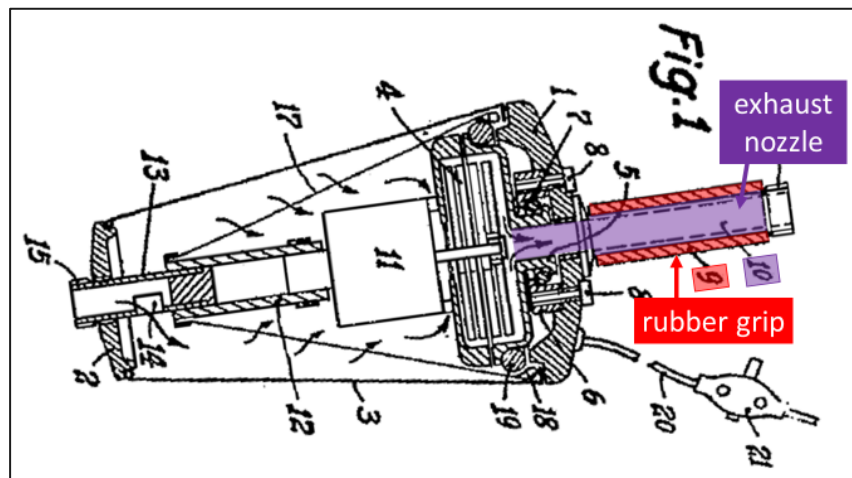


Ex1007, 2-3; Ex1002 ¶279. Peter's "suction piece" has "**suction opening[s] 26, 27**," which enable multi-directional cleaning from its top and bottom:



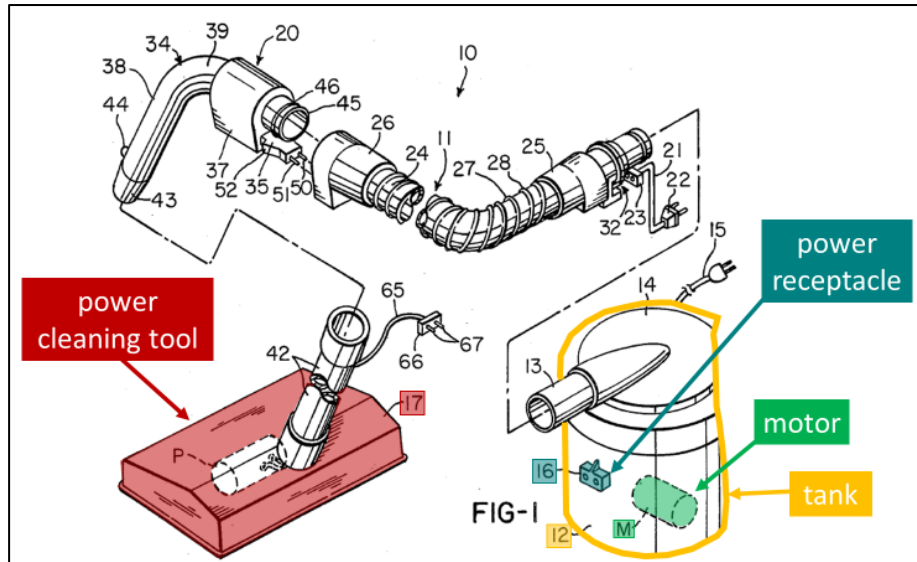
Ex1007, 2, Fig. 10; Ex1002 ¶280.

Peter's vacuum cleaner includes “**rubber grip 9**” on “**exhaust nozzle 10**”:



Ex1007, 2, Fig. 1; Ex1002 ¶281.

Neroni teaches a vacuum cleaner with an electrically powered tool. Neroni's vacuum runs electricity from the power cleaning tool to power “**receptacle 16A**,” and to **motor M**,” located in separation “**tank 12**”:



Ex1011, 3:34-42, 6:42-45, Fig. 1; Ex1002 ¶282. Neroni’s “tank” is also referred to as “**cleaner 12**[,] has an integral vacuum unit” and “because such vacuum unit is of conventional construction[,], it will not be shown or described.” Ex1011, 3:29-33, Fig. 1. A POSA would’ve understood that a cyclone unit is one such “conventional construction” of a vacuum unit, including because Neroni’s tank/cleaner is cylindrical and therefore adapted to cyclonic separation. Ex1002 ¶283.

A POSA reading Peter would’ve been motivated to incorporate Neroni’s teachings. Ex1002 ¶¶284–86.

A POSA would’ve been motivated to use a powered cleaning tool with Peter (either by modifying Peter’s suction “accessory” (“suction piece” and “pipe angle”), or by using a separate powered cleaning tool) and to incorporate Neroni’s teachings of a power cleaning tool adaptor. Ex1002 ¶285. A POSA would’ve

understood that powered cleaning tools were common, as Neroni explains. Ex1011, 1:17-49; Ex1002 ¶285. A POSA would've understood that powered cleaning tools can improve cleaning, including by agitating the surface being cleaned, which frees dust that was otherwise trapped on that surface, including surfaces such as upholstery and carpet where dust can accumulate in the upholstery/carpet fibers, which would further Peter's stated purpose of "effortlessly" cleaning "upholstered furniture," "floors, carpets, and the like," and would've reasonably expected success, given how well-known such tools were. Ex1007, 1-2; Ex1002 ¶285. For example, in 2006, US2006/0026788 to Fischer explained that "simple brushes or crevice tools without electrically powered features or accessories" are "limit[ed]" in "both their cleaning power and usefulness," but "a powered cleaning tool attachment including a motor driven rotary agitator, a headlight and/or a booster fan" can provide benefits such as "additional cleaning power" and "greater cleaning efficiency," including by "scrub[bing] and beat[ing] dirt and debris from the nap of an underlying carpet being cleaned." Ex1012 ¶¶5, 6, 20, 22. A POSA would've understood the well-known benefits of a powered floor tool and would've been motivated to incorporate Neroni's electrical system into Peter to achieve these benefits. Ex1002 ¶286.

A POSA would've reasonably expected success incorporating Neroni's teachings into Peter's. Ex1002 ¶287. A POSA would understand that Neroni's power cleaning tool adaptor teachings, including power leads and power connectors, were well-known, as Neroni explains (Ex1011, 1:17-49), that their incorporation would have simply required the addition of well-known parts—namely, Neroni's “female power receptacle 16,” which “is used to supply electrical power” and “electrical cord assembly,” which is used to transfer electrical power and “which is provided with a male fitting 22”—and that they would predictably result in delivering power to the surface cleaning tool. Ex1011, 3:34-49; Ex1002 ¶287. Further, they would've been obvious to try as there were a finite number of predictable solutions for transferring power to a powered surface cleaning accessory. Ex1002 ¶287.

2. [1]/[12]/[20]/[28]

a. [1pre]/[12pre]/[20pre]/[28pre]

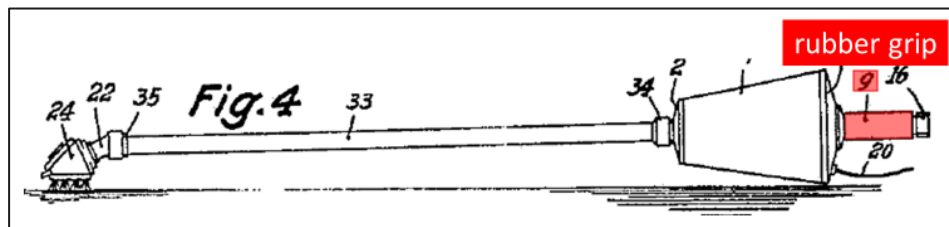
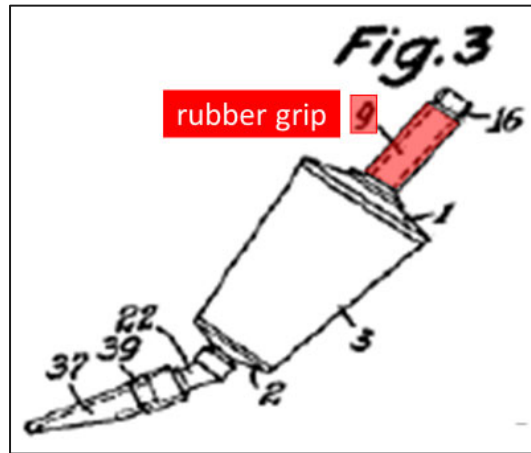
To the extent the preambles are limiting, Peter teaches them. Ex1002 ¶288.

Peter teaches a “vacuum cleaner” for “cleaning floors, carpets” and other “surface[s] to be cleaned.” Ex1007, Title, 2.

b. [1a]/[12a]/[20a]/[28a]

Peter teaches these limitations. Ex1002 ¶¶289–90.

Peter teaches a “vacuum cleaner” that is designed to be used by hand and is a handvac. Ex1007, 1; Ex1002 ¶289. Peter’s handvac includes “exhaust nozzle 10” surrounded by “**rubber grip 9**” for handling:

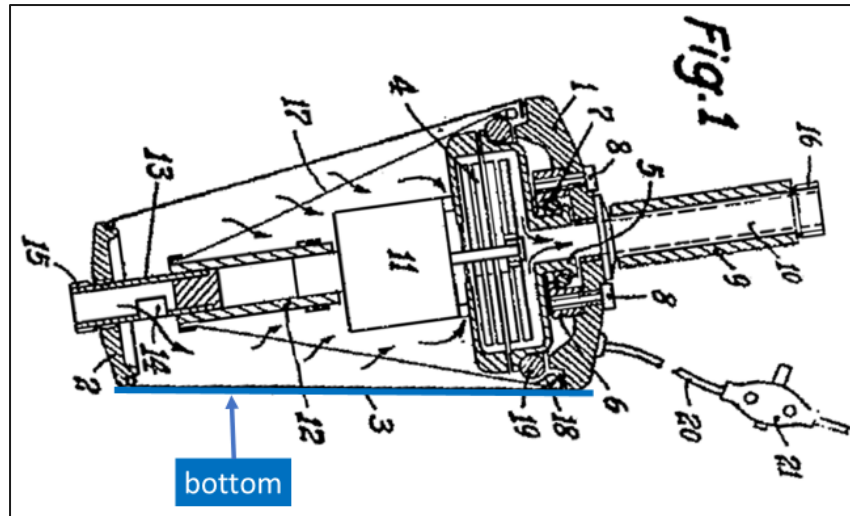


Ex1007, 1, Figs. 3-4; Ex1002 ¶¶289–90.

c. [1a.1]/[12a.1]/[20a.1]/[28a.1]

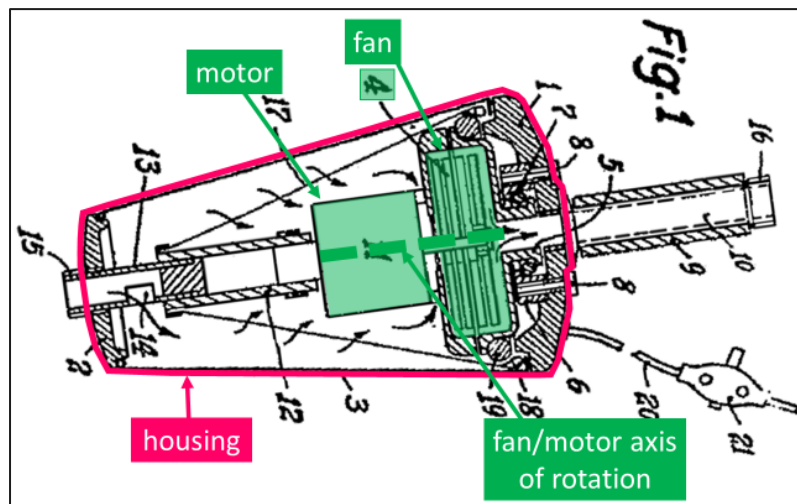
Peter teaches or renders these limitations obvious. Ex1002 ¶¶291–302.

Peter teaches a handvac body comprising a bottom: Peter’s “vacuum cleaner” has a body comprising a **bottom**:



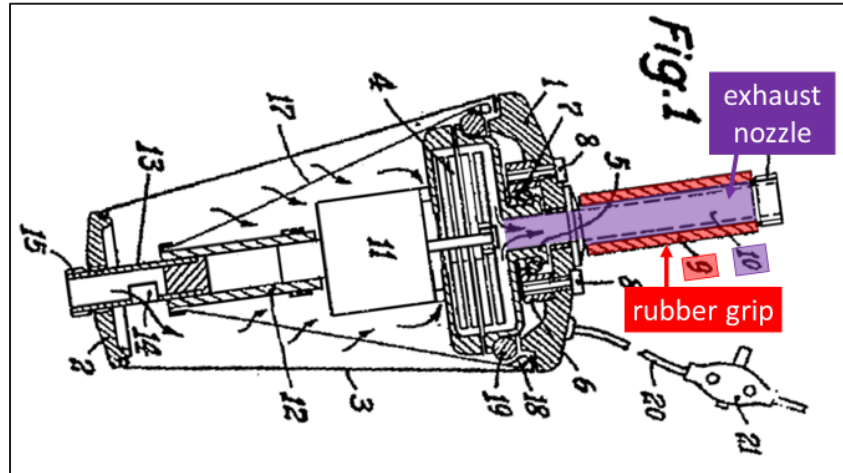
Ex1007, 2, Fig. 1; Ex1002 ¶295. Peter's handvac body is oriented such that the bottom is the portion identified in the above figure. Ex1002 ¶296.

Peter's cleaner body houses a suction motor and fan assembly having a suction motor axis of rotation: Peter's body comprises a “**housing**” with a “**fan**” and a “**motor 11**,” which a POSA would understand includes a **fan/motor axis of rotation**:



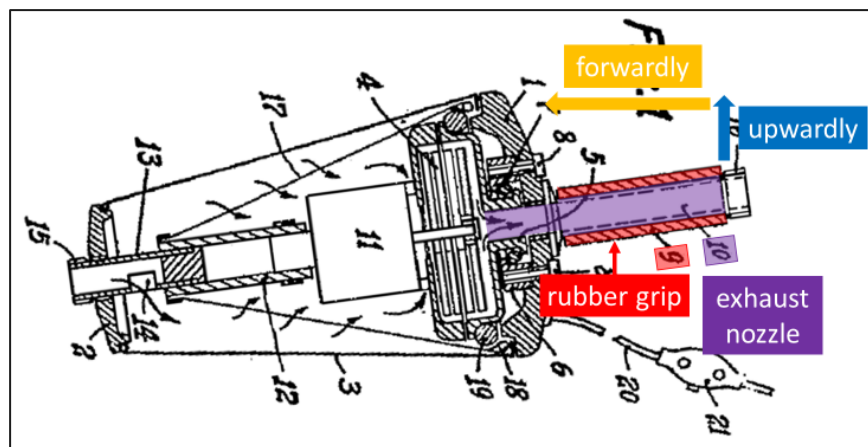
Ex1007, 2, Fig. 1; Ex1002 ¶297.

Peter's cleaner body includes a handle: “**exhaust nozzle 10**,” which is covered by “**rubber grip 9**”:



Ex1007, 2, Fig. 1; Ex1002 ¶¶298–99.

