

Petition for *Inter Partes* Review of U.S. Patent No. 10,327,607

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. IPR2024-00733

U.S. PATENT NO. 10,327,607

PETITION FOR *INTER PARTES* REVIEW

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<i>Wellman, Inc. v. Eastman Chem. Co.</i> , 642 F.3d 1355 (Fed. Cir. 2011)	12

LIST OF EXHIBITS

Exhibit	Description
1001	U.S. Patent No. 10,327,607 (“’607Patent”)
1002	Declaration of Robert Giachetti
1003	<i>Curriculum Vitae</i> of Robert Giachetti
1004	File History of U.S. 10,327,607 (App. No. 15/181,537)
1005	U.K. Patent Publication GB2,399,780A (“Liddell”)
1006	U.K. Patent Publication GB2,372,434A (“Organ”)
1007	U.S. Patent No. 1,940,609 (“Simpson”)
1008	U.S. Patent 5,267,371 (“Soler”)
1009	Dyson DC14 Owner’s Manual (“DC14Manual”)
1010	U.S. Patent Publication US2004/0237482A1 (“Lim”)
1011	U.K. Patent Publication GB2,385,292A (“Dummelow”)
1012	U.S. Patent Publication US2006/0137309A1 (“Jeong”)
1013	U.S. Patent US7,294,159B2 (“Oh”)
1014	Dyson DC07 Owner’s Manual (“DC07Manual”)
1015	Affidavit of Nathaniel E. Frank-White (regarding “DC14Manual,” “DC07Manual,” and other Dyson product manuals)
1016	SharkNinja’s Preliminary Patent-Related Disclosures and Infringement Contentions, served Dec. 15, 2023
1017	Exhibit H-2 to Infringement Contentions, Claim Chart Comparing the Dyson V8 line to U.S. Patent No. 10,327,607, served Dec. 15, 2023
1018	W.O. Patent Publication WO2006/008451A1 (“Genn”)

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1019	U.S. Patent 9,545,181 (“181Patent”)
1020	File History of U.S. 9,545,181 (App. No. 14/875381)
1021	U.K. Patent Publication GB2,035,787A (“Merritt”)
1022	U.S. Patent 6,485,536 (“Masters”)
1023	U.S. Patent 6,295,692 (“Shideler”)
1024	U.S. Patent Publication US2005/0086762A1 (“Paris”)
1025	E.P. Patent Publication EP1,652,457 (“Lee”)
1026	U.K. Patent Publication GB2413103 (“Oh103”)
1027	The Parties’ Revised Proposed Schedule in <i>SharkNinja Operating LLC v. Dyson, Inc.</i> , No. 1:23-cv-12372 (D. Mass.)
1028	https://www.uscourts.gov/sites/default/files/data_tables/fcms_na_distpr ofile1231.2023.pdf
1029	Petitioners’ Stipulation
1030	Affidavit of Nathaniel E. Frank-White (regarding “Dyson Online Help” page on the Dyson website)
1031	U.S. Patent Publication US2005/0198769A1 (“Lee769”)
1032	U.S. Patent 6,572,668 (“An”)

LIST OF CHALLENGED CLAIMS

Reference Number	Claim Limitation
Claim 1	
[1pre]	A hand carriable surface cleaning apparatus comprising:
[1a]	a fluid flow path extending between a dirty air inlet and a clean air outlet;
[1b]	a first cyclonic cleaning stage positioned in the fluid flow path downstream from the dirty air inlet, the first cyclonic cleaning stage comprising an upper end, a bottom end spaced longitudinally below the upper end and a side wall extending therebetween, the first cyclonic cleaning stage having a dirt collection region with a bottom door that is openable to empty the dirt collection region;
[1c]	a second cyclonic cleaning stage positioned in the fluid flow path downstream from the first cyclonic cleaning stage, the second cyclonic cleaning stage having an upper end which is positioned above the upper end of the first cyclonic cleaning stage, the second cyclonic cleaning stage is longitudinally moveable relative to all of the sidewall of the first cyclonic cleaning stage;
[1d]	a suction motor positioned in the fluid flow path downstream from the second cyclonic cleaning stage; and,
[1e]	a handle;
[1f]	wherein the second cyclonic cleaning stage comprises a plurality of second cyclones connected fluidly in parallel with each other,
[1g]	wherein the second cyclones are positioned around a central longitudinal axis that extends through the first cyclonic cleaning stage and the openable bottom door, and
[1h]	wherein the plurality of second cyclones includes a first set of second cyclones arranged in an inner ring and a second set of second cyclones arranged in an outer ring laterally surrounding the inner ring.
Claim 2	
[2]	The hand carriable surface cleaning apparatus of claim 1, further comprising a housing containing the suction motor and the clean air outlet, wherein the bottom door is openable while the sidewall of the first cyclonic cleaning stage is connected to the housing.
Claim 3	

Reference Number	Claim Limitation
[3]	The hand carriable surface cleaning apparatus of claim 1, wherein the upper end of the second cyclonic cleaning stage overlies the entire upper end of the first cyclonic cleaning stage.
Claim 4	
[4]	The hand carriable surface cleaning apparatus of claim 1, wherein the second cyclonic cleaning stage is moveable relative to the sidewall while the bottom door is open.
Claim 5	
[5]	The hand carriable surface cleaning apparatus of claim 1, further comprising a pre-motor filter chamber positioned in the fluid flow path between the second cyclonic cleaning stage and the suction motor, and wherein each second cyclone has a respective air outlet that is in fluid communication with the pre-motor filter chamber.
Claim 6	
[6]	The hand carriable surface cleaning apparatus of claim 1, wherein each second cyclone comprises a respective cyclone axis about which air circulates within the second cyclone, wherein the cyclone axes are generally longitudinal.
Claim 7	
[7]	The hand carriable surface cleaning apparatus of claim 1, wherein the dirty air inlet comprises a conduit extending forwardly from the first cyclonic cleaning stage, and wherein the second cyclonic cleaning stage is longitudinally moveable relative to the conduit.
Claim 8	
[8]	The hand carriable surface cleaning apparatus of claim 7, wherein the dirty air inlet is located at a front end of the hand carriable surface cleaning apparatus and the upper end of the second cyclonic cleaning stage is located above the dirty air inlet.
Claim 9	
[9]	The hand carriable surface cleaning apparatus of claim 7, wherein the conduit defines an axis that intersects the first cyclonic cleaning stage.
Claim 10	
[10]	The hand carriable surface cleaning apparatus of claim 1, further comprising an openable lid that is moveable between a closed position, in which the lid overlies the second cyclonic cleaning

Reference Number	Claim Limitation
	stage, and an open position in which the second cyclonic cleaning stage is accessible.
Claim 11	
[11]	The hand carriable surface cleaning apparatus of claim 1, wherein the second cyclonic cleaning stage is removable from the first cyclonic cleaning stage.
Claim 12	
[12pre]	A hand carriable surface cleaning apparatus comprising:
[12a]	a fluid flow path extending between a dirty air inlet and a clean air outlet;
[12b]	a first cyclonic cleaning stage positioned in the fluid flow path downstream from the dirty air inlet, the first cyclonic cleaning stage comprising an upper end, a bottom end spaced longitudinally below the upper end and a side wall extending therebetween, the first cyclonic cleaning stage having a dirt collection region with a bottom door that is openable to empty the dirt collection region;
[12c]	a second cyclonic cleaning stage positioned in the fluid flow path downstream from the first cyclonic cleaning stage, the second cyclonic cleaning stage having an upper end which is positioned above the upper end of the first cyclonic cleaning stage, the second cyclonic cleaning stage is longitudinally moveable relative to all of the sidewall of the first cyclonic cleaning stage;
[12d]	a suction motor positioned in the fluid flow path downstream from the second cyclonic cleaning stage; and,
[12e]	a handle;
[12f]	wherein the first cyclonic cleaning stage has a first stage air inlet, each cyclone of the second cyclonic cleaning stage has a second stage air inlet downstream from the first stage air inlet and the hand carriable surface cleaning apparatus further comprises a screen positioned in the fluid flow path between the first stage air inlet and the second stage air inlet, wherein the screen is longitudinally moveable relative to the sidewall.
Claim 13	
[13pre]	A hand carriable surface cleaning apparatus comprising:
[13a]	a fluid flow path extending between a dirty air inlet and a clean air outlet;

Reference Number	Claim Limitation
[13b]	a first cyclonic cleaning stage positioned in the fluid flow path downstream from the dirty air inlet, the first cyclonic cleaning stage comprising an upper end, a bottom end spaced longitudinally below the upper end and a side wall extending therebetween, the first cyclonic cleaning stage having a dirt collection region with a bottom door that is openable to empty the dirt collection region;
[13c]	a second cyclonic cleaning stage positioned in the fluid flow path downstream from the first cyclonic cleaning stage, the second cyclonic cleaning stage having an upper end which is positioned above the upper end of the first cyclonic cleaning stage, the second cyclonic cleaning stage is longitudinally moveable relative to all of the sidewall of the first cyclonic cleaning stage;
[13d]	a suction motor positioned in the fluid flow path downstream from the second cyclonic cleaning stage; and,
[13e]	a handle;
[13f]	wherein the second cyclonic cleaning stage further comprises a second stage handle.
Claim 14	
[14pre]	A hand carriable surface cleaning apparatus comprising:
[14a]	a fluid flow path extending between a dirty air inlet and a clean air outlet;
[14b]	a first cyclonic cleaning stage positioned in the fluid flow path downstream from the dirty air inlet, the first cyclonic cleaning stage comprising an upper end, a bottom end spaced longitudinally below the upper end and a side wall extending therebetween, the first cyclonic cleaning stage having a dirt collection region with a bottom door that is openable to empty the dirt collection region;
[14c]	a second cyclonic cleaning stage positioned in the fluid flow path downstream from the first cyclonic cleaning stage, the second cyclonic cleaning stage having an upper end which is positioned above the upper end of the first cyclonic cleaning stage, the second cyclonic cleaning stage is longitudinally moveable relative to all of the sidewall of the first cyclonic cleaning stage;
[14d]	a suction motor positioned in the fluid flow path downstream from the second cyclonic cleaning stage; and,
[14e]	a handle;

Reference Number	Claim Limitation
[14f]	wherein the first cyclonic cleaning stage comprises a first cyclone chamber and a first dirt collection chamber that comprises the dirt collection region and is external to the first cyclone chamber.

I. INTRODUCTION

The '607 Patent “relates to a surface cleaning apparatus” with a “portable surface cleaning unit” mountable on “a base” that “is usable when mounted on the base or when removed therefrom.” Ex1001, 1:25-30. However, the claims are not directed to a portable cleaner with a base, but instead recite a “surface cleaning apparatus” with well-known features, none of which purport to solve any problem or provide any technical benefit. That is presumably because Patent Owner (“PO”) drafted these claims—years after the specification was written—in a failed attempt read on Petitioner’s products, not to solve a technical problem.

In prosecution, the Examiner identified just one purportedly novel claimed feature—which appears in just one of the four independent claims—that “a first set of second cyclones arranged in an inner ring and a second set of second cyclones arranged in an outer ring laterally surrounding the inner ring, was not found in the prior art.” Ex1004, 1044. This feature—alone or in combination with the other claimed limitations—does not purport to solve any technical problem. Further, the Examiner’s sole reason for allowance does not even apply to three of the four independent claims, which do not require this.