Peter teaches a handle having a hand grip portion that extends upwardly and forwardly when the handvac body is positioned with the bottom on a horizontal surface: “**rubber grip 9**” extends **upwardly** and **forwardly** when so oriented:



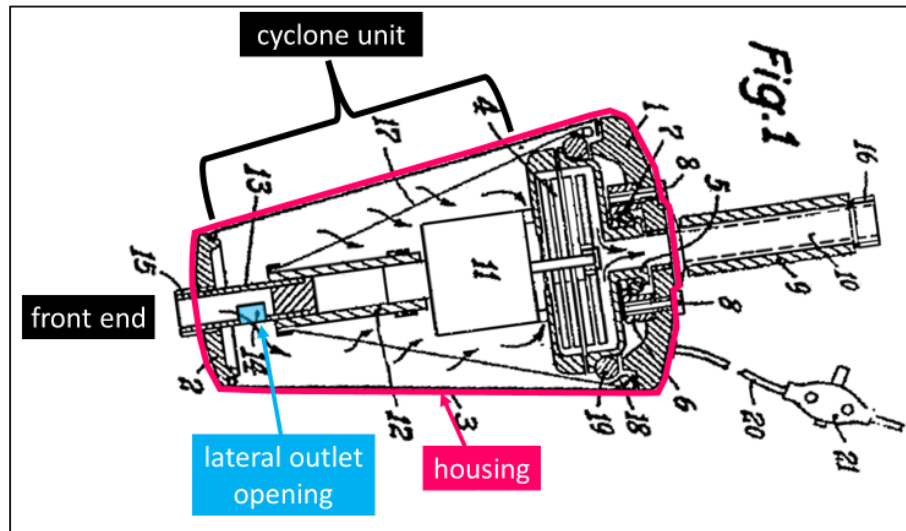
Ex1007, 2, Fig. 1; Ex1002 ¶300.

Alternatively, such a hand grip orientation would've been obvious. Ex1002 ¶301. Peter uses “articulated parts so as to be rotatable” for maximum utility. Ex1007, 3. A POSA would therefore have been motivated to pivot “exhaust nozzle 10” and “rubber grip 9” at an upward/forward angle such that the hand grip portion extends upwardly and forwardly, including by angling the exhaust nozzle outlet downward, as was commonly known in the art. Ex1002 ¶301; Ex1020, US 6,829,804 at Fig. 1. A POSA would've been further motivated to pivot Peter's exhaust nozzle because different hand grip angles are more comfortable for different cleaning use cases, e.g., the most ergonomic grip for cleaning under low furniture differs from the most ergonomic grip for cleaning high drapes or for cleaning floors. Ex1002 ¶302. For example, a POSA would've understood that pivoting Peter's exhaust nozzle outlet downward would be more comfortable for above-floor cleaning because it would align the handle with the user's natural hand position. Ex1002 ¶302. A POSA would've been motivated to modify Peter's handle and grip to pivot to allow a user to select the most ergonomic position, including various upward/forward configurations, for each particular use case, and would've reasonably expected success. Ex1002 ¶302.

d. [1a.2]/[12a.2]/[20a.2]/[28a.2]

Peter teaches these limitations. Ex1002 ¶¶303–13.

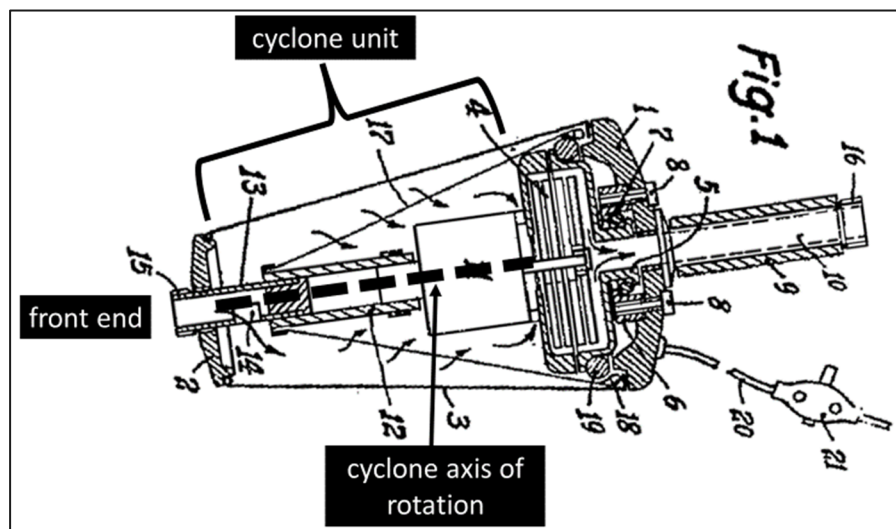
Peter teaches a cyclone unit provided at the front end of the handvac body: Peter's conically shaped "**housing**" has a tangential "**lateral outlet opening 14**," which a POSA would understand creates cyclonic airflow within a cone-shaped **cyclone unit** containing a cyclone chamber:



Ex1007, 2, Fig. 1; Ex1002 ¶¶306. Peter's "lateral outlet opening" is a tangential air inlet because it directs air tangentially towards the sidewall the "housing." Ex1002 ¶307. A POSA would understand that tangential introduction of air into a conically shaped chamber, such as Peter's "housing," would create cyclonic airflow; Peter therefore teaches a cyclone unit containing a cyclone chamber. Ex1002 ¶307.

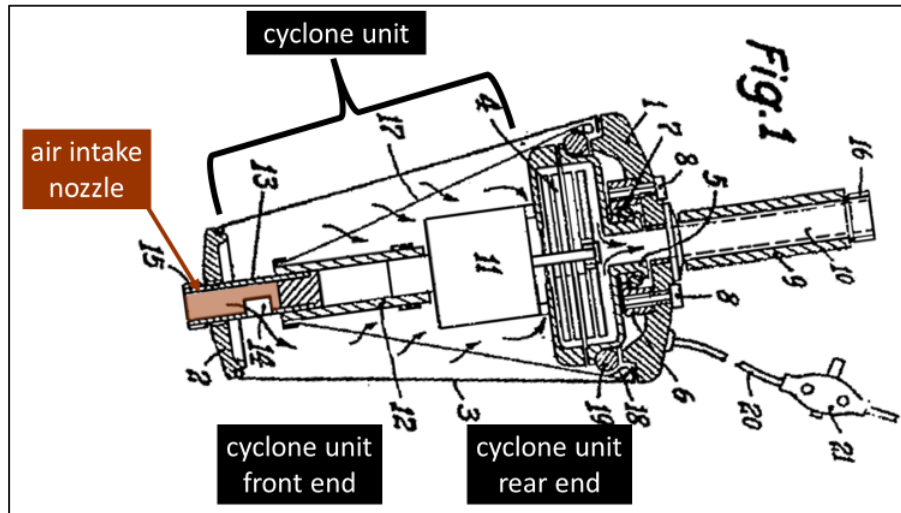
To the extent PO argues Peter's handvac does not contain a cyclone unit, a POSA would've been motivated by Peter's disclosures to modify Peter to include a cyclone unit containing a cyclone chamber. Ex1002 ¶308. Vacuum cleaners have

used cyclone units for over 80 years. *See* Ex1015, 1:50-58, Fig. 3 (“inlet 8 of a centrifugal separator” “discharges the air tangentially within the casing producing a whirling annulus of air within the casing which centrifugally separates the dust from the air”). Thus, implementing a cyclone unit into Peter’s handvac would’ve been obvious to try, easy to implement using nearly century-old teachings, and would have yielded the predictable result of “effortless[]” cleaning, which is one of Peter’s objectives. Ex1007, 2; Ex1002 ¶308. A POSA would’ve reasonably expected success based on Peter’s express teachings of a conically shaped “housing” and “lateral outlet opening 14,” which are both well-known features of cyclone units. *See supra* Ground 3, Limitation [1a.2]; Ex1002 ¶308. Peter’s **cyclone chamber** has a **cyclone axis of rotation**:



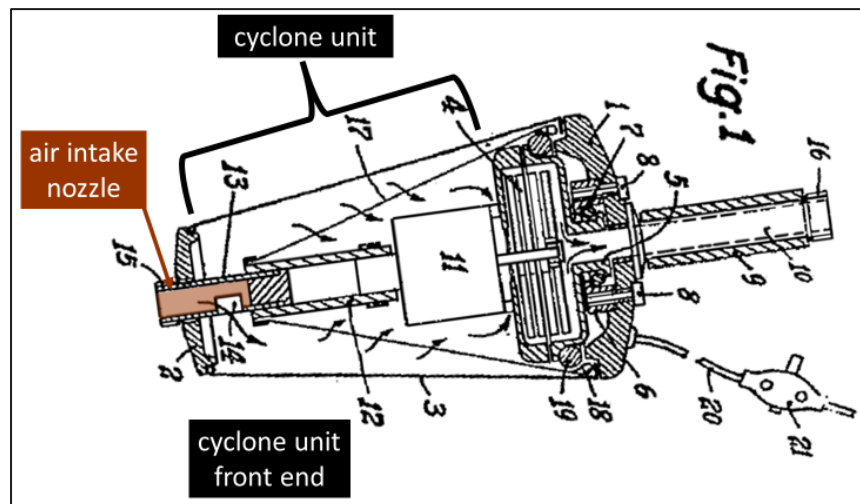
Ex1007, Fig. 1; Ex1002 ¶309.

A front end of Peter's **cyclone unit** has a handvac air inlet: air enters Peter's handvac via "**air intake nozzle 13**":



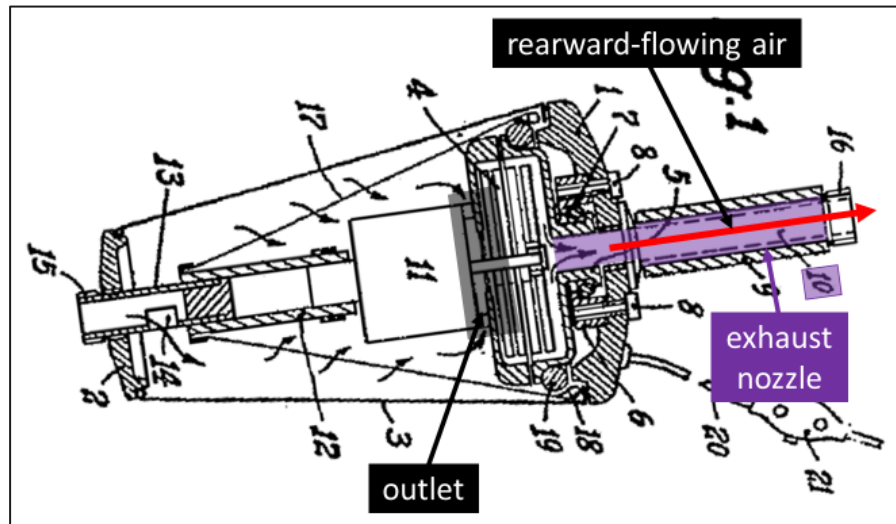
Ex1007, 2, Fig. 1; Ex1002 ¶310. Peter's "cyclone unit" has a front and rear end as identified above. Ex1002 ¶311.

Peter's handvac air inlet is provided in a center of the front end of the **cyclone unit**:



Ex1007, Fig. 1; Ex1002 ¶312.

Regarding Limitation [12a.2], Peter's cyclone unit is an air treatment member because it treats air by separating dirt. Ex1002 ¶313. Further, Peter teaches an air treatment member air **outlet** whereby air exits the air treatment member in a rearward direction, toward “**exhaust nozzle 10**”:

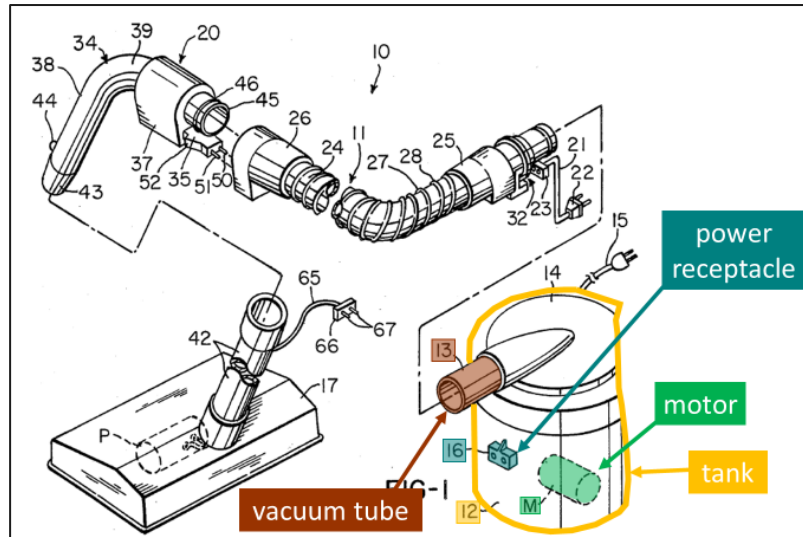


Ground 3, Claim 7; Ex1007, 2, Fig. 1; Ex1002 ¶313.

e. [1a.3]/[12a.3]/[20a.3]/[28a.3]

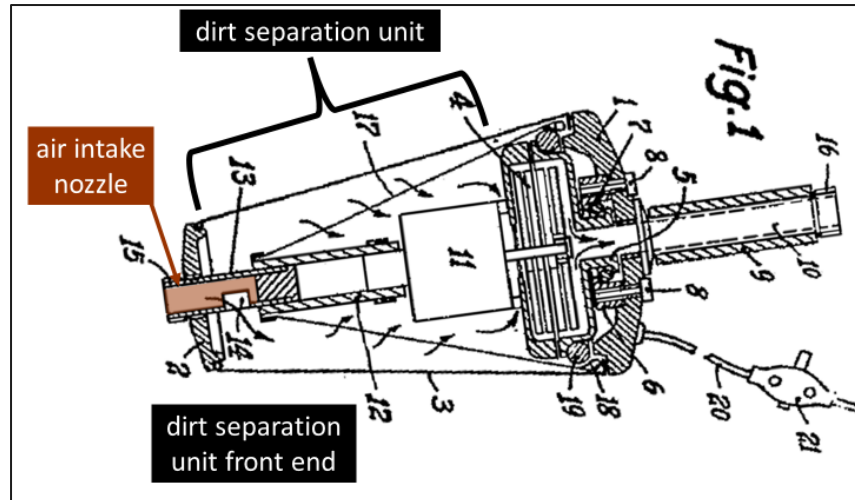
Peter in combination with Neroni renders these limitations obvious. Ex1002 ¶¶314–30.