While this feature “was not found in the prior art” by the Examiner, it was in fact well-known. For example, U.K. Patent Publication GB2,399,780A (“Liddell”) teaches an inner and outer ring of second cyclones arranged as claimed:

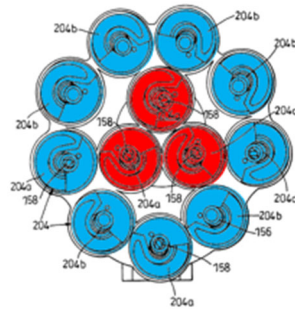


Fig. 7

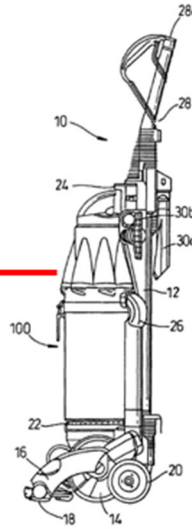


Fig. 1b

Ex1005, Fig. 7, Fig. 1, 10:5-10:20 (“[n]ine of the cyclones 204 are located in an **outer ring** and three cyclones are located in an **inner ring**”). The art in this Petition was not before the Patent Office and renders all claims unpatentable.

II. STANDING (§42.104(A))

Petitioners certify that the '607Patent is available for *inter partes* review, and that Petitioners are not barred or estopped from requesting *inter partes* review to challenge the claims on the grounds herein.

III. RELIEF REQUESTED (§42.104(B))

Petitioners respectfully request review and cancellation under 35 U.S.C. §311 of claims 1-14 as follows:¹

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

Prior Art	Publication	Basis
U.K. Patent Pub. GB2,399,780A (“Liddell”)	9/29/2004	pre-AIA §102(b)
U.K. Patent Pub. GB2,372,434A (“Organ”)	8/29/2002	
U.S. Patent 1,940,609 (“Simpson”)	12/19/1933	
Dyson DC14 Owner’s Manual (“DC14Manual”)	10/13/2005	
U.S. Patent App. No. 2004/0237482 (“Lim”)	12/2/2004	
U.S. Patent 5,267,371 (“Soler”)	12/7/1993	

Grounds	Claims	Basis
1	1, 3-4, 6-13	§102; Liddell
2	1, 3-13	§103; Liddell alone or combined with Organ
3	10	§103; Liddell combined with Organ and DC14Manual
4	14	§103; Liddell combined with Lim; and Liddell combined with Organ and Lim
5	1-4, 6-13	§103; Simpson combined with Liddell
6	1-13	§103; Simpson combined with Liddell and Organ

7	10	§103; Simpson combined with Liddell and DC14Manual; and Simpson combined with Liddell, Organ, and DC14Manual
8	14	§103; Simpson combined with Liddell and Lim; Simpson combined with Liddell, Organ, and Lim
9	1-4, 6-9, 11-13	§103; Soler combined with Liddell
10	4-5	§103; Soler combined with Liddell and Organ
11	14	§103; Soler combined with Liddell and Lim

IV. '607PATENT OVERVIEW

The '607Patent issued from Application No. 15/181,537, filed June 14, 2016, and claims priority to December 15, 2006.

A. Specification

The '607Patent relates to a vacuum with “a base with a removable portable surface cleaning unit” that “is usable when mounted on the base or when removed therefrom,” as shown:

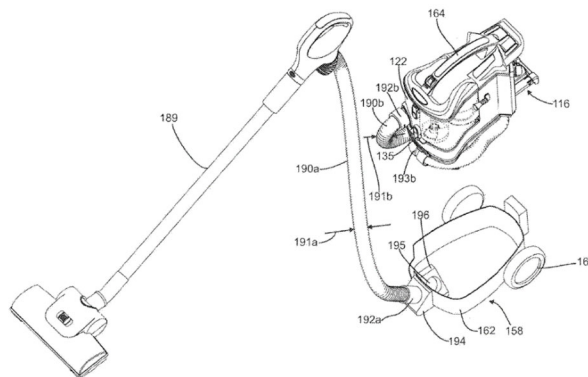


Fig. 13

Id., 1:25-30, 1:64-2:25, Fig. 13.

However, the '607 Patent's claims are not directed towards a base or a removable cleaner. Instead, they mix-and-match well-known, interchangeable vacuum cleaner features—such as a “dirty air inlet,” a “clean air outlet,” a “first cyclonic cleaning stage,” a “second cyclonic cleaning stage” that is “longitudinally moveable,” a “suction motor,” and a “handle”—that do not purport to solve any particular problem, much less an alleged problem in the art. *Id.*, Claims.

B. Prosecution History

Independent claims 1 and 12-14 issued with no prior art rejections. Ex1004, 985-989. The Examiner's Reasons for Allowance stated:

[T]he limitation of wherein the plurality of second cyclones includes a first set of second cyclones arranged in an *inner ring* and a second set of second cyclones arranged in an *outer ring* laterally surrounding the inner ring, was *not found in the prior art*.

Id., 1044.² However, this limitation appears only in claim 1, not independent claims 12-14, and no further reasons were given. *Id.* However, this limitation was known in the art, including in Liddell, which was not before the Examiner.

V. OVERVIEW OF PRIOR ART

A. Liddell

Liddell is a 2004 Dyson patent publication that teaches a vacuum with a “cyclonic separating apparatus”:

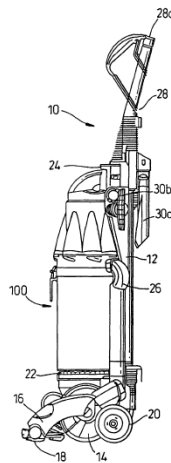
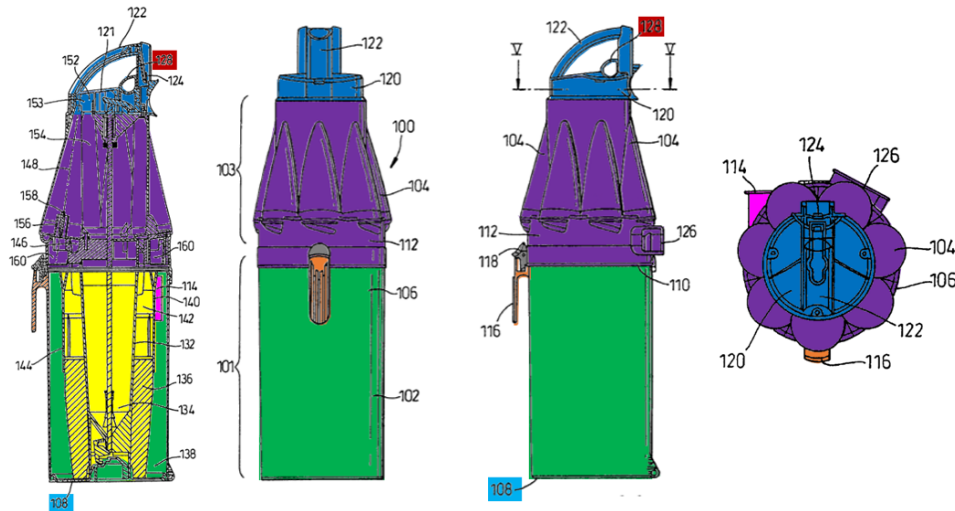


Fig. 1b

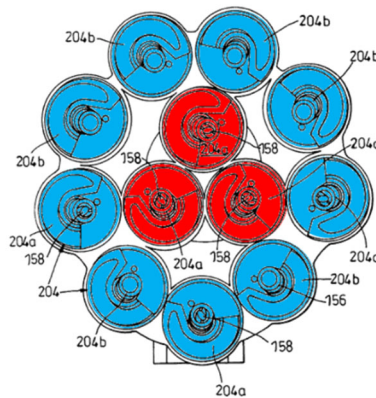
Ex1005, 4:8-9; Fig. 1b. Cyclonic separating apparatus 100 has an **upstream cyclone unit 101** and a **downstream cyclone unit 103**. *Id.*, 5:20-23. **Bin 106** has an openable

² All emphasis, and all coloring and annotations to figures, added unless otherwise noted. Where a figure has been otherwise altered to illustrate Petitioner’s argument, the citation to the figure is labeled as modified.

base 108 and can be released from downstream cyclone unit 103 using handle 116 and catch 118. *Id.*, 5:30-6:2, 6:23-25, 7:5-6.



Id., Figs. 3b&2a-2c.³ Downstream cyclone unit 103 includes downstream cyclones 104/204, arranged in an inner ring and outer ring:

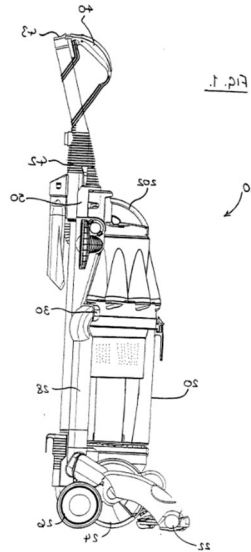


Id. Fig. 7; 5:20-23, 10:5-7.

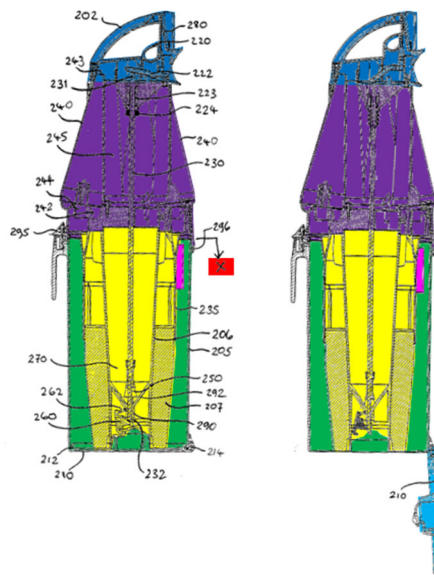
³ The components shaded in yellow are shroud 140, internal wall 132, and baffles 136. *Id.*, 7:1-21; Ex1002, ¶60.

B. Organ

Organ is a 2002 Dyson patent publication directed to a similar design as Liddell:



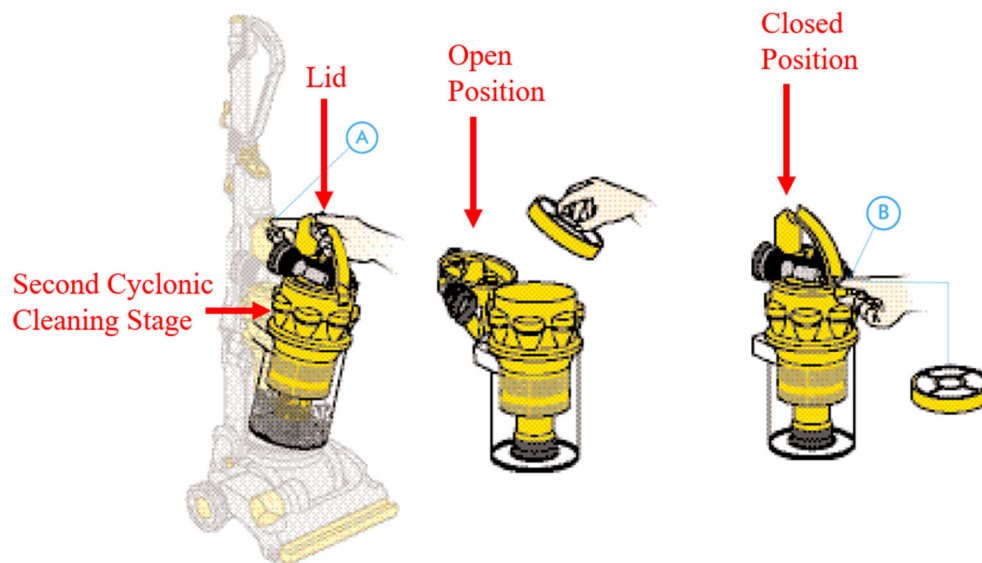
Ex. 1006, Fig. 1. Like Liddell, Organ teaches “**chamber 205** [] is removable from the **remainder of the separator unit 20**,” and moves “in the direction shown by the **arrow X**,” the vertical direction shown in Fig. 3:



Id., 12:1-9, Figs. 3&5. Organ teaches it “is not possible to separate the **chamber 205** from the **remainder of the separator unit 20** until a user operates the release mechanism” which opens the **base 210**. *Id.*, 12:1-16; 3:7-19, 8:10-9:20.