Neroni teaches an electrical connector provided on the front end of a separation unit, below the air inlet. Ex1002 ¶318. Neroni's vacuum has a “female **power receptacle 16** disposed on the outside surface of its **tank 12**,” adjacent “**vacuum tube 13**,” and electricity runs from the power cleaning tool to “**receptacle 16A**, and to **motor M**”:



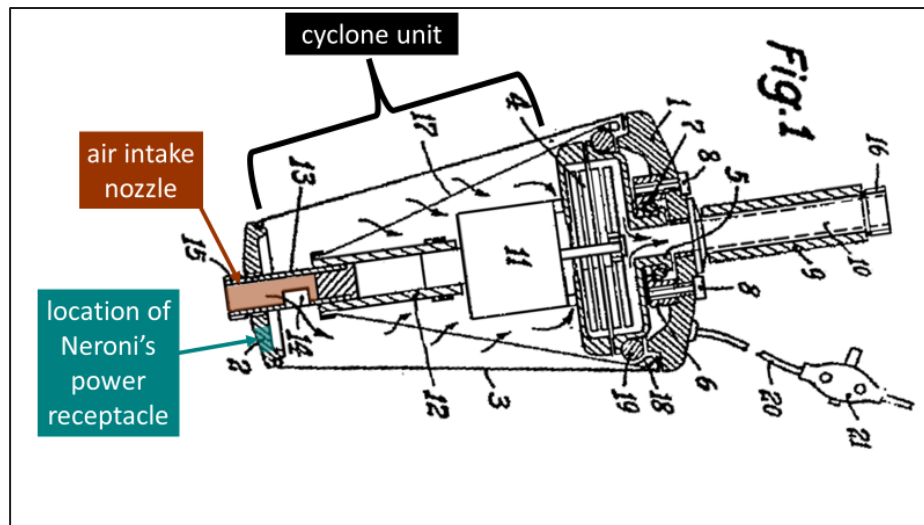
Ex1011, 3:34-49, 6:42-45, Fig. 1; Ex1002 ¶318. Neroni’s “tank” is also referred to as “**cleaner 12**[,] has an integral vacuum unit” and “because such vacuum unit is of conventional construction[,], it will not be shown or described.” *Id.*, 3:29-33, Fig. 1. A POSA would’ve understood that a cyclone unit is one such “conventional construction” of a vacuum unit, including because Neroni’s tank/cleaner 12 is cylindrical and therefore adapted to cyclonic separation. Ex1002 ¶319. A POSA would’ve further understood that Neroni’s “power receptacle 16” is an electrical connector, and that it is disposed on the front end of the vacuum unit. Ex1002 ¶319.

Like Neroni, Peter’s “**air intake nozzle 13**” is at the front of the **dirt separation unit**:



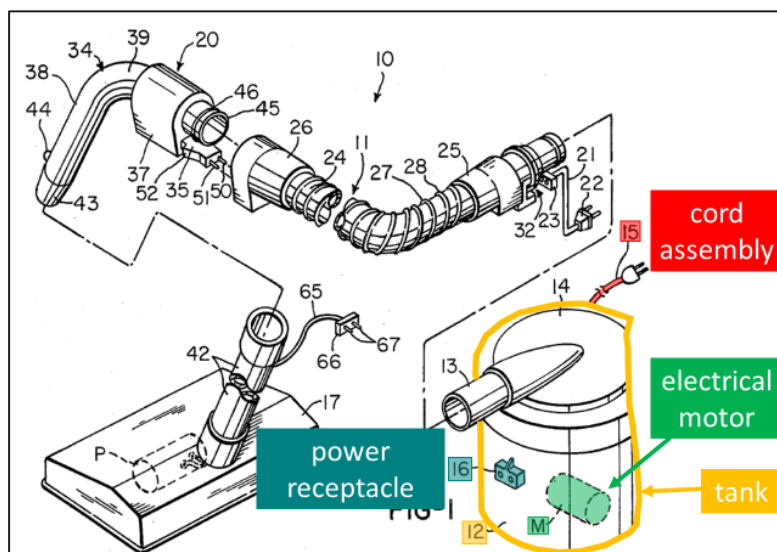
Ex1007, 1, Fig. 1; Ex1002 ¶320; *see also* Ground 3, Limitation [1a.2].

A POSA would've been motivated to implement Neroni's "power receptacle 16" on the front end of Peter's cyclone unit, adjacent the handvac air inlet, and would've reasonably expected success. Ex1002 ¶321. A POSA would've understood that this was one of a finite number of identified locations for the connector, and it would've been the most convenient location to connect a powered attachment to Neroni's "cord assembly 21A," because that is where the powered attachment (and rigid airflow conduit connecting the powered attachment to the vacuum cleaner) connects to Peter's cleaner. Ex1002 ¶321. In their combined teachings, an electrical connector is provided on the front end of the **cyclone unit**:

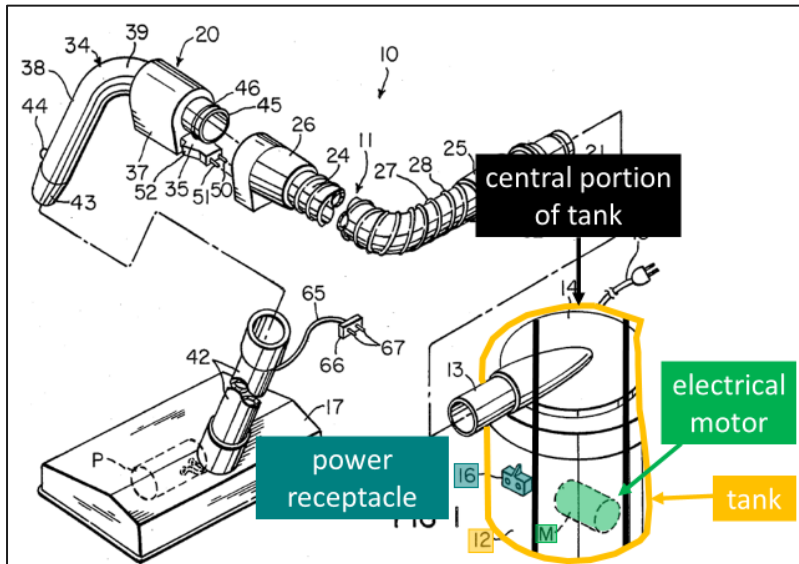


Ex1007, Fig. 1; Ex1002 ¶321.

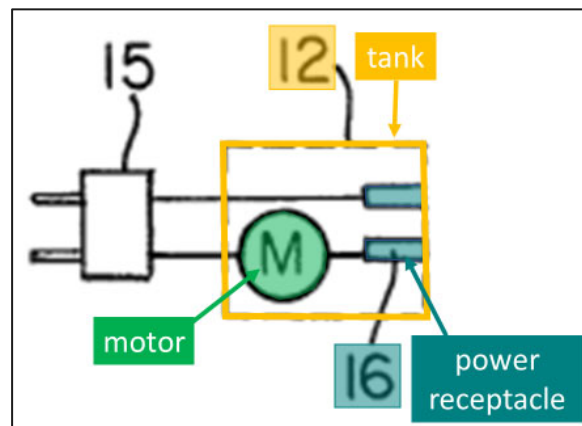
Neroni further teaches electrical cables extending rearwardly from the electrical connector through a central portion of the separation unit toward the suction motor and fan assembly. Ex1002 ¶322. Neroni's “**tank 12**” comprises an “**electrical motor [M]** receiving electrical power through a **cord assembly 15**”:



Ex1011, 3:22-36, Fig. 1; Ex1002 ¶322. Electricity runs from the power cleaning tool to “receptacle 16A, and to motor M” which is positioned in a central portion of “tank 12”:



Ex1011, 3:29-33, 6:42-45, Fig. 1; Ex1002 ¶323. Neroni illustrates this electrical connection in the “wiring diagram” of Figure 4:



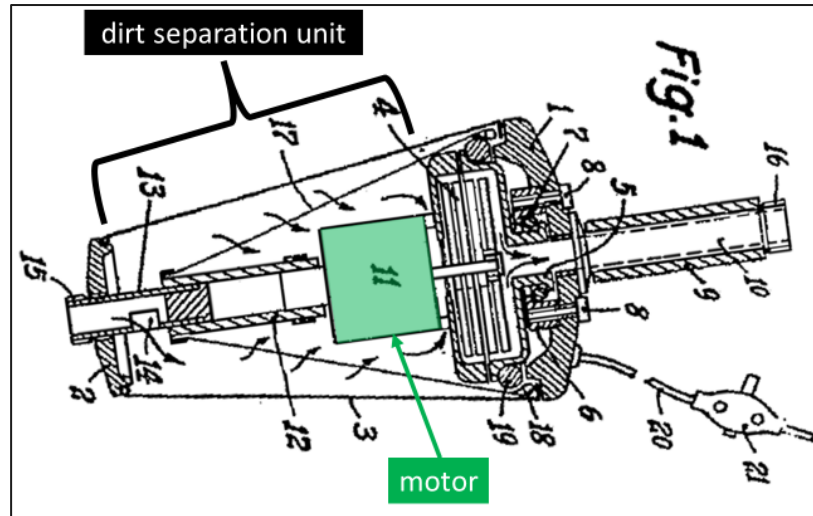
Ex1011, 3:1-2, Fig. 4; Ex1002 ¶324.

A POSA would therefore understand that electrical cables extend rearwardly from the power receptacle to the motor, and from the motor as a “cord assembly,”

including through a central portion of the separation unit, including a radially central portion shown above, and a central portion from top to bottom, as power receptacle 16 is located roughly halfway between the top and bottom of the tank. Ex1002 ¶325.

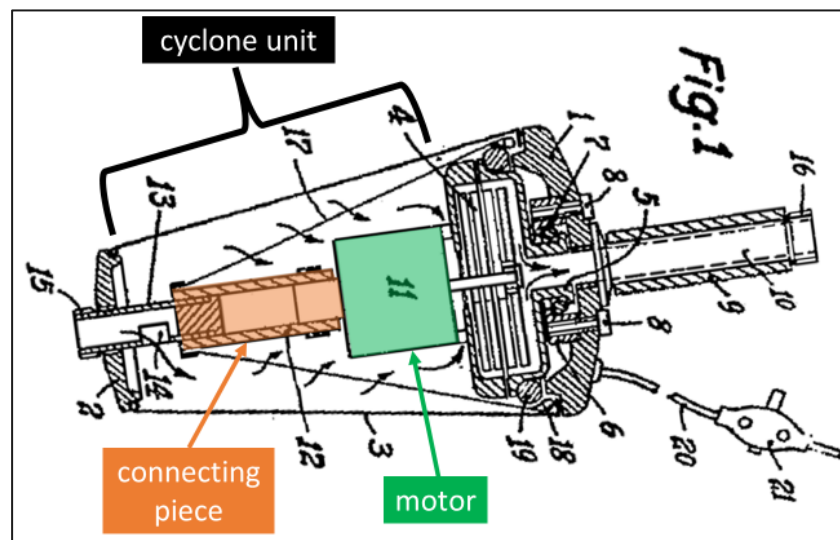
Further, it would've been obvious to have Neroni's cord assembly 15 extend rearwardly through a central portion (centered both front-to-back and top-to-bottom) of the "tank." Ex1002 ¶326. There were a finite number of solutions to implement Neroni's teaching that electricity runs from "receptacle 16A, and to motor M"—and the most direct route—running an existing electrical cord through the center of Neroni's "tank" would've been obvious to try, simple to implement using known techniques, and would have yielded predictable results of transmitting electricity. Ex1011, 3:22-36, 6:42-45, Fig. 1; Ex1002 ¶326. Moreover, a POSA would've been motivated to run Neroni's "cord assembly" through the "tank"'s center because that is where there is the least airflow and dirt when implemented as a cyclone, thereby minimizing wear-and-tear, and because it is the shortest distance through the vacuum unit, thereby reducing the amount of material needed and reducing costs. Ex1002 ¶326.

Like Neroni, Peter's "**motor 11**" is positioned in the **dirt separation unit**:



Ex1007, 2, Fig. 1; Ex1002 ¶327; *see also* Ground 3, Limitation [1a.1].

Further, it would've been obvious to extend the electrical cables rearwardly through Peter's “**connecting piece 12**,” which extends rearwardly through each central portion of the **cyclone unit** and connects to “**motor 11**”:



Ex1007, 2, Fig. 1; Ex1002 ¶328. There were a finite number of solutions to implement Neroni's cable teachings into Peter—namely, two: through Peter's “dust filter [17],” which would require routing the cables through the filter every

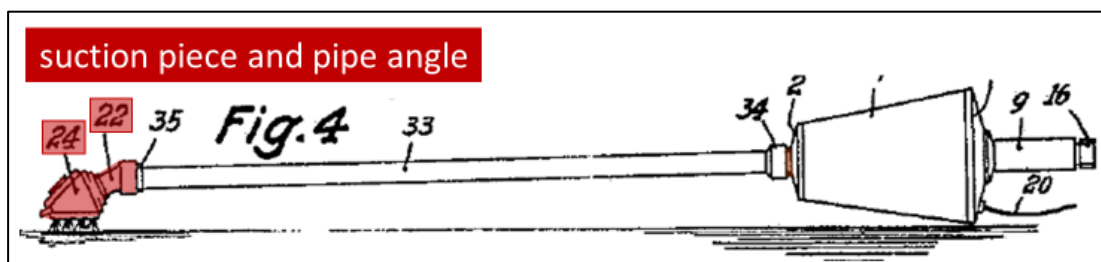
time it needed to be changed, or directly to “motor 11” through Peter’s “connecting piece,” which would avoid this inconvenience. Ex1002 ¶329. Running the cables through Peter’s “connecting piece” would’ve been obvious to try, simple to implement using known techniques, would have yielded the predictable result of transmitting electricity, and would extend rearwardly through the center (from front-to-back and radially) of Peter’s cyclone unit, and would facilitate filter changing. Ex1002 ¶329.

A POSA would’ve been motivated to combine Neroni and Peter, including to combine Neroni’s electrical connectors and cables with Peter’s cyclone unit and would’ve reasonably expected success, for the same reasons as discussed above. Ground 3, Limitation [1a.3]; Ground 3, §1. In their combined teachings, electrical cables extend rearwardly from the electrical connector through a central portion of the cyclone unit toward the suction motor and fan assembly. Ex1002 ¶330.

f. [1b]/[12b]/[20b]/[28b]

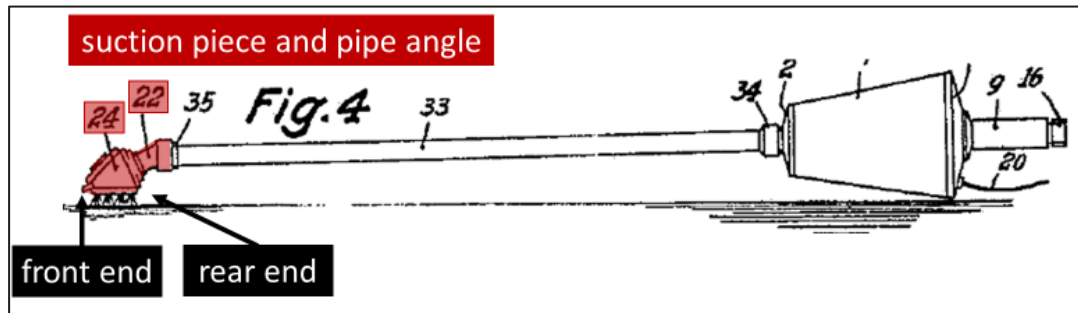
Peter teaches these limitations. Ex1002 ¶¶321–36.