C. DC14Manual

DC14Manual is a user manual for the Dyson DC14, dated June 3, 2004. DC14Manual teaches a cyclonic vacuum cleaner with an openable lid, which provides access to the cleanable “filter”:



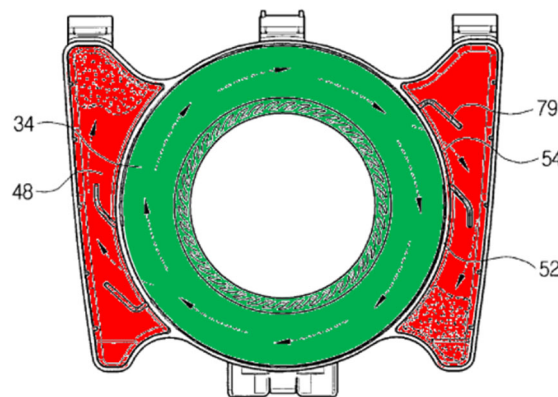
Ex1009, 10.

DC14Manual was publicly available at Dyson's U.S. website (http://www.dyson.com:80/aftersales/Manuals/dc14_opmanual_USA.pdf) no later than October 13, 2005, as shown by Archive.org. Ex1015, 1-4, 148-164. The DC14Manual was indexed on Dyson's website such that POSAs exercising reasonable diligence would have been able to locate it. At the time of the '607Patent,

Dyson was (and remains) a large and well-known vacuum cleaner manufacturer such that POSAs would have been familiar with Dyson and its website. Ex1002, ¶68. As shown in a March 23, 2006 Wayback Machine capture of Dyson’s website, Dyson made its manuals available to the public via a “Dyson Online Help” section of its website (<http://www.dyson.com:80/aftersales/>), where customers could access “Manuals.” Ex1030. POSAs exercising reasonable diligence would therefore have been able to locate the DC14Manual. Ex1002, ¶¶66-68.

D. Lim

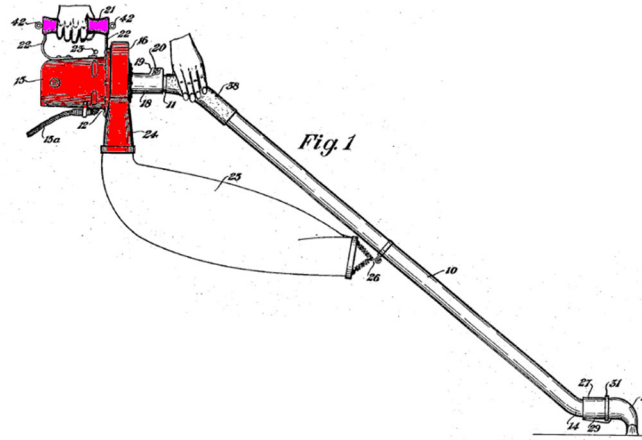
Lim is a 2004 US patent publication that teaches a cyclonic vacuum cleaner where “**dust-collecting chambers 48** are partitioned off from the **cyclone chamber 34** by a partition 52:”



Ex1010, [0002], [0053], [0066], Fig. 5.

E. Simpson

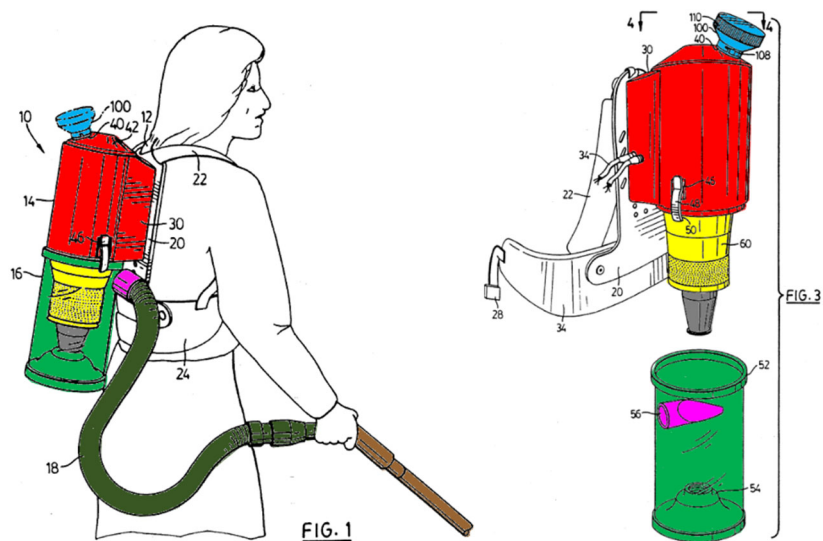
Simpson relates to a hand vacuum with a “**motor-fan exhausting unit**” and a **handle**:



Ex1007, 1:45-58, 1:101-107, 2:78-84, Fig. 1.

F. Soler

Soler is 1993 US patent that teaches a backpack vacuum with “a first cyclone and a second cyclone in series.” Ex1008, 1:9-11, 3:18-19. Soler teaches a “**lower casing 16**,” which contains “**first cyclone chamber 62**,” “is releasably mounted on **upper casing 14**,” which contains “**second cyclone chamber 64/74**,” such that second cyclone chamber [64]/74 is moveable relative to **first cyclone chamber 62**:



Id., 5:46-47, 6:5-37, Figs. 1&3.

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 machine design, including machines that include fluid dynamics or fluid paths, such as vacuum cleaners. Additional education could offset less experience and vice versa, and a POSA could have also obtained similar knowledge and experience through other means.

VII. CLAIM CONSTRUCTION

"[C]laim terms need only be construed to the extent necessary to resolve the controversy."⁴ *Wellman, Inc. v. Eastman Chem. Co.*, 642 F.3d 1355, 1361 (Fed. Cir. 2011). As described below, the preambles should be construed as non-limiting. The remaining terms should be given their plain and ordinary meaning for purposes of this IPR.⁵

A. The Preambles Of Claims 1-14 Should Be Construed As Non-Limiting

"[A]s a general rule[,] preamble language is not treated as limiting." *Aspex Eyewear, Inc. v. Marchon Eyewear, Inc.*, 672 F.3d 1335, 1347 (Fed. Cir. 2012). "[A]

⁴ Dyson is unaware of any "prior claim construction determination" related to the '607Patent. 37 C.F.R. §42.100(b).

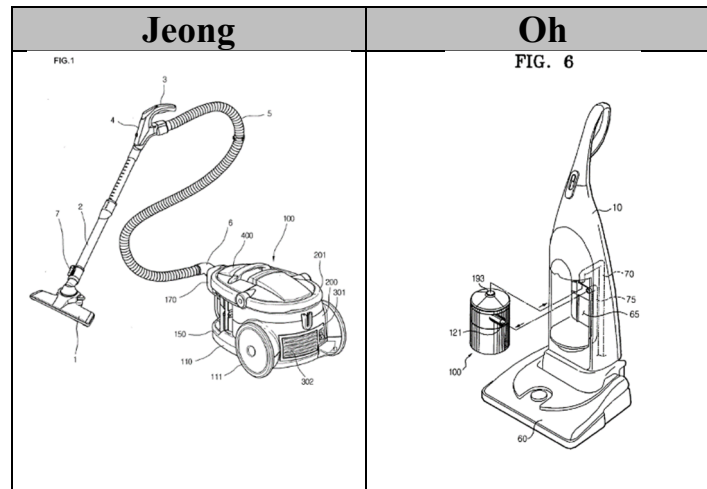
⁵ Dyson reserves all rights to raise claim construction and other arguments in any litigation.

preamble is not limiting where a patentee defines a structurally complete invention in the claim body and uses the preamble only to state a purpose or intended use for the invention.” *Catalina Mktg. Int’l, Inc. v. Coolsavings.com, Inc.*, 289 F.3d 801, 808 (Fed. Cir. 2002). The preambles here should be construed as non-limiting because the body of the challenged claims each describe a structurally complete vacuum cleaner—from a “dirty air inlet” to a “clean air outlet” and containing a complete structure for a vacuum cleaner, including two “cyclonic cleaning stage[s]” to separate dust, a “dirt collection region with a bottom door” to collect and dispose of dirt, “a suction motor” to power the device and a “handle” by which to manipulate it. *See* Ex1001, Claims. The challenged claims—with their structurally complete bodies—“use[] the preamble only to state a purpose or intended use for the invention”—that purpose being for “surface cleaning” and an intended use in a device that is “hand carriable.” *Catalina*, 289 F.3d at 808.

B. If The Preamble Is Construed As Limiting, It Should Be Given Its Plain And Ordinary Meaning

If the Board construes the “hand carriable” portion of the preamble as limiting (it should not), it should be given its plain and ordinary meaning: able to be carried by a hand or hands. While many vacuum cleaners have handles or other configurations that allow them to be carried by a hand or hands, others, such as a central vacuum system in a home, or a carwash vacuum that is fixed into the ground, cannot be hand-carried.

The specification and file history support this plain meaning. PO did not act as its own lexicographer or otherwise define “hand carriable” to modify its plain and ordinary meaning, and made no statements during prosecution that would change the plain meaning of this term. Further, during prosecution, the Examiner rejected the as-filed version of claim 1 (which contained the same “hand carriable” preamble as the challenged claims) based on Jeong (US2006/0137309A1) in view of Oh (US7,294,159), both of which are reproduced below:



Ex1004, 985-989; Ex1012; Ex1013. PO did not dispute the Examiner’s finding that Jeong and Oh disclose “a hand carriable surface cleaning apparatus,” which further counsels in favor of plain meaning, and against a limiting construction that would exclude these canister and upright vacuum references. Ex1012; Ex1013.

VIII. THE CHALLENGED CLAIMS ARE UNPATENTABLE

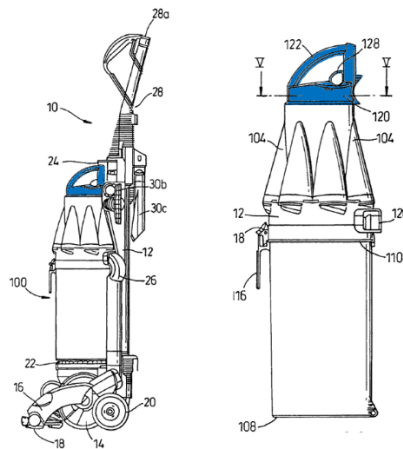
A. Ground 1: Liddell Anticipates Claims 1, 3-4, 6-13

1. [1]/[12]/[13]

a. [1pre]/[12pre]/[13pre]⁶

If construed as limiting, Liddell teaches these preambles. Ex1002, ¶¶78-82.

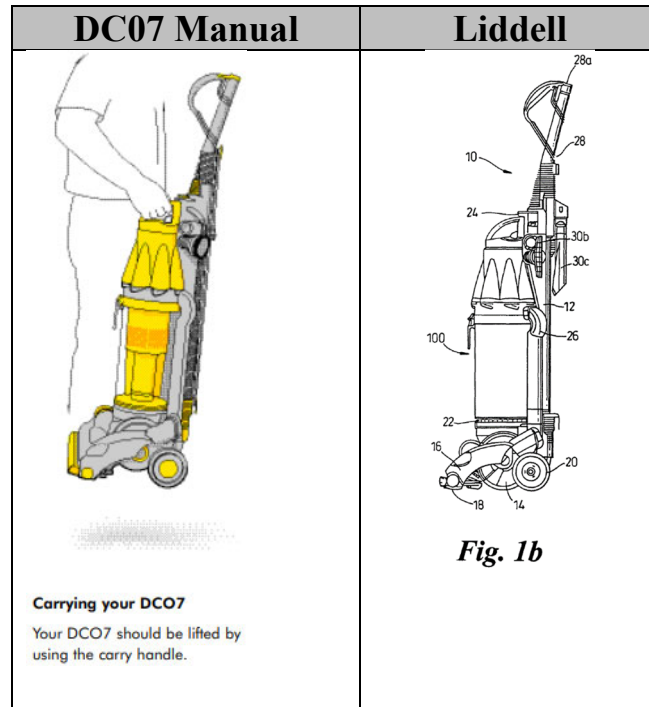
Liddell's vacuum cleaner is hand carriable: it includes “**handle 122**” for carrying it.



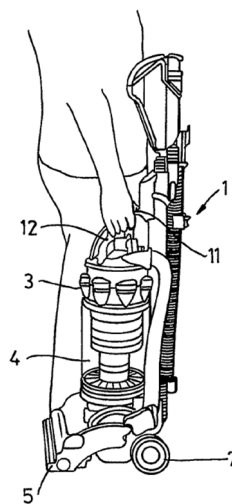
Ex1005, Figs. 1b&2b; 6:16-18; Ex1002, ¶¶78-82.

Other examples in the prior art further support this understanding. For example, the product manual for Dyson's DC07 vacuum shows vacuums like Liddell's were hand carriable and instructs users: “Your DC07 should be lifted by using the carry handle.”

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



Ex1014, 6; Ex1005, Fig. 1b. This manual for the DC07 was available on Dyson's website in 2005. Ex1015, 1-4, 135-147. Further, a Dyson patent filed in 2004 depicts a similarly-configured vacuum and states that the "handle 12...serves to allow the user to lift and carry the appliance as a whole, as shown in Figure [3]":



Ex1018, Fig. 3, 5:29-30.

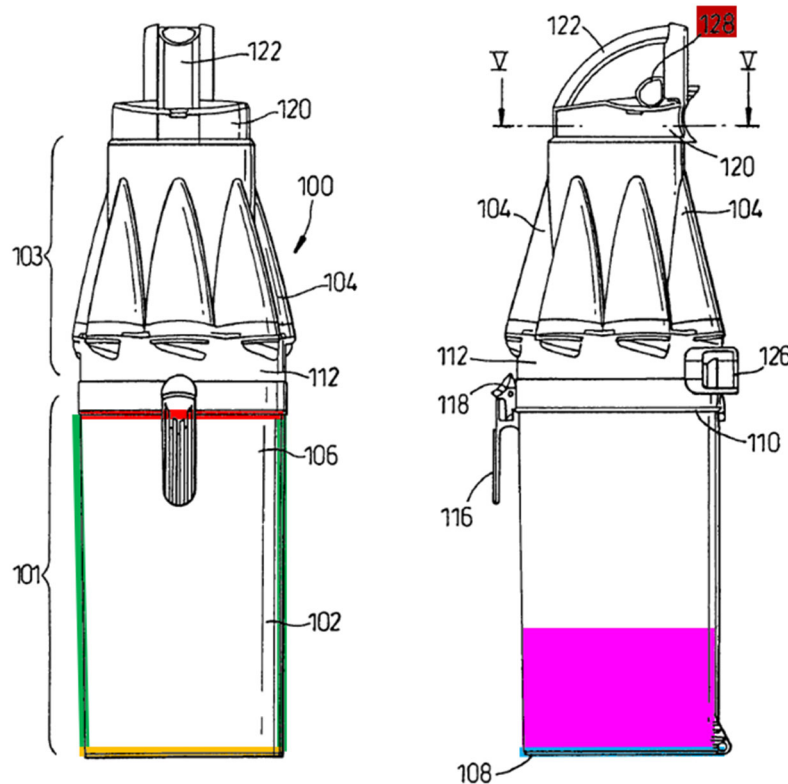
b. [1a]/[12a]/[13a]

Liddell teaches a dirty air inlet; collectively “inlet 18,” “upstream ducting,” and “inlet port 114;” a clean air outlet, located at “filter cover 22” where air is “exhausted from the vacuum cleaner;” and a fluid flow path extending between them. Ex1005, 4:11-12, 4:31-5:30, 6:1-2, 6:20-23, 7:17-26, 8:7-14, 9:14-31, 9:31-10:3; Ex1002, ¶¶83-85.

c. [1b]/[12b]/[13b]

Liddell teaches a first cyclonic cleaning stage, “upstream cyclone unit 101 consisting of a single upstream cyclone 102.” Ex1005, 5:20-5:24, Fig. 2a. Upstream cyclone unit 101 is positioned in the fluid flow path downstream from the dirty air inlet. *Id.*, 5:26-30, 4:31-5:14; Ex1002, ¶¶86-87.

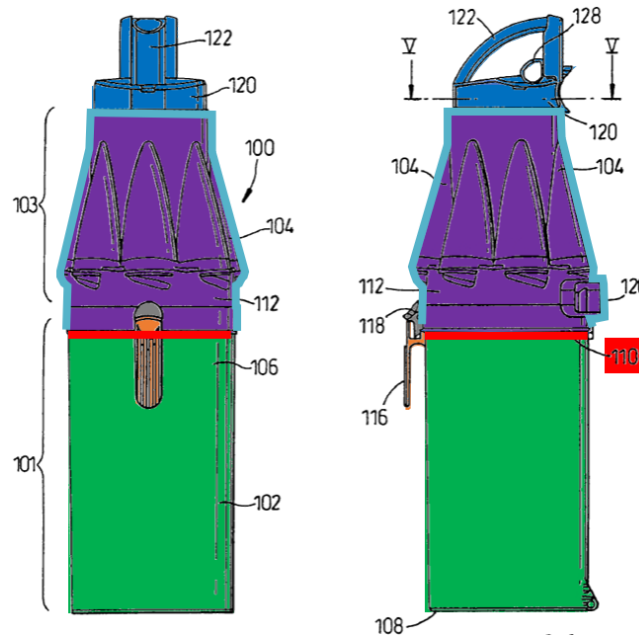
Liddell’s first cyclonic cleaning stage has an upper end (**upper end 110**), a bottom end (**bottom end of cylindrical bin 106**) spaced longitudinally below the upper end and a side wall (**side wall of cylindrical bin 106**) extending therebetween, and a dirt collection region (**collection space 138**) with a bottom door (**base 108**). Ex1005, 5:20-30, 6:14-25, 9:11-9:15, 7:10-15; Ex1002, ¶¶88-89.



Ex1005, Figs. 2a-2b. Liddell’s bottom door is openable to empty the dirt collection region: it includes “a mechanism for opening the **base 108** of the cylindrical bin 106 for emptying purposes.” *Id.*, 6:23-6:25, 7:3-6, 9:11-14.

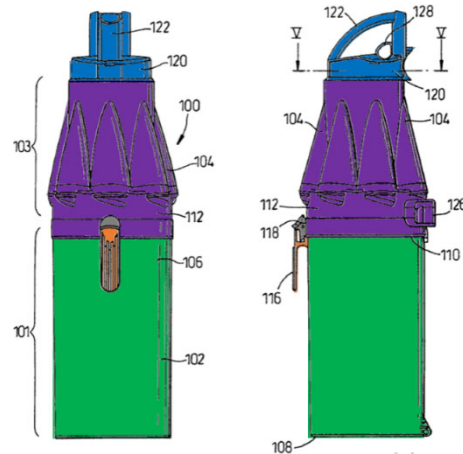
d. [1c]/[12c]/[13c]

Liddell teaches a second cyclonic cleaning stage, “**downstream cyclone unit 103**,” positioned in the fluid flow path downstream from the first cyclonic cleaning stage. *Id.*, 5:20-5:22, 7:18-26, 9:7-10:3, Fig. 2a. Liddell further teaches the second cyclonic cleaning stage (**downstream cyclone unit 103**) has an upper end (**upper surface** of **downstream cyclone unit 103**) positioned above the upper end of the first cyclonic cleaning stage (**upper end 110** of **upstream cyclone unit 101**):

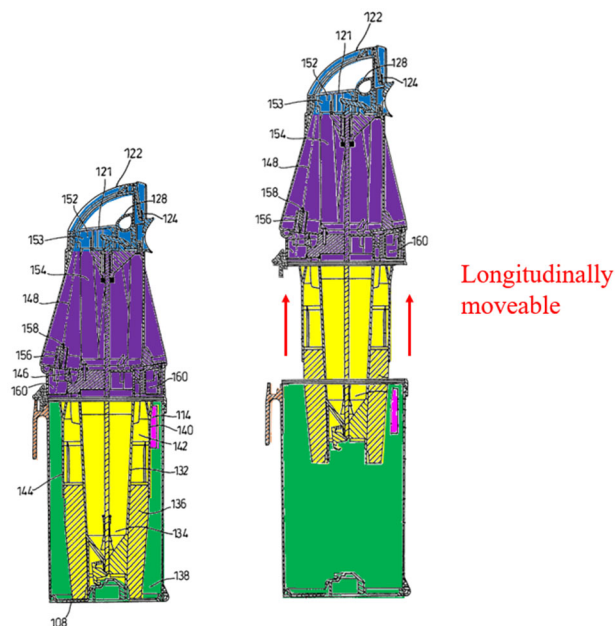


Id., Figs. 2a-2b; Ex1002, ¶¶90-91.

Liddell teaches the second cyclonic cleaning stage (**downstream cyclone unit 103**) is longitudinally moveable relative to all of the sidewall of the first cyclonic cleaning stage (sidewall of **cylindrical bin 106 of upstream cyclone unit 101**). Ex1002, ¶¶92-95. **Inlet support member 112** is part of the **downstream cyclone unit 103** (Ex1005, Fig. 2a, 7:17-26), and Liddell teaches “[a] **handle 116** and a **catch 118** are provided on the **cylindrical bin 106** and the **inlet support member 112** respectively in order to provide means for releasing the **cylindrical bin 106** from the **inlet support member 112** when the **cylindrical bin 106** requires to be emptied.” *Id.*, 5:30-6:2.