Peter teaches a surface cleaning head: “**suction piece 24**” connected to “**pipe angle 22**”:



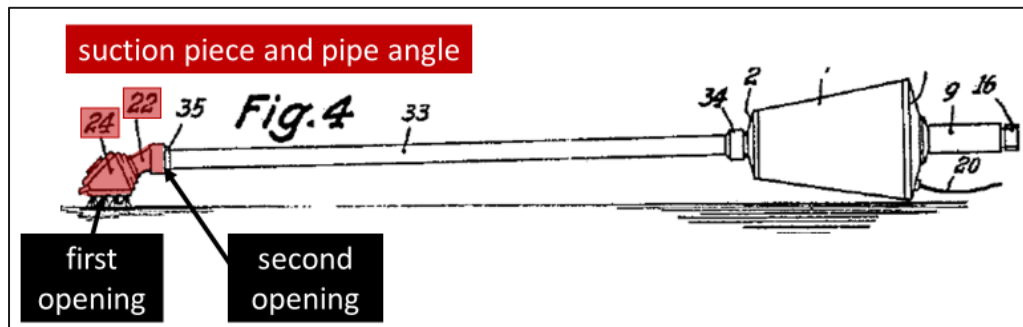
Ex1007, 2, Fig. 4; Ex1002 ¶332. Together, “suction piece 24” and “pipe angle 22” are a surface cleaning head. Ex1002 ¶333.

Peter’s “**suction piece**” and “**pipe angle**” assembly has a **front end** and a **rear end**:



Ex1007, Fig. 4; Ex1002 ¶334.

Peter’s surface cleaning head has a dirt air inlet and a cleaning head outlet. Ex1002 ¶335. In Peter, air flows into the “**suction piece**” via a **first opening**, and exits the “**pipe angle**” via a **second opening**:



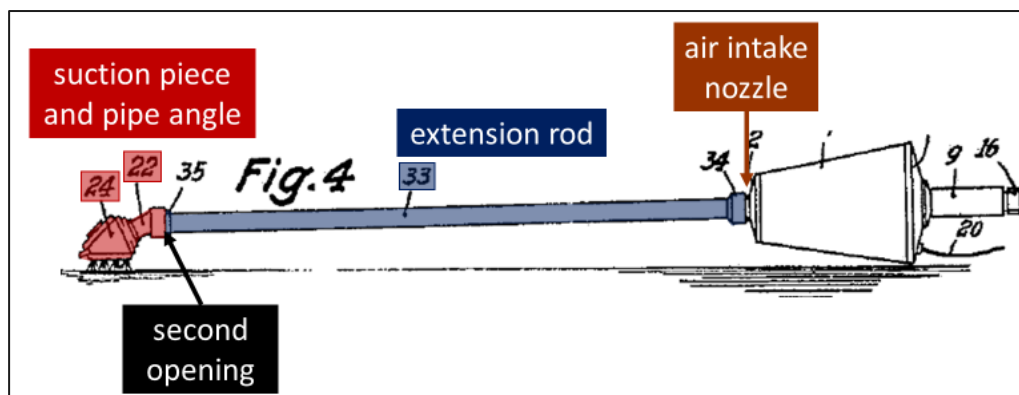
Ex1007, Fig. 4; Ex1002 ¶335. Peter’s first opening is a dirt air inlet; Peter’s second opening is a cleaning head air outlet. Ex1002 ¶335. A POSA would’ve been motivated to incorporate a powered surface cleaning head with Peter, including by modifying Peter’s surface cleaning head (“suction piece” and “pipe

angle”). Ground 3, §1. When so modified, Peter likewise meets these limitations. Ex1002 ¶336.

g. [1c]/[20c]

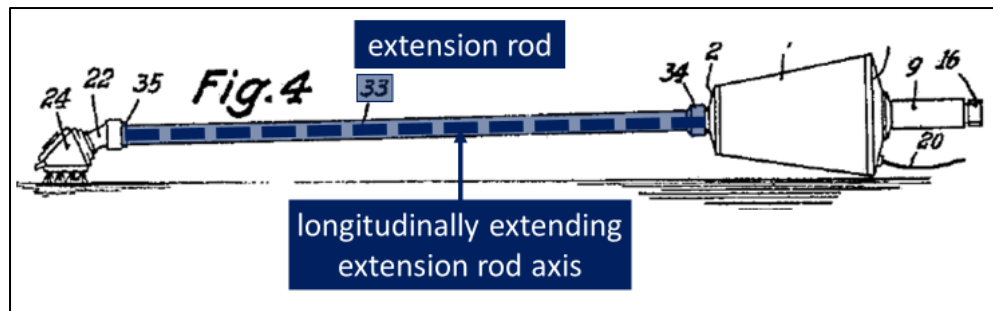
Peter teaches these limitations. Ex1002 ¶¶337–42.

Peter teaches a rigid airflow conduit extendable between the cleaning head air outlet and the handvac air inlet: “**extension rod 33**” can be “inserted between the vacuum cleaner housing,” at “**air intake nozzle 13**,” and “**pipe angle 22**,” at the **second opening**:



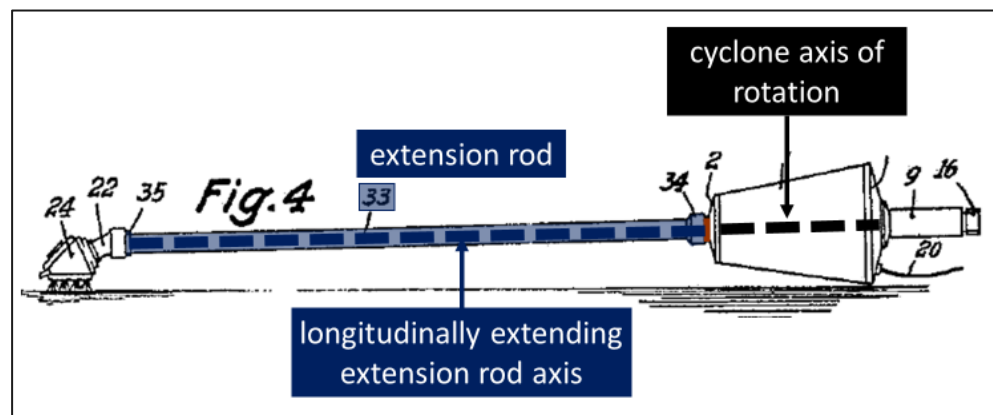
Ex1007, 2-3, Fig. 4; Ex1002 ¶338. “[E]xtension rod 33 [] has a connection sleeve 34 at one end” that connects to “connecting thread 15 of the air intake nozzle 13,” and a “connecting thread 35 at the other end” that connects to “pipe angle 22 ... connection sleeve 23.” Ex1007, 2. “[E]xtension rod 33” is a rigid airflow conduit extendable between the cleaning head air outlet and the handvac air inlet. Ex1002 ¶339.

Peter’s **extension rod** has a **longitudinally extending conduit axis**:



Ex1007, 2, Fig. 4; Ex1002 ¶340.

Peter's **extension rod's axis** is parallel to the **cyclone axis of rotation** when **extension rod 33** extends between the second opening and air intake nozzle 13:



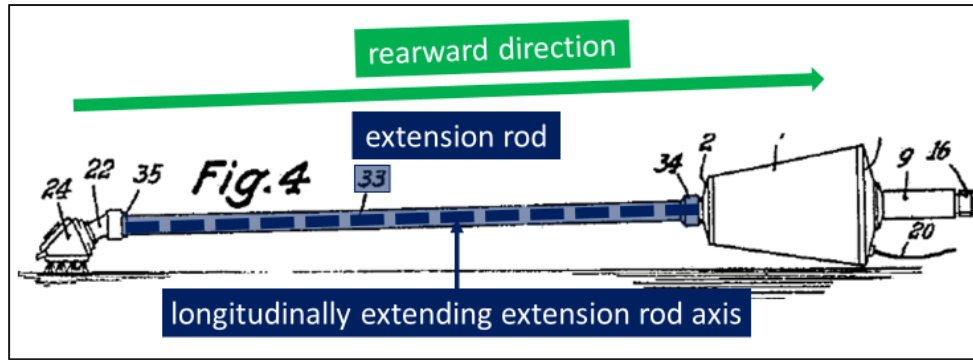
Ex1007, Fig. 4; Ex1002 ¶¶341–42.

h. [12c]

Peter teaches this limitation. Ex1002 ¶¶343–47.

Peter teaches a rigid airflow conduit extendable between the cleaning head air outlet and the handvac air inlet, the rigid airflow conduit having a longitudinally extending conduit axis. Ground 3, Limitation [1c]; Ex1002 ¶344.

Peter's **longitudinally extending conduit axis** is parallel to the **rearward direction** when oriented as claimed:



Ex1007, Fig. 4; Ex1002 ¶345. Peter's connection sleeve 34 is at the downstream end of Peter's extension rod 33. Ex1002 ¶346.

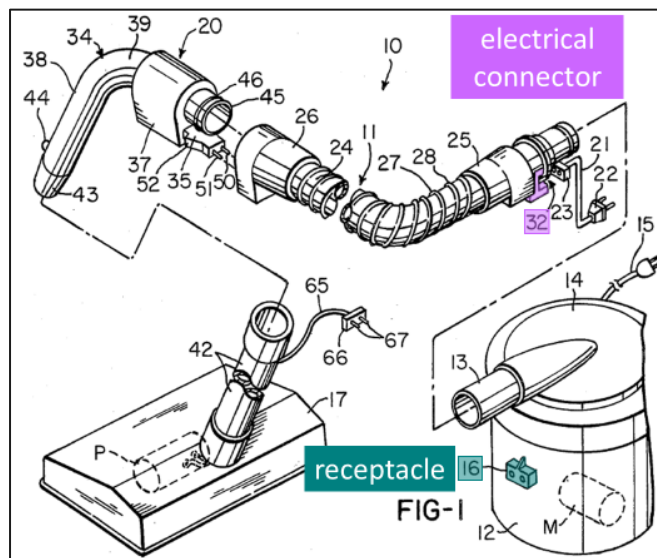
Further, Peter teaches that when the handvac is mounted to a downstream end of the rigid airflow conduit, the handle is a driving handle for the surface cleaning apparatus. Ground 3, Limitation [1d]; Ex1002 ¶347.

i. [28c]

Peter in combination with Neroni renders this limitation obvious. Ex1002 ¶¶348–54.

Peter teaches a rigid airflow conduit extendable between the cleaning head air outlet and the handvac air inlet, the rigid airflow conduit having a longitudinally extending conduit axis, and when the rigid airflow conduit is extending between the cleaning head air outlet and the handvac air inlet the conduit axis is parallel to the cyclone axis of rotation. Ground 3, Limitation [1c]; Ex1002 ¶349. Peter in combination with Neroni renders obvious a cyclone unit electrical connector. Ground 3, Limitation [1a.3].

Neroni teaches an airflow conduit electrical connector: “hose assembly 11” with “**electrical connector 32**” attaches to “female fitting 23,” and “male fitting 22 ... for connection to the **receptacle 16**”:



Ex1011, 3:42-49; 4:7-10, Fig. 1; *see also id.*, 3:34-49, 4:7-10; Ground 3, Limitation [1a.3]; Ex1002 ¶¶350–52. These connectors and fittings are individually (and together) an airflow conduit electrical connector. Ex1002 ¶353.

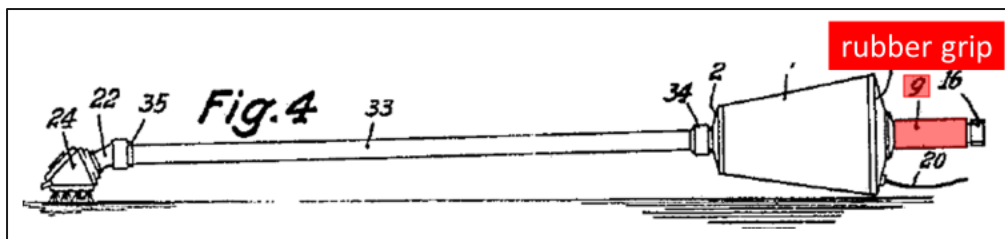
A POSA would've been motivated to incorporate Neroni's "electrical connector" teachings, including the "female fitting" and "male fitting," into Peter's rigid "extension rod" to power its floor tool and would've reasonably expected success for the same reasons discussed in Limitation [1a.3]. Ground 3, Limitation [1a.3]; Ex1002 ¶354. Their combined teachings teach these limitations. Ex1002 ¶354.

j. [1d]/[20d]/[28d]

Peter teaches these limitations. Ex1002 ¶¶355–60.

Peter’s handvac is removably mountable to a downstream end of the rigid airflow conduit, and the rigid airflow conduit extends between the surface cleaning head and the handvac. Ground 3, Limitation [1c]; Ex1002 ¶358.

When Peter’s rigid airflow conduit extends between the surface cleaning head and the handvac, the handle is a driving handle for the surface cleaning apparatus: “exhaust nozzle 10” has “**rubber grip 9**”:



Ex1007, 2, Fig. 4; Ex1002 ¶359. Peter’s “exhaust nozzle” with “rubber grip” is a driving handle because driving the handle drives the vacuum cleaner. Ex1002 ¶360.

k. [20e]

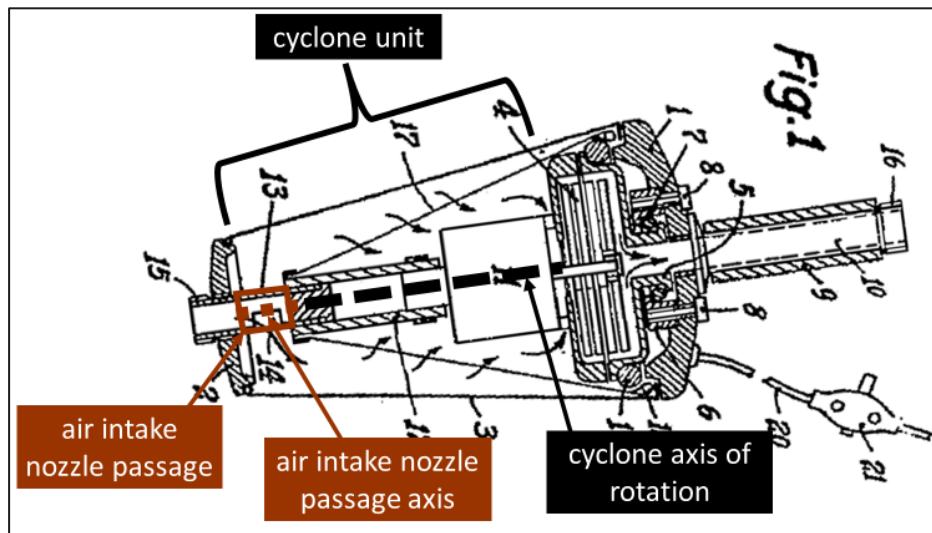
Peter in combination with Neroni renders this limitation obvious. Ex1002 ¶¶361–66.

When Peter’s rigid airflow conduit extends between the cleaning head air outlet and the handvac air inlet, the handvac air inlet comprises a handvac inlet

passage that is generally coaxial with the longitudinally extending conduit axis.