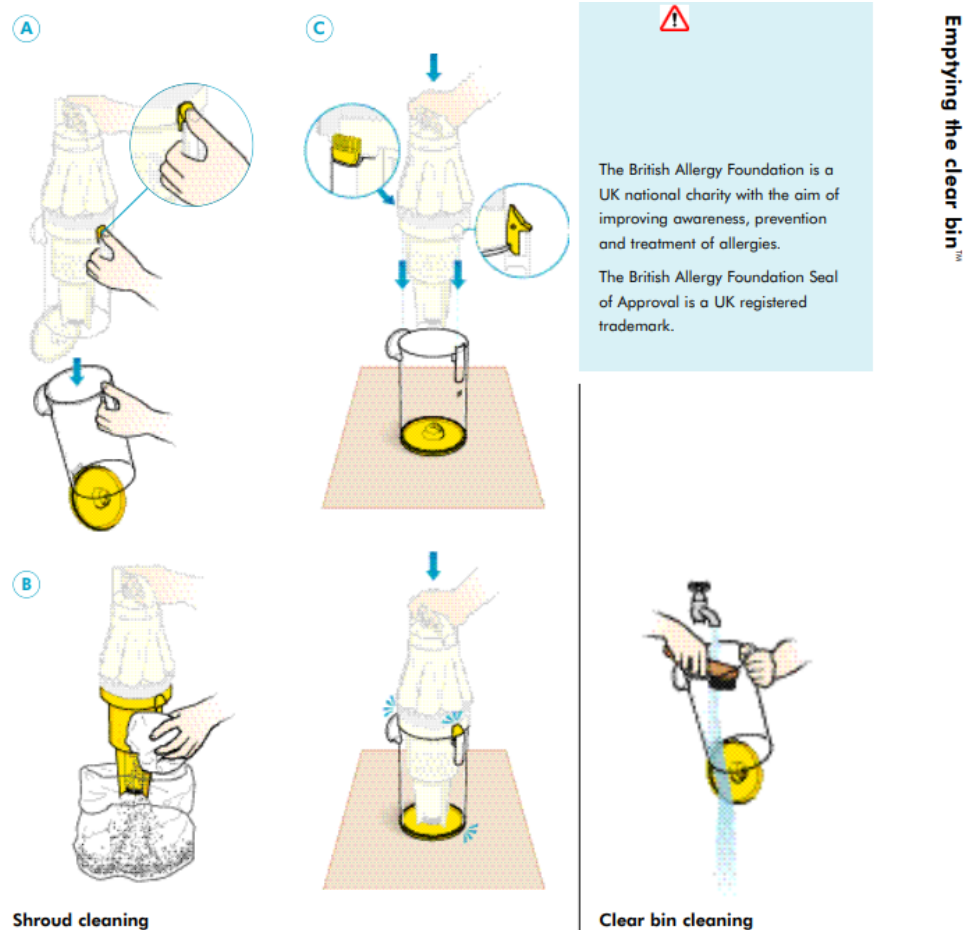


Id., Figs. 2a-2b. When **handle 116** and **catch 118** are disengaged, the **cylindrical bin 106** is released from the **inlet support member 112**, and POSAs would have understood that **downstream cyclone unit 103** is moveable relative to the entire sidewall of **the upstream cyclone unit 101**, including longitudinally, as illustrated below.



Id., 6:16-25, 7:17-26; Ex1002, ¶¶93-95; Ex1005, Fig. 3b(modified). For example, the product manual for Dyson's DC07 vacuum shows vacuums like the one taught

by Liddell with a second stage that is moveable relative to the sidewall of a first stage when the “clear bin” housing the first stage is released from the second stage for cleaning:



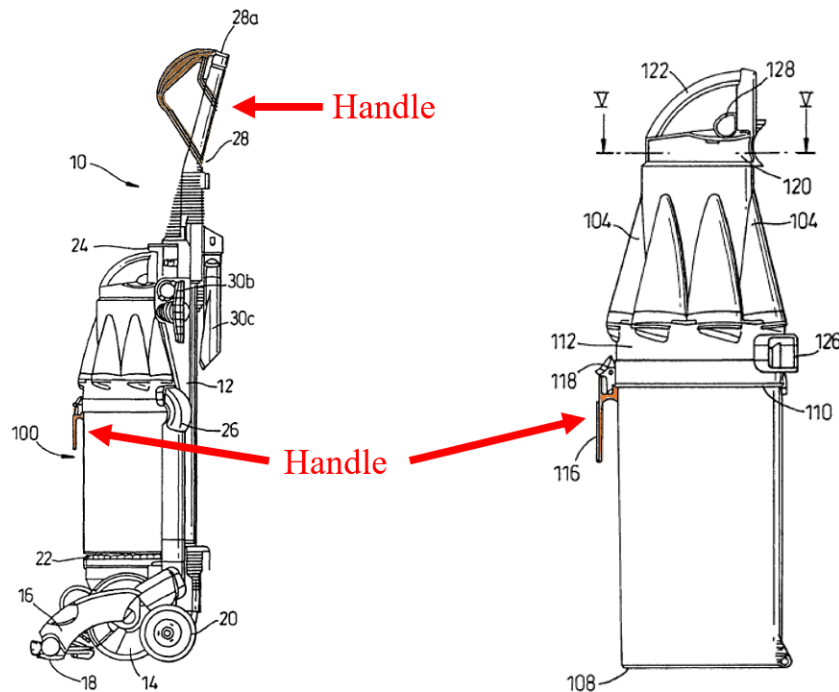
Ex1014, 10.

e. [1d]/[12d]/[13d]

Liddell teaches a suction motor; a “motor.” Ex1005, 5:5-14. Liddell’s motor is in the fluid flow path downstream from the second cyclonic cleaning stage (downstream cyclone unit 103). Ex1002, ¶¶96-98; Ex1005, 5:5-22, 6:20-23.

f. [1e]/[12e]/[13e]

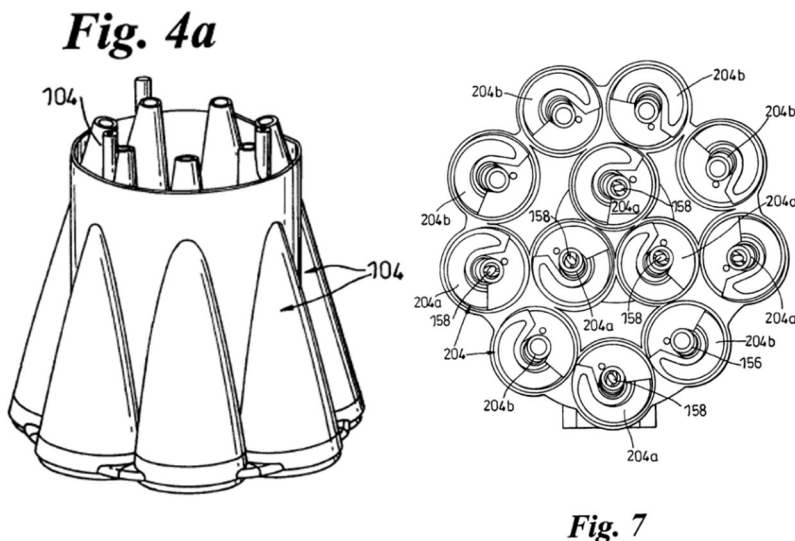
Liddell teaches a “**hose and wand assembly 28**” that “function[s] as a handle.” Ex1005, 4:16-4:17, Fig. 1. Liddell also teaches a “**handle 116**...on the cylindrical bin 106.” *Id.*, 5:30-6:2.



Id., Figs 1b, 2b. Further, Liddell’s “handle 122” is a “handle” for limitations [1e]/[12e]. §VIII.A.1.a; Ex1002, ¶¶99-101.

g. [1f]

Liddell teaches “**downstream cyclone unit 103** consist[s] of a plurality of downstream cyclones 104[/204] arranged in parallel.” Ex1005, 5:21-5:22, 10:5-10:6; Ex1002, ¶¶102-07.⁷



Ex1005, Figs. 4a&7.

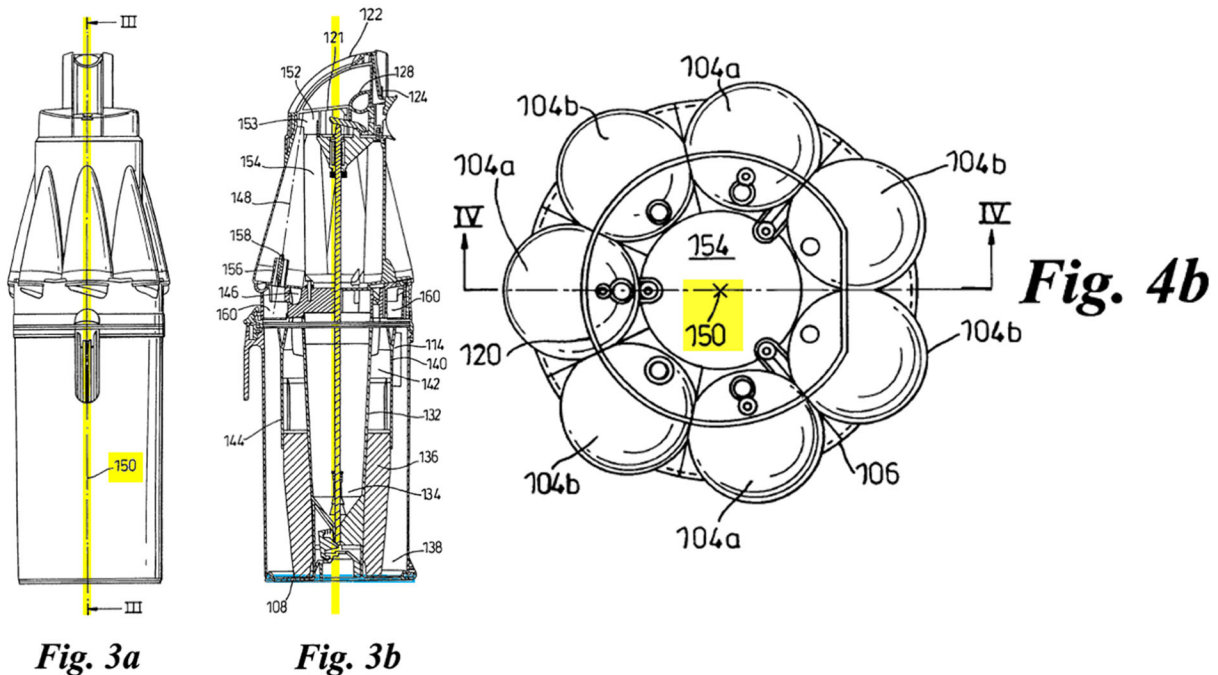
Liddell teaches that the parallel-connected downstream cyclones 104/204 are connectedly fluidly: “partially-cleaned air [] moves along the air passageway 142 in which it is divided into seven portions. Each portion enters either one of the first cyclones 104a[/204a] or one of the second cyclones 104b[/204b] via the respective

⁷ In the Figure 7 embodiment, used herein, the downstream cyclones are labeled 204 instead of 104. Ex1005, 10:5-12, Fig. 7. All references herein to downstream cyclones 104 apply equally to downstream cyclones 204.

inlet 146.” *Id.*, 9:15-18, 7:20-26, 7:29-8:3. Air from each of the downstream cyclones 104/204 passes “into the annular chamber 160 and from there to the outlet port 126.” *Id.*, 9:19-10:3, 8:7-14, 7:28-8:5.

h. [1g]

Liddell teaches the second cyclones (downstream cyclones 104/204) are positioned around a central longitudinal **axis 150** that extends through the first cyclonic cleaning stage (upstream cyclone unit 101) and the openable bottom door (**base 108**):



Ex1005, Figs. 3a-3b&4b, 5:23-24, 6:6-6:7, 7:5-6, Figs. 1-3b&7; Ex1002, ¶¶108-110.

Liddell states “downstream cyclones 104[/204] are equi-angularly spaced about the central longitudinal **axis 150** of the downstream cyclone unit...” Ex1005, 6:6-8.

i. [1h]

Liddell teaches the plurality of second cyclones (downstream cyclones 104/204) includes a first set of second cyclones arranged in an inner ring and a second set of second cyclones arranged in an outer ring laterally surrounding the inner ring. Ex1002, ¶¶111-12. Liddell teaches that “twelve parallel cyclones 204 are provided,” and “[n]ine of the cyclones 204 are located in an **outer ring** and three cyclones are located in an **inner ring**.” Ex1005, 10:5-10:20.

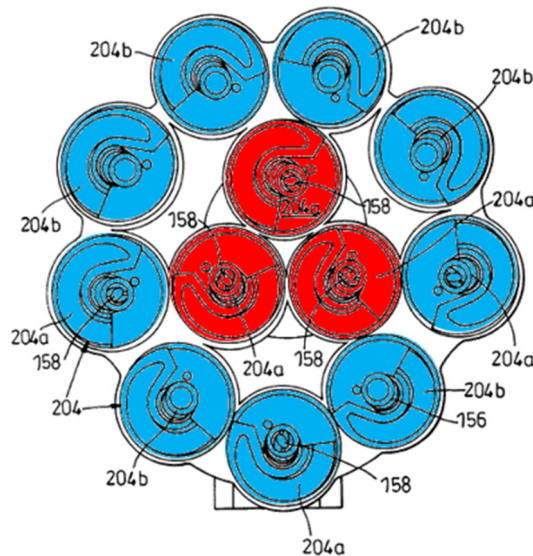


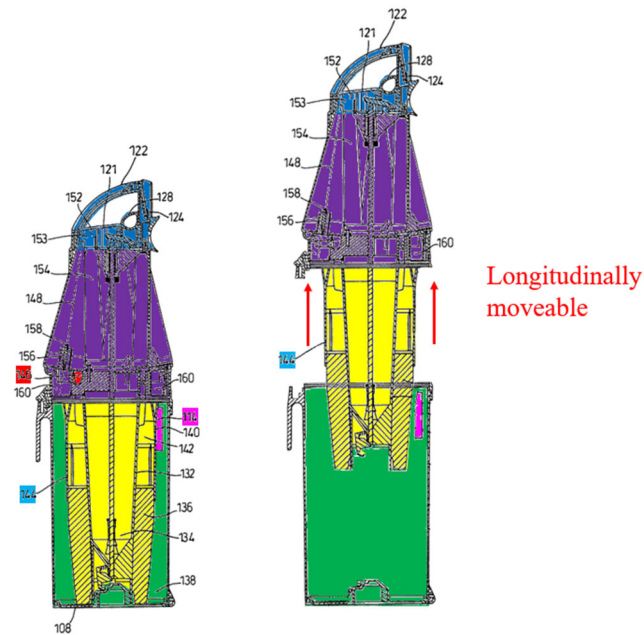
Fig. 7

Id., Fig. 7.

j. [12f]

Liddell teaches the first cyclonic cleaning stage has a first stage air inlet (**inlet port 114**). §VIII.A.1.b-c. Liddell further teaches each cyclone of the second cyclonic cleaning stage (**downstream cyclones 104/204**) has a second stage air inlet

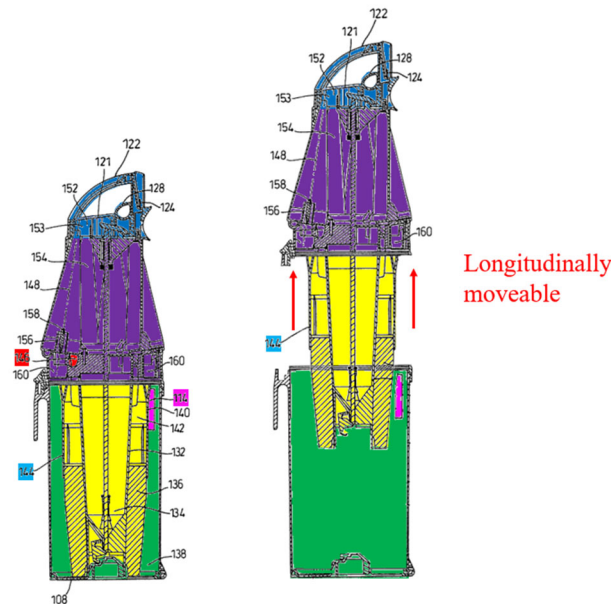
(inlet 146) downstream from the first stage air inlet (inlet port 114), and that the hand carriable surface cleaning apparatus (vacuum cleaner 10) further has a screen (perforated portion 144 of shroud 140) positioned in the fluid flow path between the first and second stage air inlets, wherein the screen is longitudinally moveable relative to the sidewall (sidewall of bin 106). Ex1002, ¶¶113-18.



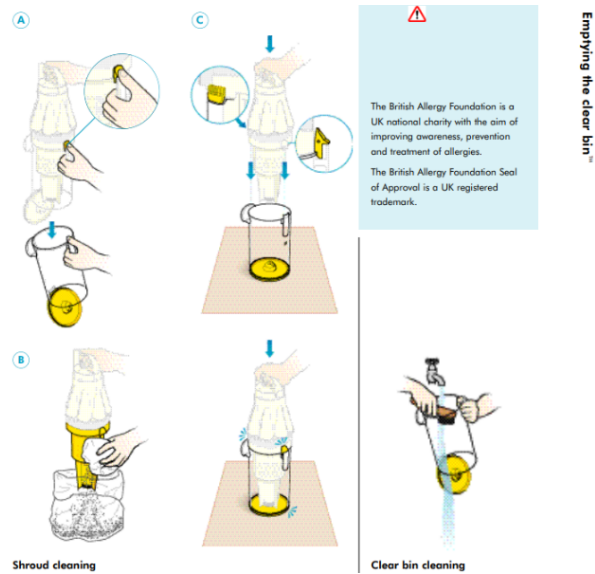
Ex1005, Fig. 3b(modified).

Liddell teaches “inlet port 114 is provided in the cylindrical bin 106 in order to allow dirty air to be introduced to the interior of the upstream cyclone 102.” Ex1005, 5:22-30, 9:8-11. Liddell further teaches “[l]ocated outwardly of the internal wall 132 in an upper portion of the upstream cyclone 102 is a shroud 140,” which “has a perforated portion 144 allowing air to pass from the interior of the upstream cyclone 102 to the air passageway 142. The air passageway 142 communicates with

the inlet 146 of each of the **downstream cyclones 104[/204]**.” *Id.*, 7:17-33, 8:7-14, 9:7-10:3. The **perforated portion 144** of **shroud 140** remains attached to the remainder of the cyclonic separating apparatus 100 when **bin 106** is released for emptying, and thus is longitudinally moveable relative to the **cylindrical bin 106**. Ex1002, ¶¶116-18; Ex1005, 7:17-8:5, Fig. 3b; §VIII.A.1.d.



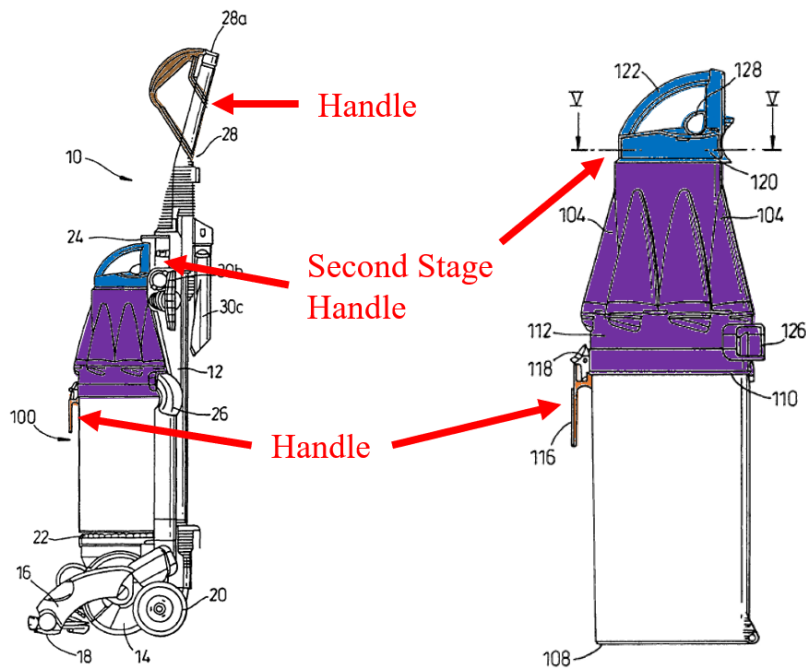
Ex1005, Fig. 3b(modified); Ex1002, ¶117. A POSA’s understanding of Liddell’s teachings is further supported by the product manual for Dyson’s DC07 vacuum, which shows vacuums like the one taught by Liddell with a perforated shroud moving longitudinally to the sidewall of a first stage when the “clear bin” housing the first stage is released from the remainder of the cyclone assembly:



Ex1014, 1, 10.

k. [13f]

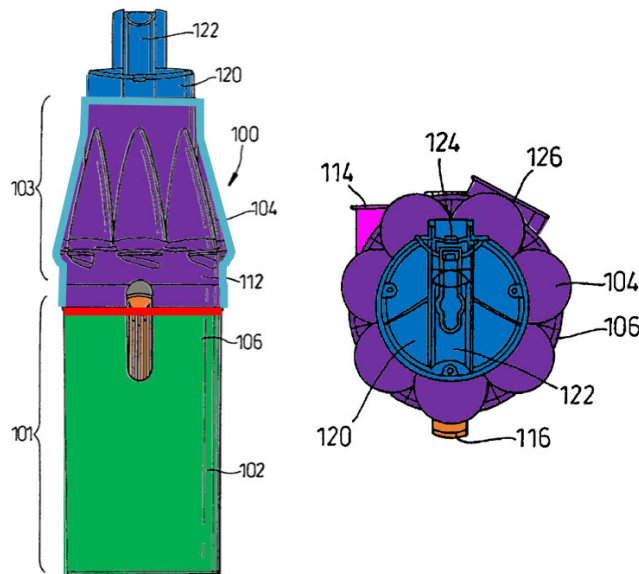
Liddell teaches the second cyclonic cleaning stage (**downstream cyclone unit 103**) has a second stage handle (**handle 122**):



Id., Ex1005, 4:16-4:17, 5:30-6:2, 6:17-6:19, Figs. 1b&2b; Ex1002, ¶¶119-20.