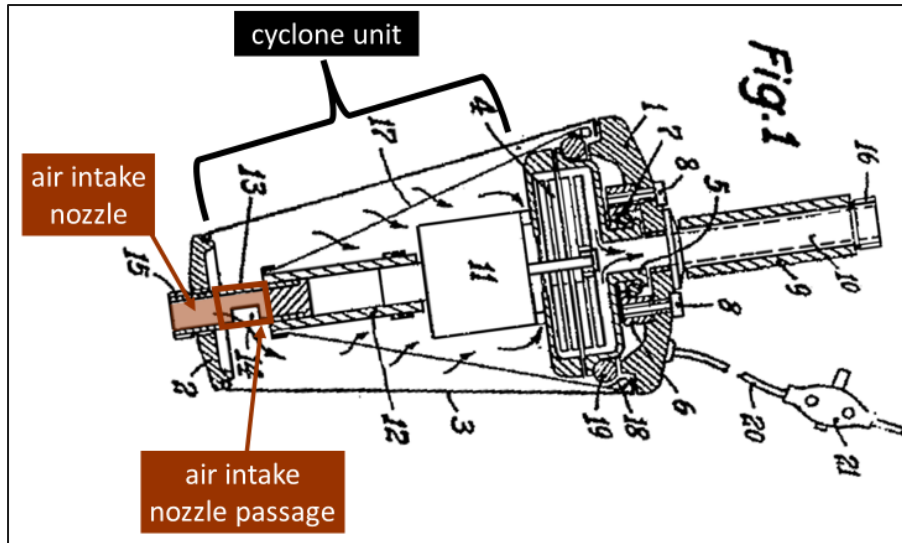
Ground 3, Limitation [1c]/Claim 9.

Peter's handvac inlet passage is generally coaxial with the cyclone axis of rotation: **air intake nozzle 13's passage** is generally coaxial with the **cyclone axis of rotation**:



Ex1007, Fig. 1; Ex1002 ¶¶362–63.

Further, Peter's handvac air inlet passage is positioned inside the cyclone unit. Ex1002 ¶364. Peter's "air **intake nozzle 13** protrud[es] *through* the housing cover 2" and the cyclone unit:



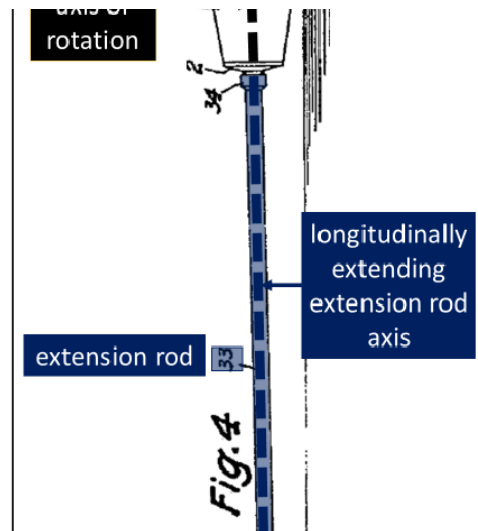
Ex1007, 2, Fig. 1; Ex1002 ¶364. Peter's air intake nozzle passage is positioned inside the cyclone unit as depicted above. Ex1002 ¶365.

Peter in combination with Neroni renders obvious the electrical cables extend rearwardly from the electrical connector through the cyclone unit adjacent the handvac inlet passage towards the suction motor fan and assembly. Ground 3, Limitation [1a.3]; Ex1002 ¶366; Ground 3, §1.

3. [2]/[14]

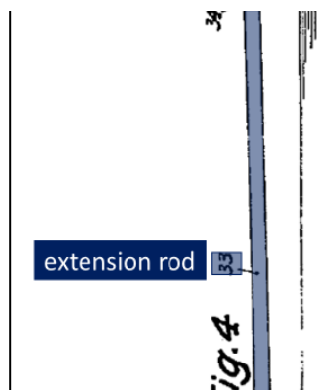
Peter in combination with Neroni renders claims 1/12 obvious and teaches the remaining limitations of these claims. Ex1002 ¶¶367–73.

Peter's cyclone axis of rotation is rearward of the longitudinally extending conduit axis when Peter's cleaner is mounted to the rigid airflow conduit: Peter's **cyclone axis of rotation** is rearward of the **longitudinally extending extension rod axis** when the handvac is mounted to the **extension rod 33**:



Ex1007, Fig. 4; Ex1002 ¶370.

Peter’s rigid airflow conduit extends generally vertically upwardly from the surface cleaning head: When oriented as claimed, Peter’s **extension rod 33** extends generally vertically upwardly from “**suction piece 24**” and “**pipe angle 22**”:

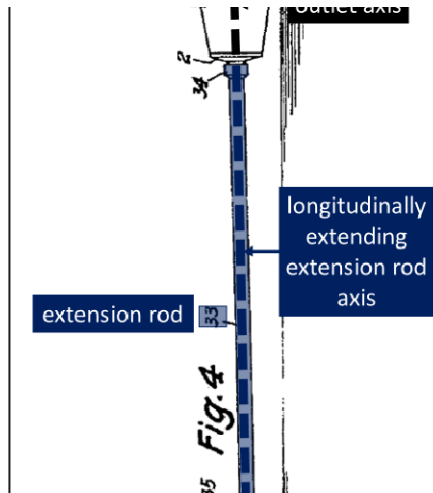


Ex1007, Fig. 4; Ex1002 ¶371; *see also* Ground 3, Limitations [1c]/[1d].

“[C]onnecting threads between the pipe angle 22 and the suction piece 24” “rotate” such that “the suction piece [can] always rest well on the surface to be cleaned, whereby the inclination of the extension rod in relation to the floor can be

changed,” and “rotatability between the vacuum cleaner housing and [the] suction piece” can occur. Ex1007, 2, claim 4; Ex1002 ¶372.

Regarding Claim 14, Peter teaches an outlet conduit with an axis. Ground 3, Claim 7. Further, Peter’s **outlet axis** is rearward of the **longitudinally extending extension rod axis** when oriented as claimed:

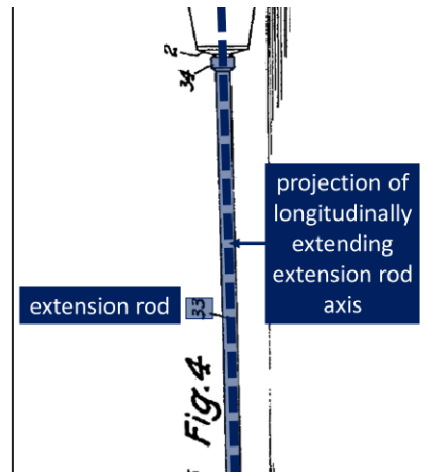


Ex1007, Fig. 4; Ex1002 ¶373.

4. [3]/[5]/[15]

Peter in combination with Neroni renders claims 1/2/14 obvious and teaches the remaining limitations of these claims. Ex1002 ¶¶374–79.

A **projection of Peter’s longitudinally extending extension rod axis** intersects Peter’s “**rubber grip 9**” when Peter’s cleaner is mounted to **extension rod 33**:

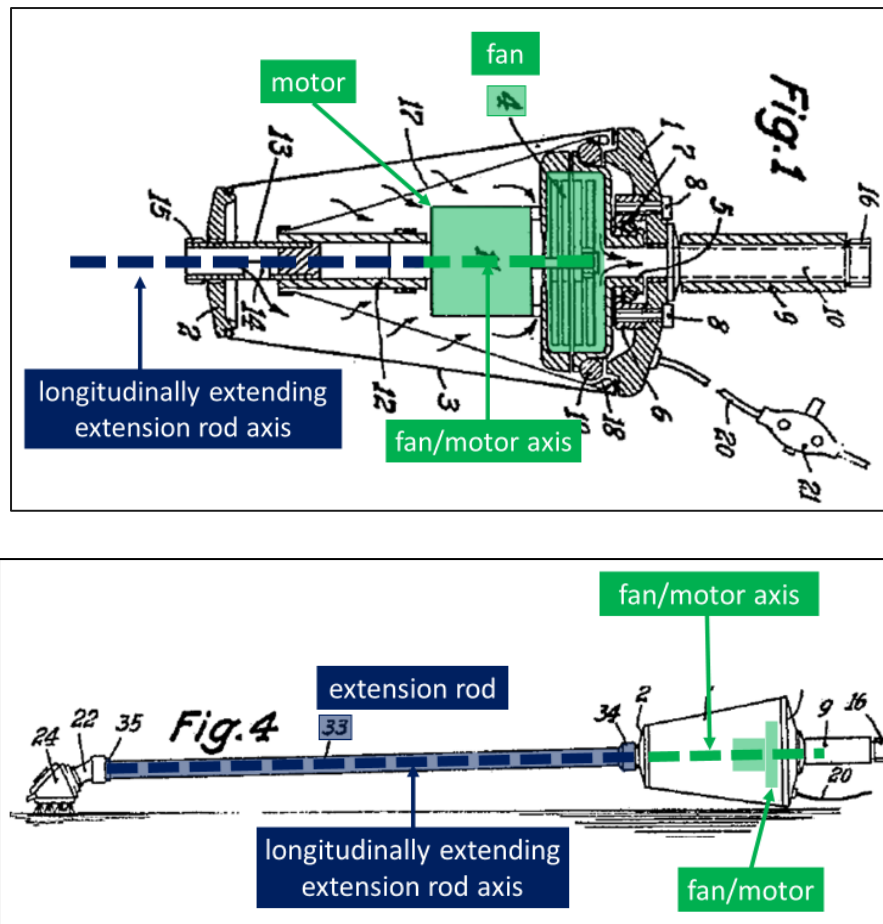


Ex1007, Fig. 4; Ex1002 ¶378; *see also* Ground 3, Limitation [1a.1]. Further, when modified to pivot the handle angle as described in Limitation [1a.1], the projection likewise intersects Peter’s rubber grip. Ex. 1002 ¶379; *see also* Ground 3, Limitation [1a.1].

5. [4]/[6]/[16]/[17]

Peter in combination with Neroni renders claims 1/2/12/15 obvious and teaches the remaining limitations of these claims. Ex1002 ¶¶380–86.

Peter’s **fan/motor axis** is generally parallel to the **longitudinally extending extension rod axis**:

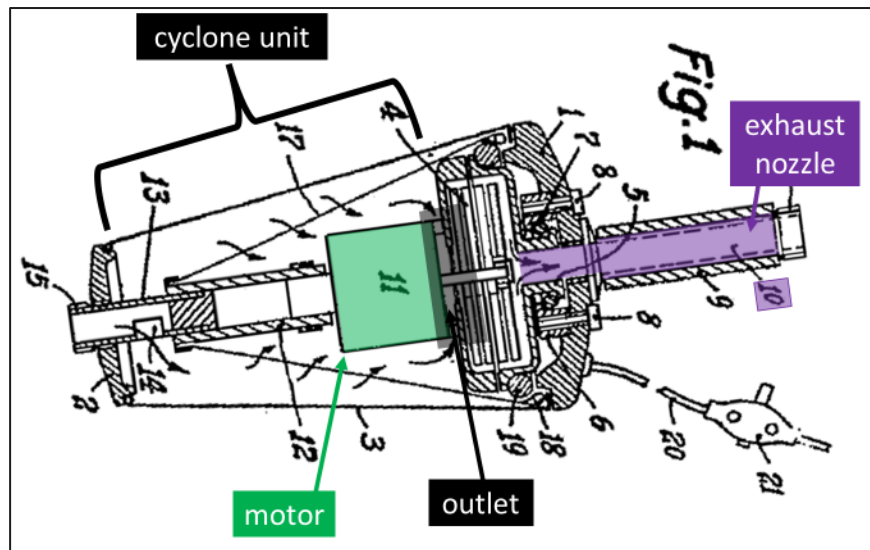


Ex1007, Figs. 1, 4; Ex1002 ¶¶385–86.

6. [7]

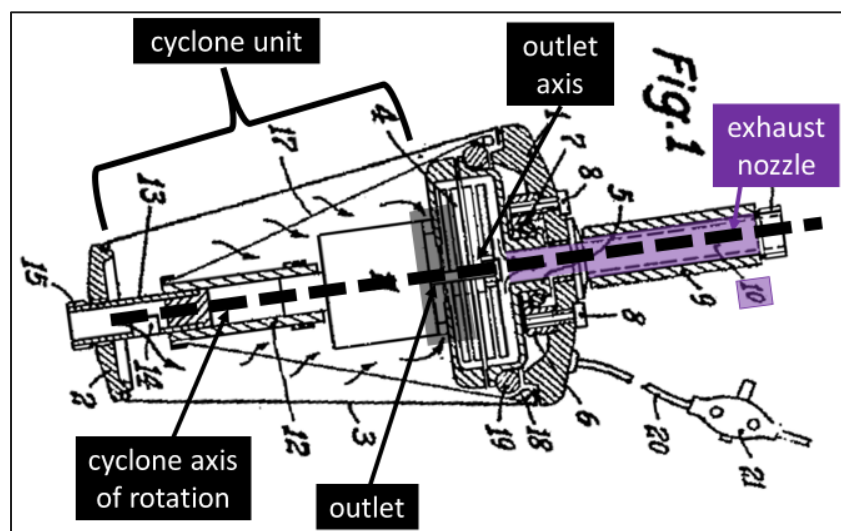
Peter in combination with Neroni renders claim 1 obvious and teaches the remaining limitations of this claim. Ex1002 ¶¶387–92.

Peter’s cyclone unit has an outlet conduit: in use, air exits the **cyclone unit** through an **outlet** behind “**motor 11**” before exiting through “**exhaust nozzle 10**”:



Ex1007, 2, Fig. 1; Ex1002 ¶389. Peter's outlet is an outlet conduit because it is where air exits the cyclone unit. Ex1002 ¶390.

Peter's outlet conduit extends in a direction that is generally parallel to the cyclone axis of rotation: Peter's **outlet** extends in a direction that is generally parallel to the **cyclone axis of rotation**:



Ex1007, Fig .1; Ex1002 ¶¶391–92.

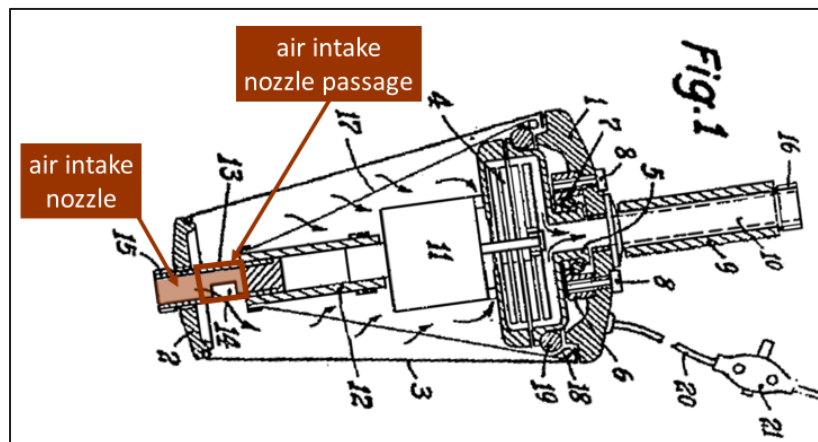
7. [8]

Peter in combination with Neroni renders claim 1 obvious and Peter teaches the remaining limitations of this claim. Ground 3, Limitations [1c]/[1d]; Ex1002 ¶¶393–95.