2. [3]

Liddell teaches the upper end of the second cyclonic cleaning stage (**upper surface** of **downstream cyclone unit 103**) overlies the entire upper end of the first cyclonic cleaning stage (**upstream cyclone unit 101**):



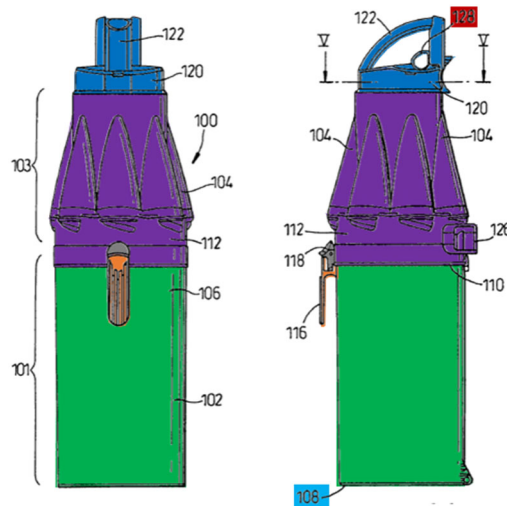
Id., Figs. 2a&2c; Ex1002, ¶¶121-25. As shown, the **upper surface** of Liddell's **downstream cyclone unit 103**, which is an upper end, completely overlies the top of **upstream cyclone unit 101**, such that **upstream cyclone unit 101** is completely covered when viewed from above. *Id.*⁸

⁸ Like Liddell, the top of the alleged second stage on the accused Dyson V8 vacuum is narrower than the alleged first stage. Ex1017, 23-24; Ex1016. If the V8 meets this limitation, so does Liddell. Ex1002, ¶¶124-25.

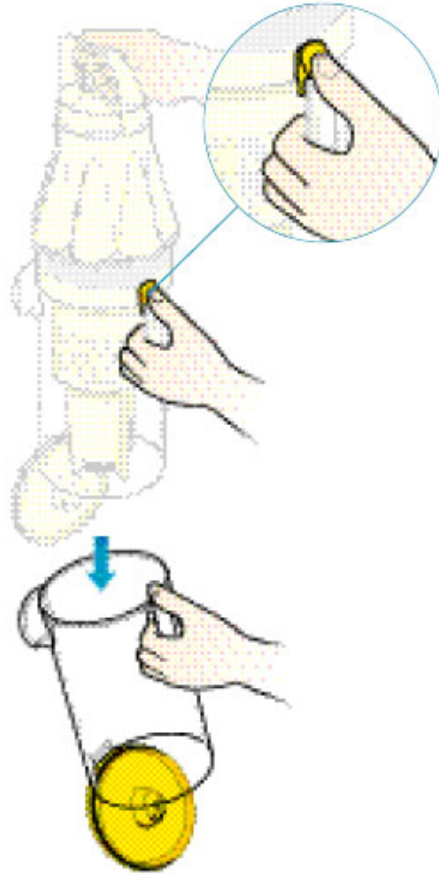
3. [4]

Liddell teaches the second cyclonic cleaning stage (**downstream cyclone unit 103**) is moveable relative to the sidewall (sidewall of **cylindrical bin 106**) while the bottom door (**base 108**) is open. §§VIII.A.1.c-d; Ex1002, ¶¶126-29.

Liddell teaches both “releasing the cylindrical bin” and “opening the base” in order to empty cylindrical bin 106. Ex1005, 5:30-6:3, 6:23-25, 7:5-8, 7:28-29, Figs 2a-2b, 3b. And POSAs would understand Liddell allows both to be performed at the same time. Ex1002, ¶128. For example, Liddell teaches **downstream cyclone unit 103** is moveable relative to the sidewall of **bin 106** while **base 108** is opened by disengaging **handle 116** and **catch 118** after engaging **actuating lever 128**. *Id.*



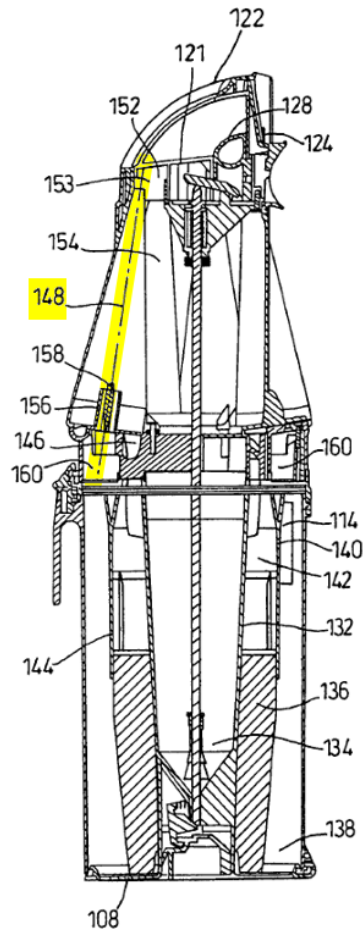
Ex1005, Figs. 2a-2b. Other examples in the prior art support this understanding. For example, Dyson’s DC07 manual shows a “clear bin” is releasable after its base is open:



Ex1014, 10.

4. [6]

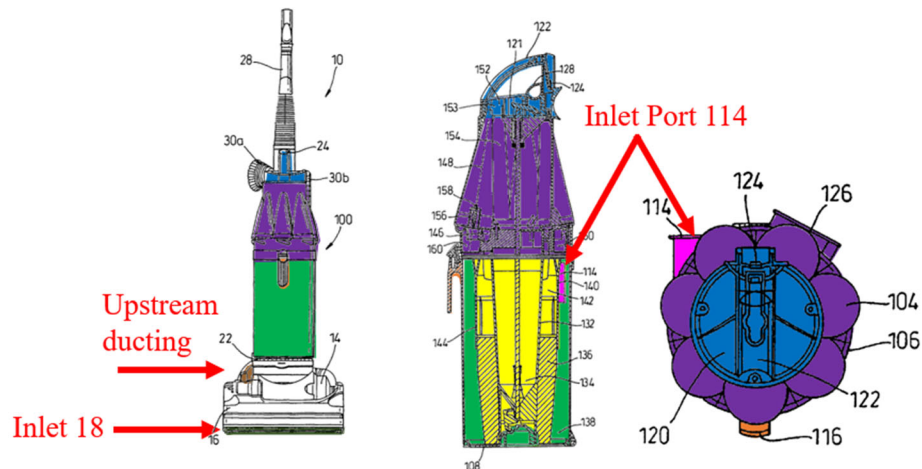
Liddell teaches each second cyclone (downstream cyclone 104/204) has a respective cyclone axis (longitudinal axis 148), wherein the cyclone axes are generally longitudinal. Ex1002, ¶¶130-38. Liddell states “[e]ach downstream cyclone 104 has a **longitudinal axis 148** (see Figure 3b)....” Ex1005, 6:10-12, 6:5-16, Fig. 7.



Id., Fig. 3b. Liddell also teaches that air circulates within the second cyclone about the cyclone axis. Ex1002, ¶¶130-36; Ex1005, 7:22-25; 9:16-22.

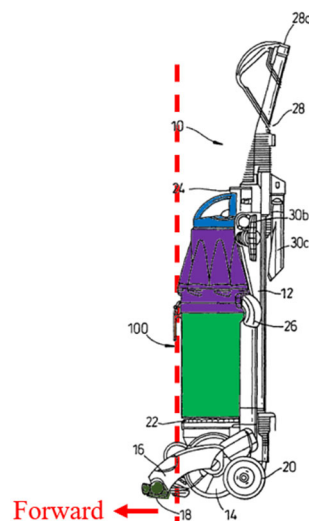
5. [7]

Liddell teaches the dirty air inlet (inlet 18, “upstream ducting,” and inlet port 114) has a conduit (airways formed by inlet 18, “upstream ducting,” and inlet port 114) extending forwardly from the first cyclonic cleaning stage (upstream cyclone unit 101), and wherein the second cyclonic cleaning stage (downstream cyclone unit 103) is longitudinally moveable relative to the conduit. Ex1002, ¶¶139-42.



Ex1005, Figs. 1a, 3b, 2c.

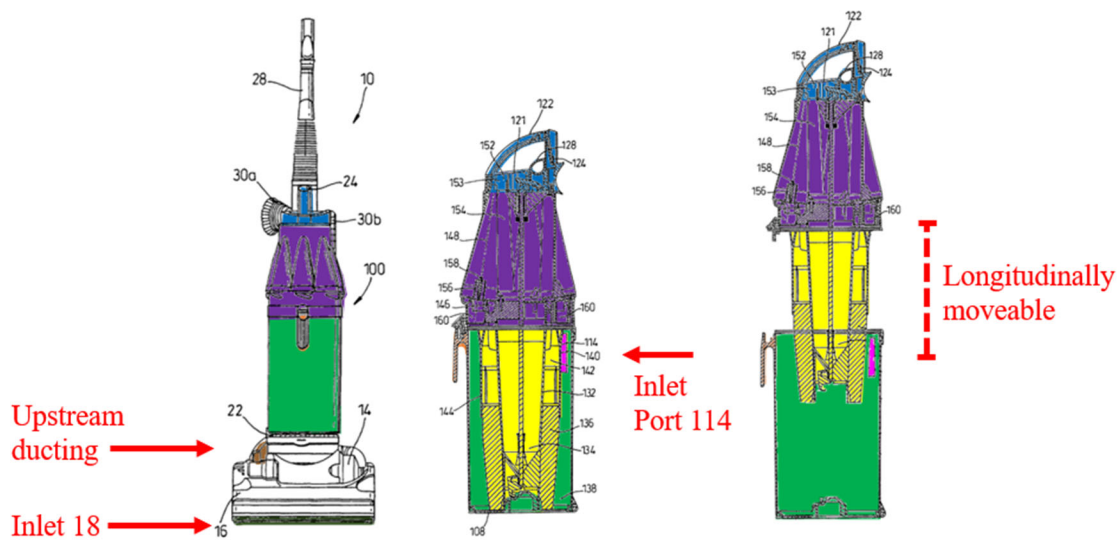
Inlet 18, “**upstream ducting**,” and **inlet port 114** form a conduit extending from **inlet port 114** on **upstream cyclone unit 101** to the **suction inlet 18** in cleaning head 16, and the conduit of **inlet 18**, “**upstream ducting**,” and **inlet port 114** extends forwardly from **upstream cyclone unit 101**:



Id., Fig. 1b.