8. [9]/[11]/[18]/[19]

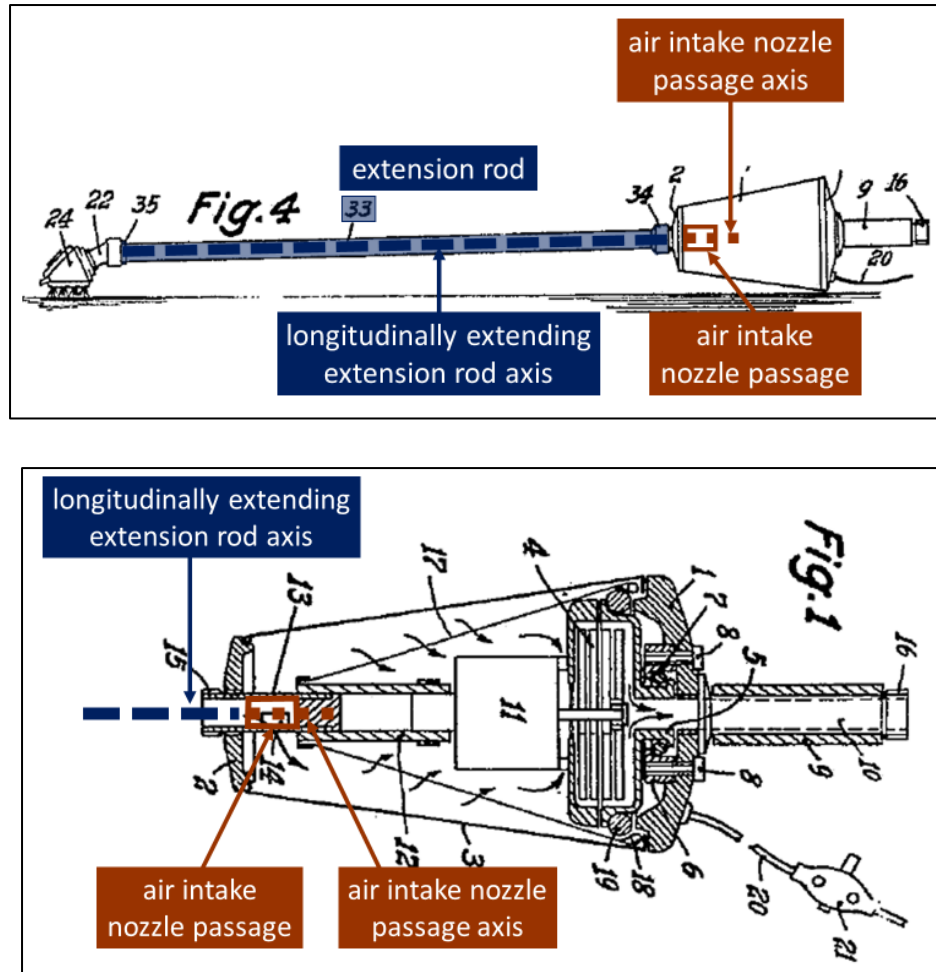
Peter in combination with Neroni renders claims 8/12 and the remaining limitations of these claims obvious. Ex1002 ¶¶396–410.

Peter's handvac air inlet comprises a handvac inlet passage: Peter's “**air intake nozzle 13**” comprises an **air intake nozzle passage**:



Ex1007, Fig. 1; Ex1002 ¶401.

Peter's handvac inlet passage is generally parallel to the longitudinally extending conduit axis: Peter's **air intake nozzle passage** is generally parallel to the **longitudinally extending extension rod axis**:

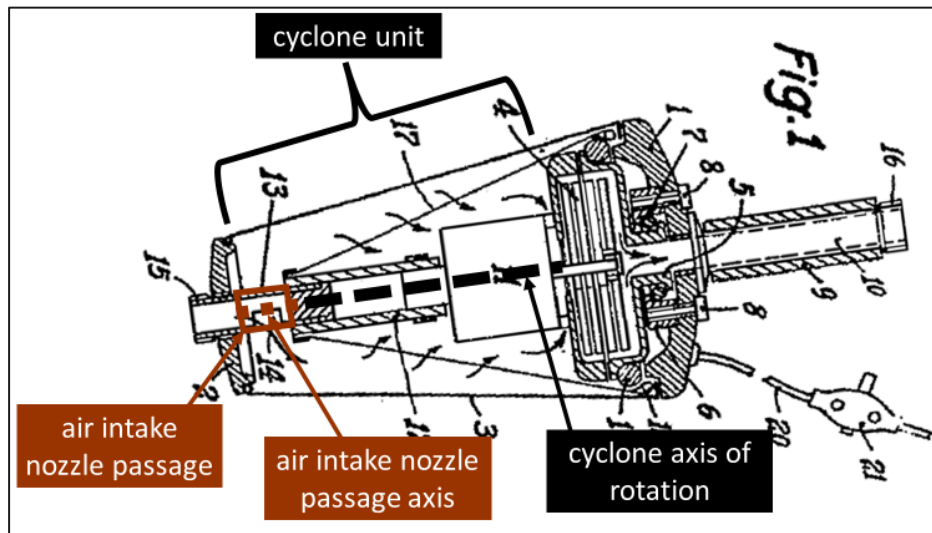


Ex1007, Figs. 4, 1; Ex1002 ¶¶402–03.

Regarding Claims 11/19, Peter’s handvac inlet passage is coaxial with the longitudinally extending conduit axis, as shown above. Ex1002 ¶404.

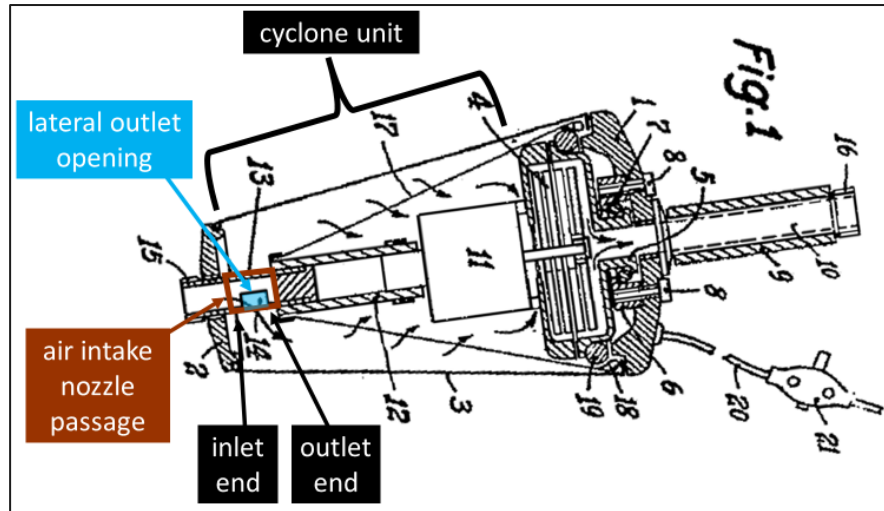
Regarding Claim 18, Peter’s handvac inlet passage is also generally parallel to the longitudinally extending conduit axis when the rigid airflow conduit is attached to the handvac air inlet, as shown above. Ex1002 ¶405; *see also* Ground 3, Limitation [1c].

Peter's handvac inlet passage is generally parallel to the cyclone axis of rotation: Peter's **air intake nozzle passage** is generally parallel to the **cyclone axis of rotation**:



Ex1007, Fig. 1; Ex1002 ¶¶406–07.

Peter's handvac inlet passage has an inlet and outlet ends, the outlet end communicating with a cyclone chamber air inlet: Peter's **air intake nozzle passage** has **inlet and outlet ends**, the outlet end communicating with a **cyclone unit** via “**lateral outlet opening 14**”:



Ex1007, 2, Fig. 1; Ex1002 ¶408.

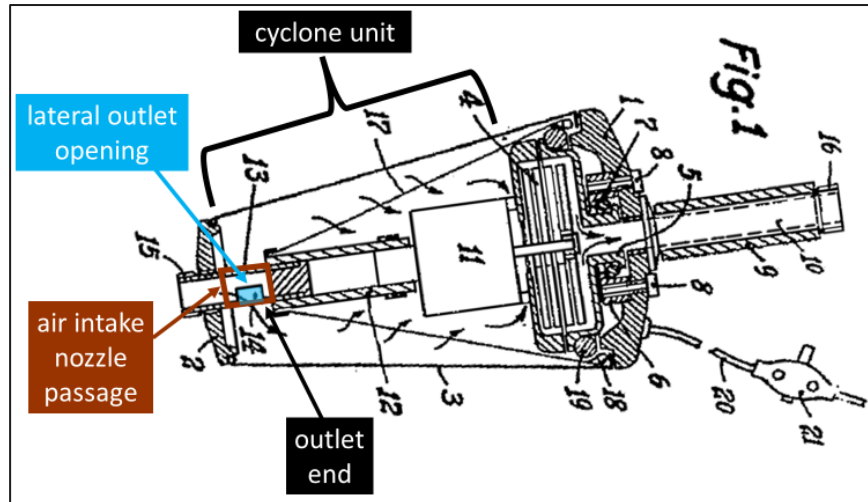
Peter in combination with Neroni renders obvious electrical cables extending rearwardly adjacent the handvac inlet passage. Ground 3, Limitation [1a.3]; Ex1002 ¶¶409–10; Ground 3, §1.

9. [10]

Peter in combination with Neroni renders claim 9 obvious and teaches the remaining limitations of this claim. Ex1002 ¶¶411–15.

Peter teaches a handvac air inlet passage with an outlet end and a cyclone chamber air inlet. Ground 3, Claim 9.

Peter's cyclone chamber air inlet comprises a tangential air inlet provided at the outlet end of the handvac inlet passage: “**lateral outlet opening 14**” directs air towards the sidewall of the **cyclone unit** as it enters the cleaner:



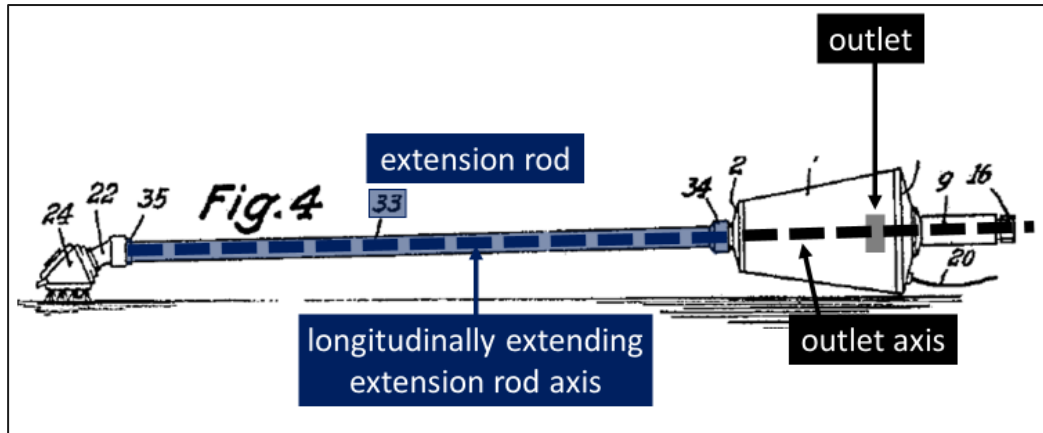
Ex1007, 2, Fig. 1; Ex1002 ¶¶413–14. Peter’s “lateral outlet opening” is a tangential air inlet because it directs air tangentially towards the sidewall of the cyclone unit. Ex1002 ¶415. Peter’s “lateral outlet opening” is located at the **outlet end** of the **air intake nozzle passage**. Ex1002 ¶415.

10. [13]

Peter in combination with Neroni renders claim 12 obvious and teaches the remaining limitations of this claim. Ex1002 ¶¶416–20.

Peter’s cyclone unit air outlet comprises an outlet conduit. Ground 3, Claim 7.

Peter’s outlet conduit has an outlet conduit axis that is generally parallel to the longitudinally extending conduit axis: Peter’s **outlet** has an **outlet axis** that is generally parallel to the **longitudinally extending extension rod axis**:



Ex1007, Fig. 4; Ex1002 ¶¶419–20.

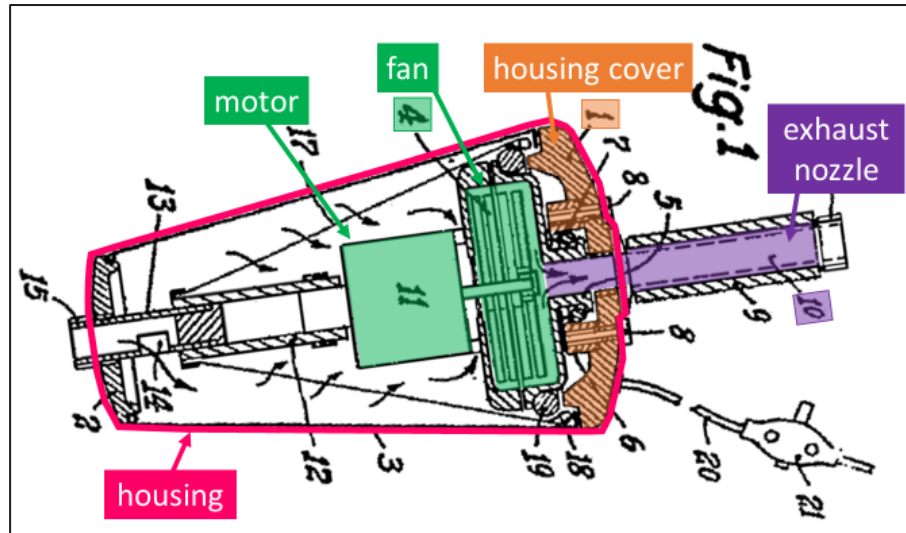
11. [21]

Peter in combination with Neroni renders claim 20 obvious and teaches the remaining limitations of this claim. Ex1002 ¶¶421–28.

Peter’s handvac body comprises a suction motor and fan assembly housing. Ground 3, Limitation [1a.1].

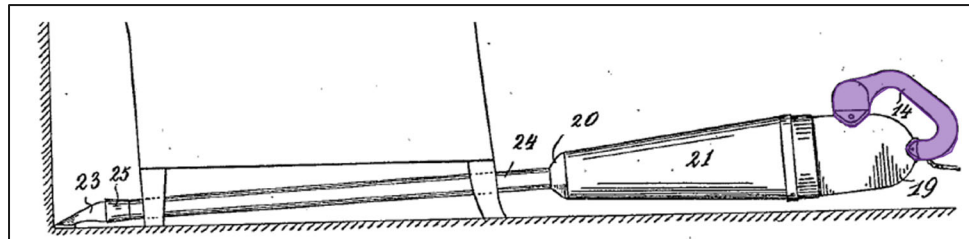
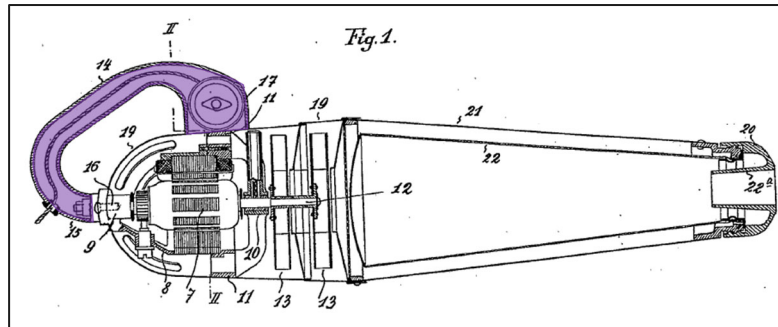
Peter teaches a handle. Ground 3, Limitation [1a.1].

Peter’s handle extends from a sidewall of the suction motor and fan assembly housing: Peter’s “**exhaust nozzle 10** [is] inserted into the **housing cover 1**”:



Ex1007, 2, Fig. 1; Ex1002 ¶¶423–25. “[H]ousing cover 1” is a sidewall of the suction motor and fan assembly housing from which “exhaust nozzle 10” extends. Ex1002 ¶426.

Alternatively, a POSA would’ve been motivated to modify Peter’s handle by relocating it, extending it, or by placing a second handle on the top side of Peter’s housing. Ex1002 ¶427. This would further Peter’s purpose of providing “easy” and “effortless[]” cleaning “under tables, chairs,” and “[p]articularly hard-to-reach areas,” because a user would not need to bend down as far, and would be especially beneficial for users with less flexibility or mobility. Ex1007, 2; Ex1002 ¶427 Further, **handles** extending from the top of the vacuum housing have existed for over a century:



Ex1014, Figs. 1, 6; Ex1002 ¶427.

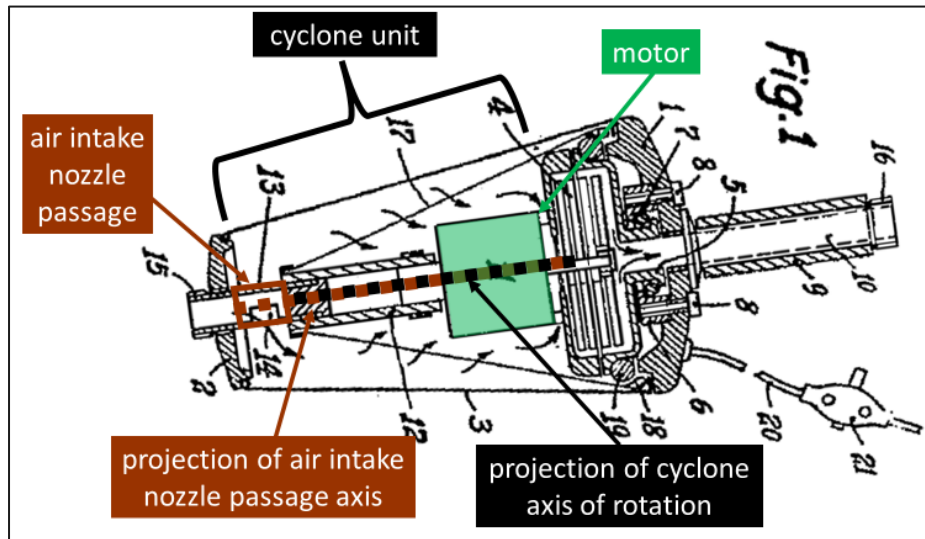
Modifying Peter's handle would've involved adding or substituting one known feature (a handle extending from the top of the housing and into the back) for another to achieve the predictable result of ergonomic handling. Ex1002 ¶428. Because there were only a finite number of possible handle positions, it would've been obvious to try. Ex1002 ¶428. A POSA would've reasonably expected success implementing such a handle because it would've involved a simple addition of a handle or a simple substitution of one handle for another, and as shown above, provides the benefit of ergonomic cleaning in low areas, such as below furniture. Ex1002 ¶428.

12. [22]

Peter in combination with Neroni renders claim 1 obvious and teaches the remaining limitations of this claim. Ex1002 ¶¶429–32.

Peter's handvac inlet passage has an inlet axis. Ground 3, Claim 9.

In Peter, a projection of each of the inlet axis and the cyclone axis intersects the suction motor: a projection of Peter's **air intake nozzle passage axis** and **cyclone axis of rotation** intersects **motor 11**:



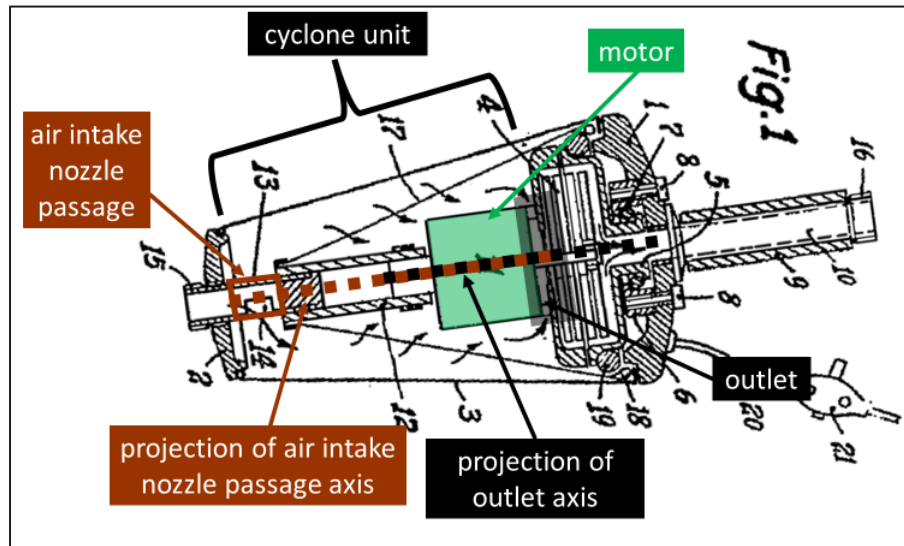
Ex1007, Fig. 1; Ex1002 ¶¶431–32.

13. [23]

Peter in combination with Neroni renders claim 12 obvious and teaches the remaining limitations of this claim. Ex1002 ¶¶433–36.

Peter's handvac air inlet comprises a handvac inlet passage that has an inlet axis, and when the rigid airflow conduit extends between the cleaning head air outlet and the handvac air inlet, the inlet axis is generally parallel to the longitudinally extending conduit axis. Ground 3, Limitation [1c], Claim 9.

In Peter, a projection of each the inlet axis and an outlet conduit axis of the air treatment member intersects the suction motor: a projection of each of Peter's **air intake nozzle passage** and **outlet axis** of the **cyclone unit** (air treatment member) intersects **motor 11**:



Ex1007, Fig. 1; Ex1002 ¶¶435–36.

14. [24]

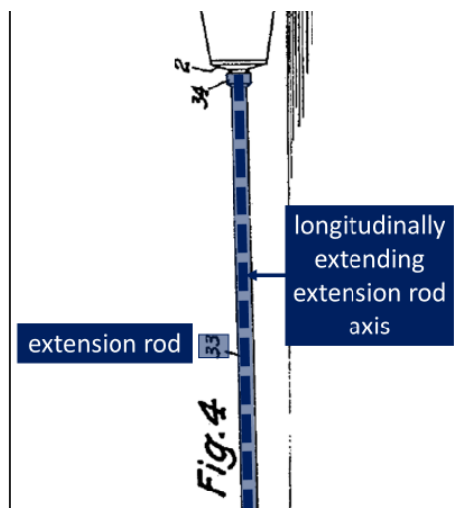
Peter in combination with Neroni renders claim 20 obvious and teaches the remaining limitations of this claim. Ground 3, Claims 9/22/23; Ex1002 ¶¶437–39.

15. [25]/[26]/[27]

Peter in combination with Neroni renders claims 1/12/20 obvious and teaches the remaining limitations of these claims. Ex1002 ¶¶440–45.

Peter's handvac is mounted to the downstream end of the rigid airflow conduit. Ground 3, Limitation [12c]; Ex1002 ¶444.

When Peter's rigid airflow conduit is in an upright storage position, the handle is at an upper end of the surface cleaning apparatus and a portion of the handle is rearward of the wand axis: when oriented as claimed, Peter's **extension rod 33** is in an upright storage position, exhaust nozzle 10 with a **rubber grip 9** is at an upper end of the vacuum and a portion of exhaust nozzle 10 is rearward of the **extension rod's axis**:



Ex1007, Fig. 4; Ex1002 ¶445.

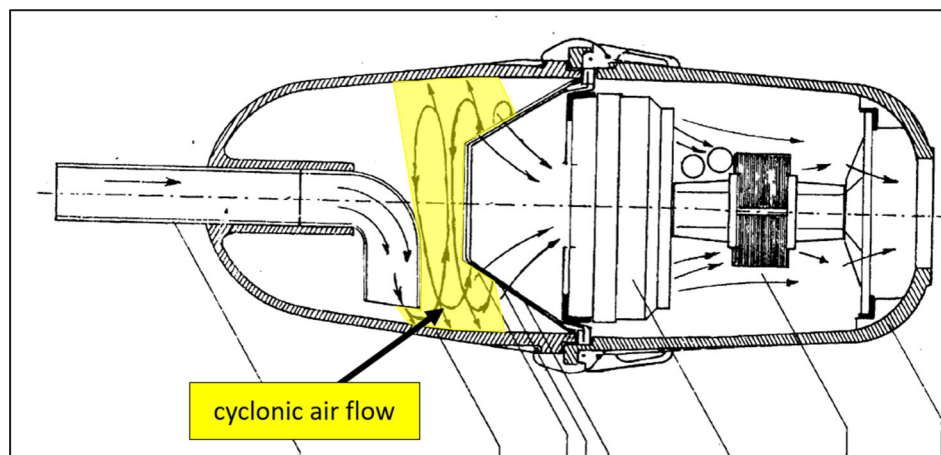
D. Ground 4: Peter in Combination With Neroni And Martelliere And/Or Jansen Renders Claims 1-28 Obvious

1. Martelliere Teaches Cyclonic Airflow That A POSA Would Have Been Motivated To Incorporate Into Peter (Limitations [1a.2]/[12a.2]/[20a.2]/[28a.2], Claim [9])

A POSA would've understood that Peter's teaching of "lateral opening 14 which opens into the interior of the housing," creates cyclonic airflow by releasing air tangentially into Peter's conical chamber, "housing," however, to the extent PO argues otherwise, it would've been obvious to incorporate Martelliere's express

teachings of creating cyclonic airflow using a tangential pipe for the same purpose. Ground 3, Limitations [1a.2]/[12a.2]/[20a.2]/[28a.2], Claim [9]; Ex1007, 2, Fig. 1; Ex1002 ¶446.

Martelliere teaches a cyclonic vacuum cleaner that applies “the ‘Whirlwind’ principle” to separate dust from air, which a POSA would’ve understood is a cyclonic air filtration unit, using a tangential pipe:



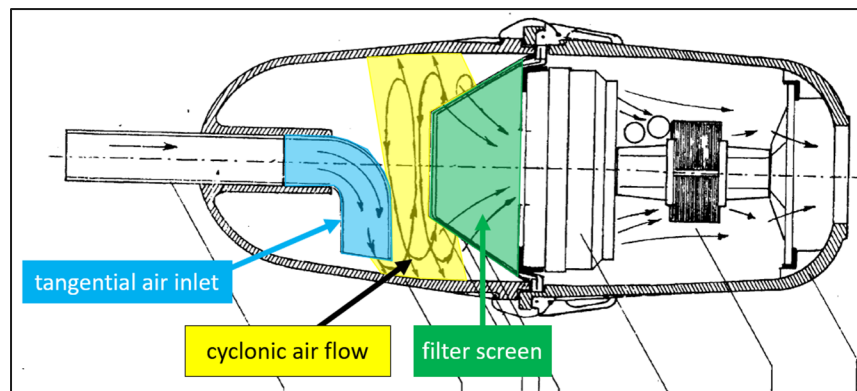
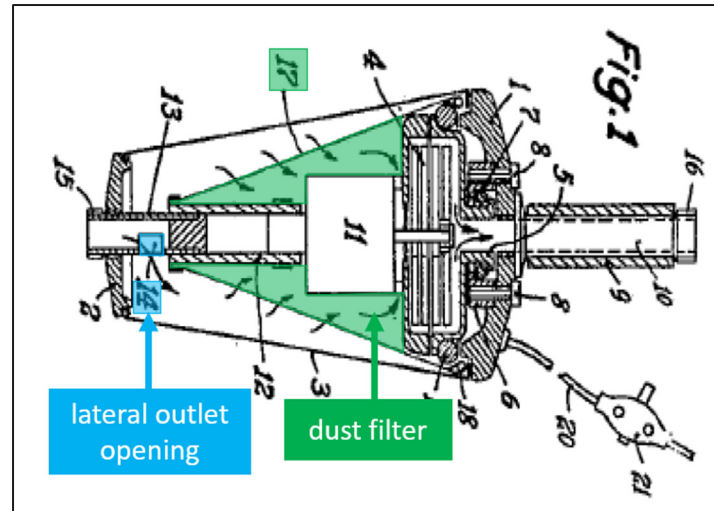
Ex1010, 1, Fig. 1; Ex1002 ¶447. In use, dirty air is “sucked tangentially to the interior wall of the transparent container,” the cyclonic airflow separates dirt from air, and the separated dirt is “deposited in the bottom of the container, after having separated from the air.” Ex1010, 1; Ex1002 ¶448.

A POSA would’ve been motivated to employ cyclonic filtration with Peter using Martelliere’s teachings of a tangential pipe. Ex1002 ¶449. Martelliere’s teaching of “the ‘Whirlwind’ principle” (cyclonic filtration) was well known by the time of the ’550Patent’s alleged invention. Ex1002 ¶449. A POSA would’ve

understood that including cyclonic filtration had certain advantages, including because cyclonic separators maintain a consistently high level of suction, even as the dust collecting chamber fills with dirt. Ex1002 ¶449. As Martelliere explains, “the ‘Whirlwind’ principle” “prevent[s] clogging” and creates “stable suction.” Ex1010, 1. And as Martelliere recognizes, dust bags must be replaced after their “pores ... become blocked,” which does not occur with cyclonic filtration units. *Id.*; Ex1002 ¶449.

A POSA would’ve reasonably expected success incorporating Martelliere’s cyclonic airflow teachings into Peter. Ex1002 ¶450. Peter already teaches creating tangential airflow using “lateral opening 14,” and a POSA would’ve been motivated to add a tangential pipe as taught in Martelliere, which serves the same purpose of creating tangential airflow, because doing so would have involved nothing more than simple substitution of known elements (a tangential pipe in place of a tangential opening) to achieve the predictable result of creating cyclonic airflow, and would’ve reasonably expected success. Ex1002 ¶450.

Further, Peter and Martelliere are analogous art with similar configurations, including for filtration, which would’ve further motivated a POSA to incorporate Martelliere’s teachings:

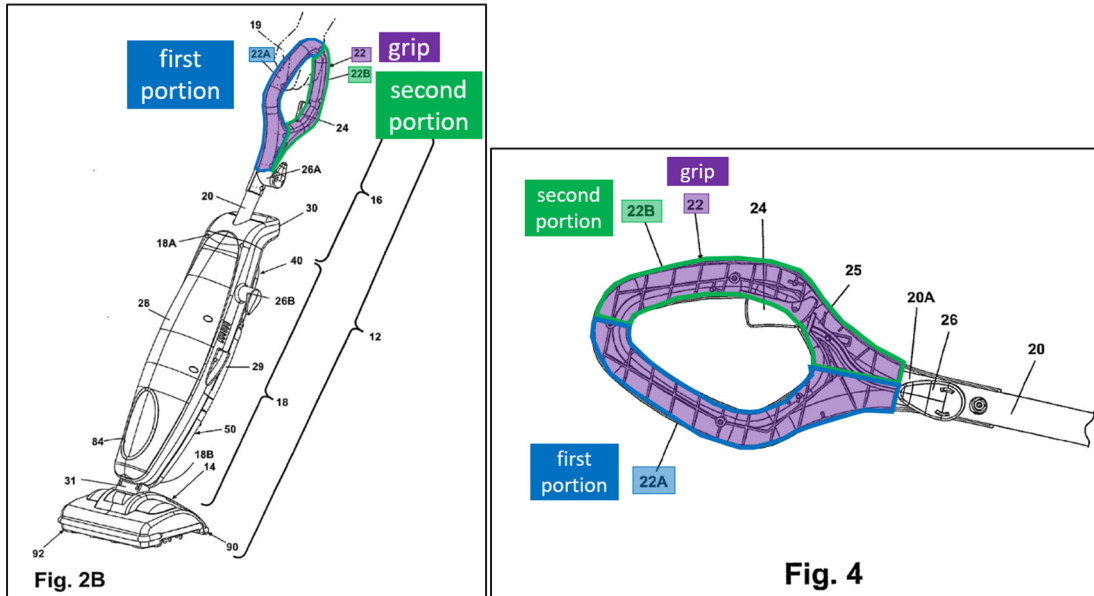


Ex1007, Fig. 1; Ex1010, Fig. 1; Ex1002 ¶451.

2. Jansen Teaches A Handle Having A Hand Grip Portion That Extends Upwardly and Forwardly That A POSA Would Have Been Motivated To Incorporate Into Peter (Limitations [1a.1]/[28a.1])

While Peter teaches a hand grip portion of a handle, “rubber grip 9,” that extends upwardly and forwardly when Peter’s handvac body bottom is on a horizontal surface, it also would’ve been obvious to incorporate Jansen’s upward/forward handle teachings into Peter. Ground 3, Limitations [1a.1]/[28a.1], Ex1007, 2, Figs. 1-4; Ex1002 ¶¶452–60.

Jansen teaches a bi-directional floor-cleaning tool and accordingly has a bi-directional handle. Ex1008 ¶30. Jansen teaches “a handle pivotally connected to the base for movement between” two positions, and has a “**bi-directional grip 22**” with a “**first portion 22A**” and a “**second portion 22B**”:



Ex1008 ¶¶30, 65-66, Figs. 2B, 4; Ex1002 ¶¶453–55. “Because the grip 22 is bilaterally symmetrical, the first and second portions 22A, 22B can be grasped by the user in substantially the same relative position when the handle assembly 12 is in the first and second positions, respectively.” Ex1008 ¶66.

A POSA would’ve been motivated to modify Peter’s handle having a hand grip portion, Peter’s “exhaust nozzle” having a “rubber grip,” to have a “bi-directional,” “bilaterally symmetrical” shape as Jansen teaches. Ex1007, 2, Figs. 1-4; Ex1008 ¶¶30, 65-66, Figs. 2B, 4; Ex1002 ¶456. Like Jansen, Peter teaches a multi-directional floor-cleaning tool (with openings on its top and bottom) and that

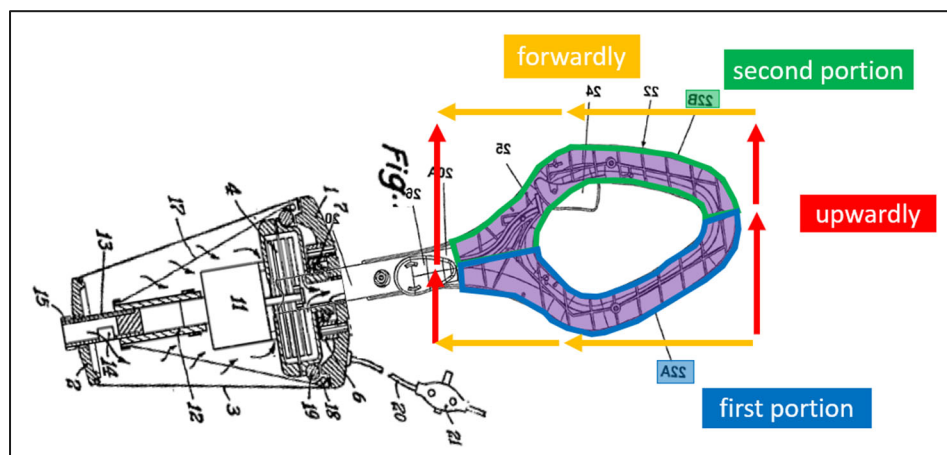
“achieves a special articulation which allows the suction edges of the suction piece to always rest well on the surface to be cleaned, whereby the inclination of the extension rod in relation to the floor can be changed,” which “makes it easy to work under tables, chairs, and similar furniture,” as well as “hard-to-reach areas of the floor or walls.” Ex1007, 2.

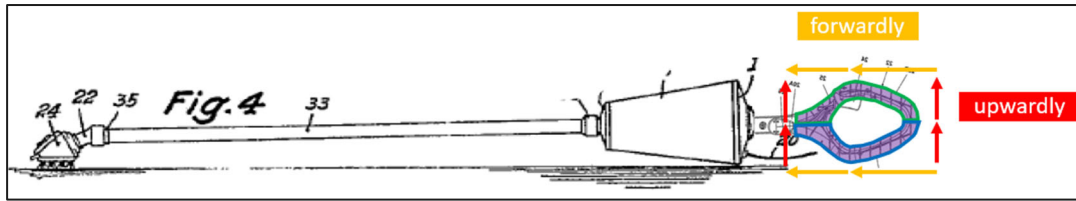
As Jansen explains, “[b]ecause the grip 22 is bilaterally symmetrical, the first and second portions 22A, 22B can be grasped by the user in substantially the same relative position,” and “the feel of the grip 22 in the hand 19 is generally the same regardless of the orientation of the handle assembly 12.” Ex1008 ¶66. A POSA would recognize this increased user comfort would have certain advantages over Peter’s straight “rubber grip.” For example, the user would be able to grip the angled handle more loosely, and clean under low furniture more easily, as they would not need to bend down as far. Ex1002 ¶457. A POSA would’ve found this to be a simple modification of the shape of a known element (Peter’s straight “exhaust nozzle” having a “rubber grip”) into another (Jansen’s “bilaterally symmetrical,” “bi-directional grip” shape) to obtain the predictable result of allowing a user to manipulate Peter’s vacuum cleaner comfortably in different use cases. Ex1002 ¶457. A POSA would understand that when Peter’s “exhaust nozzle” was modified to use this bilaterally symmetrical shape, it would still allow airflow through it, as it would remain hollow and would retain an air outlet, and it

would still be “provided with a rubber grip” along its surface as Peter teaches. Ex1007, 2, Figs. 1-4; Ex1002 ¶457.

A POSA would’ve reasonably expected success because it would have simply involved substituting one handle and grip shape (Jansen’s “bilaterally symmetrical” shape having “bi-directional grip,” Ex1008 ¶66) for another (Peter’s straight “exhaust nozzle” shape having a “rubber grip,” Ex1007, 2, Fig. 1). Ex1002 ¶458. Moreover, a POSA would be further motivated by Peter’s teaching that its vacuum cleaner “parts,” including the “rubber grip,” can be “rotated, individually exchanged and combined.” Ex1007, 1-2; Ex1002 ¶458.

When so modified, Peter’s bilaterally symmetrical handle having a bi-directional grip is a handle having a hand grip portion that extends upwardly and forwardly when the handvac body is in any position, including when positioned with the bottom on a horizontal surface:





Ex1007, Fig. 1, 4; Ex1008, Fig. 4; Ex1002 ¶459. Jensen’s “**first portion 22A**” and “**second portion 22B**” (and portions thereof) are each a hand grip portion of Jensen’s handle (“**grip 22**”) that extend upwardly and forwardly. Ex1002 ¶460.

IX. DISCRETIONARY FACTORS FAVOR INSTITUTION

A. §314(a)

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

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

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

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

Factor 2 favor institution: while the scheduled Litigation trial date is July 21, 2025—approximately 17 months away—any comparison of a projected FWD date against the scheduled trial date is speculative. *See Dish Network v. Broadband iTV*, IPR2020-01280, Paper 17 at 16 (PTAB Feb. 4, 2021) (“We cannot ignore the fact that the currently scheduled trial date is more than nine months away and much can change during this time”); Guidance at 8 (“Stakeholders correctly noted that scheduled trial dates are unreliable and often change[,]” and a “scheduled trial date ... is not by itself a good indicator of [when] the district court trial will occur.”). Instead, “when considering the proximity of the district court’s trial date to the date when the PTAB final written decision will be due, the PTAB will consider the median time from filing to disposition of the civil trial for the district in which the parallel litigation resides.” *Id.* at 3. The median time to trial in the District of Massachusetts is 34.6 months according to Federal Court Management Statistics (December 31, 2023). Ex1018. The district court litigation was filed on August 15, 2023, when the ’550Patent was added to an Amended Complaint in Case No. 23-cv-1277, and which indicates an expected trial date of approximately July 1, 2026, approximately 10 months after a FWD. Because the expected trial date is after the FWD deadline, this factor weighs in favor of institution. *Samsung*

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

Factor 3 favors institution. “If, at the time of the institution decision, the district court has not issued orders related to the patent at issue in the petition, this fact weighs against exercising discretion to deny institution” *Apple Inc., v. Fintiv, Inc.*, IPR2020-00019, Paper 11 at 10 (PTAB Mar. 20, 2020) (precedential). No such substantive orders have issued with respect to the ’550Patent, and none are expected prior to institution. A *Markman* hearing is scheduled for July 16, 2024, and a *Markman* order is not expected until several months after the hearing. *E.g., iRobot Corp. v. SharkNinja Operating LLC et al.*, 19-cv-12125 (D. Mass.) (holding a *Markman* hearing on 8/6/2020 and issuing a *Markman* order on 1/14/21). Further, the parties’ investments in co-pending litigation have been low and will remain low at the time of institution. In the co-pending litigation, PO added the ’550Patent to an Amended Complaint on August 15, 2023 in Case No. 23-cv-11277, which the Court severed on October 13, 2023 as Case No. 23-cv-12372. On October 10, 2023, Dyson filed a motion to dismiss, which remains pending, and Dyson has not yet filed an Answer to the Complaint. Litigation, Dkt. 76. Fact discovery began on 10/30/2023 and no depositions have been taken. Litigation, Dkts. 103–04. PO served its infringement contentions on December 15,

2023, and Petitioners filed this petition within three months of those contentions. Ex1017.

Factor 4 favors institution because there is little overlap between the two proceedings. This Petition challenges 8 claims not at-issue in the Litigation, *see* Ex1016, 2; and Petitioners stipulate that, unless the Board denies or later vacates institution of this Petition, Petitioners will not seek resolution of invalidity in the copending litigation based on the specific grounds asserted in this Petition. Ex1019.

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

The *General Plastics* factors favor institution because this is the only petition against the '550Patent. *General Plastics Indus. Co., Ltd. v. Canon Kabushiki Kaisha*, IPR2016-01357, Paper 19 at 9-10 (PTAB Sept. 6, 2017).

B. §325(d)

The §325(d) factors favor institution. The relied-upon 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, *SharkNinja Operating LLC v. Dyson, Inc.*, No. 1:23-cv-12372 (D. Mass.) (the "Litigation"), the '550Patent 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

Lead Counsel	Back-Up Counsel
Christian Huehns Reg. No. 77,717 christian.huehns@kirkland.com <u>Postal and Hand-Delivery Address:</u> KIRKLAND & ELLIS LLP 300 North LaSalle Chicago, IL 60654 Telephone: (312) 862-2000 Facsimile: (312) 862-2200	Matthew Benjamin Hershkowitz Reg. No. 77,881 matt.hershkowitz@kirkland.com <u>Postal and Hand-Delivery Address</u> KIRKLAND & ELLIS LLP 601 Lexington Ave New York, NY 10022 Telephone: (212) 446-4800 Facsimile: (212) 446-4900 Jay Emerick (<i>pro hac vice</i> motion forthcoming) jay.emerick@kirkland.com <u>Postal and Hand-Delivery Address:</u> KIRKLAND & ELLIS LLP 300 North LaSalle Chicago, IL 60654 Telephone: (312) 862-2000

Lead Counsel	Back-Up Counsel
	Facsimile: (312) 862-2200 Bryan S. Hales, P.C. (<i>pro hac vice</i> motion forthcoming) bhales@kirkland.com <u>Postal and Hand-Delivery Address:</u> KIRKLAND & ELLIS LLP 300 North LaSalle Chicago, IL 60654 Telephone: (312) 862-2000 Facsimile: (312) 862-2200

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. 10,117,550

Date: March 12, 2024

Respectfully submitted,

/s/ Christian Huehns

Christian Huehns (Reg. No. 77,717)
Bryan S. Hales, P.C. (*pro hac*
forthcoming)
Jay Emerick (*pro hac* forthcoming)
KIRKLAND & ELLIS LLP
300 N. LaSalle
Chicago, IL 60654
Telephone: (312) 862-2000
Facsimile: (312) 862-2200
christian.huehns@kirkland.com
bhasles@kirkland.com
jay.emerick@kirkland.com
DysonIPR@kirkland.com

Matthew B. Hershkowitz (Reg. No.
77,881)
KIRKLAND & ELLIS LLP
601 Lexington Ave.
New York, NY 10022
Telephone: (212) 446-4800
Facsimile: (212) 446-4900

Attorneys for Petitioner

CERTIFICATE OF COMPLIANCE

This Petition complies with the type-volume limitations as mandated in 37 C.F.R. § 42.24, totaling 13,916 words. Counsel has relied upon the word count feature provided by Microsoft Word.

/s/ Christian Huehns

CERTIFICATE OF SERVICE

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

1059 – Bereskin & Parr LLP / S.E.N.C.R.L., srl.
40 King Street West
40th Floor
Toronto, ON
Canada

A copy was also served via electronic mail and FTP on the attorneys of record in the following related matter, SharkNinja Operating LLC et al. v. Dyson, Inc. et al., 1:23-cv-12372-ADB (D. Mass.):

GIBSON, DUNN & CRUTCHER LLP
SharkNinja-Dyson@gibsondunn.com
Brian A. Rosenthal
Benjamin Hershkowitz
Vivian Lu
Brian Buroker
Wendy W. Cai

WILMER CUTLER PICKERING HALE AND DORR LLP
WHSharkNinja-DysonService@wilmerhale.com
Joseph J. Mueller
Todd C. Zubler
Omar A. Khan
Jeffrey A. Dennhardt

/s/ Sheryl A. Brongiel
Sheryl A. Brongiel