Liddell’s second cyclonic cleaning stage (**downstream cyclone unit 103**) is longitudinally moveable relative to the conduit running through **inlet 18**, “**upstream**

ducting,” and inlet port 114. When the bin 106 is released from downstream cyclone unit 103 (see [1c] and [4]), the downstream cyclone unit 103 is longitudinally moveable relative to the conduit of inlet 18, “upstream ducting,” and inlet port 114 because inlet port 114 remains connected to bin 106, inlet 18 remains connected to cleaning head 16, and “upstream ducting” remains connected to upstanding body 12:

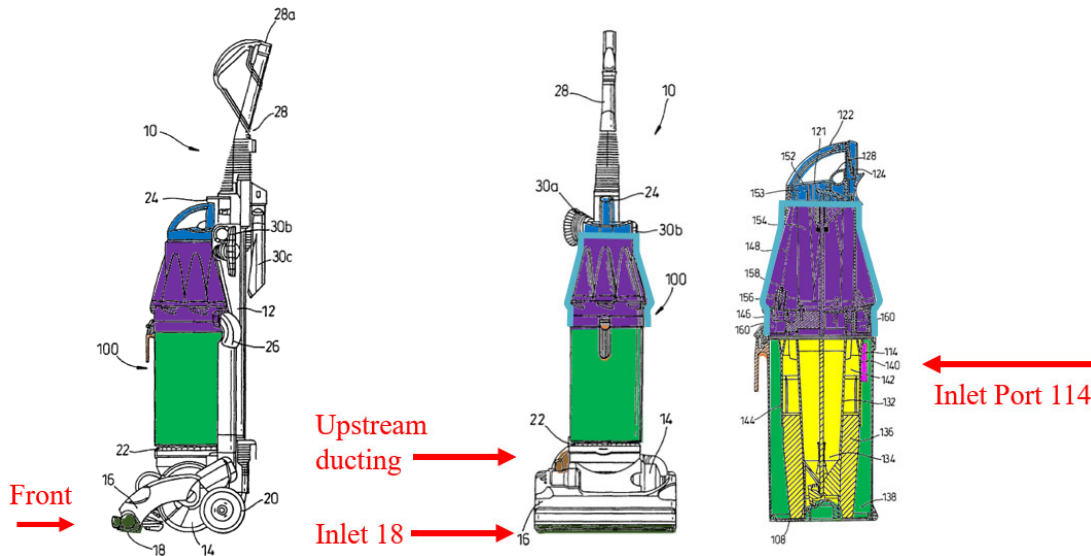


Ex1005, Figs. 1a, 3b(modified); Ex1002, ¶142.

6. [8]

Liddell teaches the dirty air inlet (inlet 18, upstream ducting, and inlet port 114) is located at a front end of the hand carriable surface cleaning apparatus and the upper end of the second cyclonic cleaning stage (upper surface of downstream cyclone unit 103) is located above the dirty air inlet. Ex1002, ¶¶143-45. The dirty air inlet (inlet 18, upstream ducting, and inlet port 114) is located at a front end of

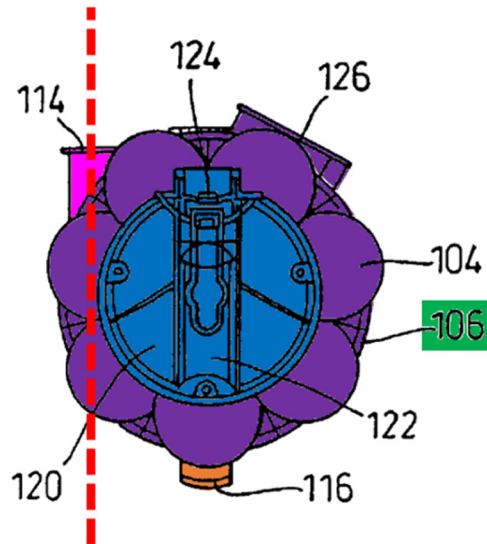
the hand carriable surface cleaning apparatus at least because its **inlet 18** is located at a front end of the vacuum cleaner 10 and the entire second cyclonic cleaning stage, including its upper end, is above the **inlet 18**, **upstream ducting**, and **inlet port 114**, as shown:



Ex1005, Fig. 1a-1b, 3b, 5:24-30, 7:28-30.

7. [9]

Liddell teaches the dirty air inlet conduit (airways formed by **inlet 18**, **upstream ducting**, and **inlet port 114**) defines an axis that intersects the first cyclonic cleaning stage (**upstream cyclone unit 101**). Ex1002, ¶¶146-47; Ex1005, 5:22-30, 9:8-11. The conduit meets **upstream cyclone unit 101** at **inlet port 114**, and forms an **axis** that intersects the **bin 106** of the **upstream cyclone unit 101**:

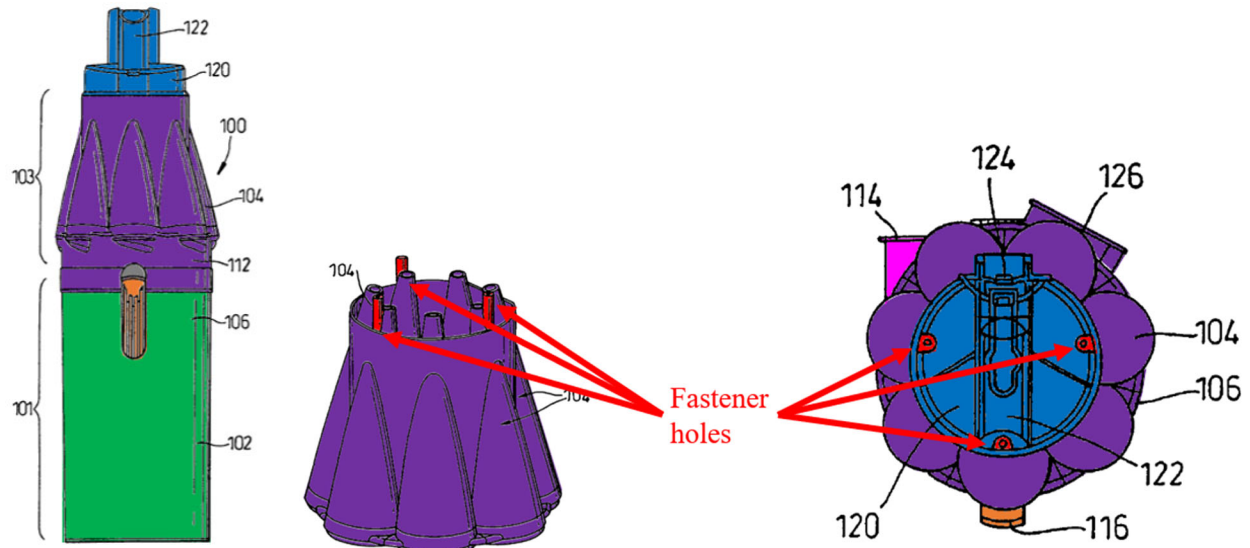


Id., 5:24-30, 7:28-30, Fig. 2c.

8. [10]

Liddell teaches an openable lid (**upper portion 120**) moveable between a closed position, in which the lid overlies the second cyclonic cleaning stage (**downstream cyclone unit 103**), and an open position in which the second cyclonic cleaning stage is accessible. Ex1002, ¶¶148-53.

Liddell teaches the “uppermost ends of the downstream cyclones 104[/204] project inside an **upper portion 120** which extends upwardly from the surfaces of the downstream cyclones 104[/204].” Ex1005, 6:14-16, Figs. 2c, 3b, 4a-4c. Liddell teaches fastener holes in **upper portion 120**, and POSAs would have understood it could be opened via these fasteners to access the downstream cyclones 104/204 of the **downstream cyclone unit 103**:



Ex1005, Figs. 2a, 4a, 2c, Ex1002, ¶¶148-53. POSAs would further understand Liddell’s openable lid is moveable between a closed position when the fasteners are engaged, where the lid overlies the second cyclonic cleaning stage, and an open position when the fasteners are removed, where the second cyclonic cleaning stage is accessible. *Id.*

9. [11]

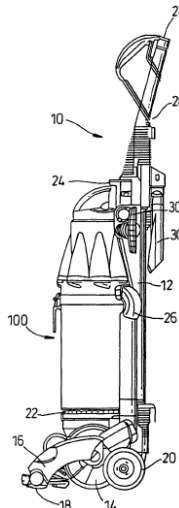
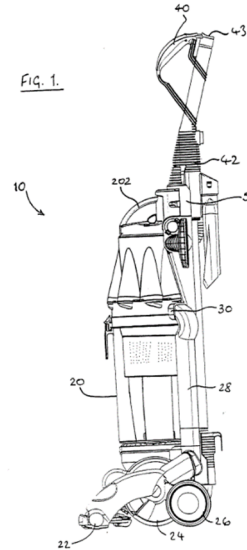
Liddell teaches the second cyclonic cleaning stage (downstream cyclone unit 103) is removable from the first cyclonic cleaning stage (upstream cyclone unit 101). §§VIII.A.1.d, VIII.A.3; Ex1002, ¶¶154-56.

B. Ground 2: Liddell Alone Or Combined With Organ Renders Obvious Claims 1, 3-13

To the extent PO argues Liddell does not anticipate claims 1, 3-4, and 6-13, it also renders them—and claim 5—obvious, either alone or in combination with Organ. Ex1002, ¶¶157-59.

1. Motivation To Combine

POSAs would have combined Liddell and Organ. Ex1002, ¶¶160-77. Organ is a Dyson patent describing a similar vacuum as Liddell with additional details about certain features.

Liddell	Organ
 Fig. 1b Ex1005, Fig. 1b.	 FIG. 1. Ex1006, Fig. 1

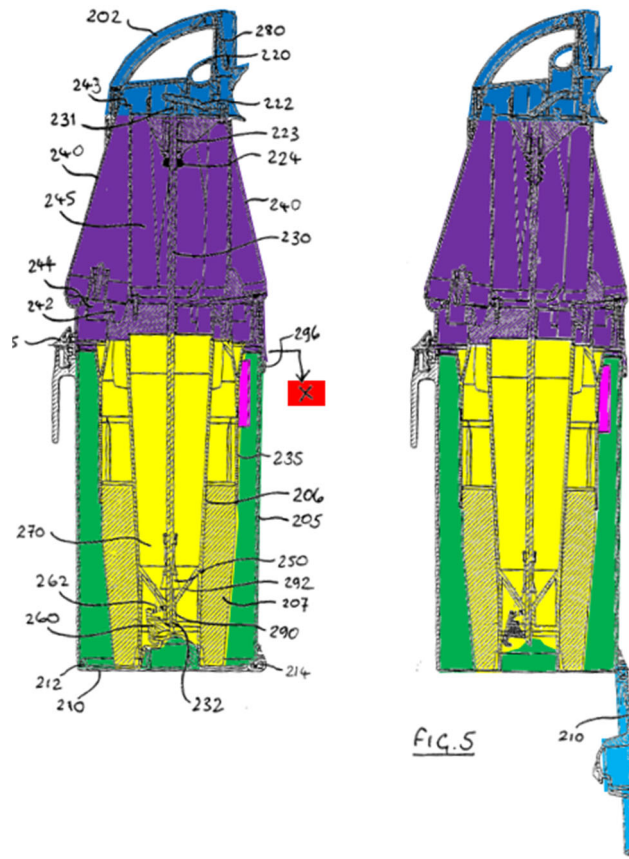
To the extent PO argues Liddell does not teach a moveable second stage and screen, or the ability to move a second stage while a bottom door on a first stage is open, Organ teaches these limitations, and POSAs would have been motivated to combine them with Liddell. Further, Organ teaches a pre-motor filter that POSAs would have been motivated to combine with Liddell. POSAs would have had a reasonable expectation of success incorporating these features into Liddell because Liddell describes similar components as Organ, and modifying Liddell merely

required applying known techniques to improve a similar device in the same way.

Ex1002, ¶¶168, 174.

a. **Organ's Moveable Second Stage and Screen**

Liddell teaches a second stage and screen that are moveable relative to the sidewall of the first stage. §VIII.A.1.d, VIII.A.1.j. But if PO argues it does not, Organ teaches this. Organ teaches a separator unit 20 having a **chamber 205** (a “first separation stage”), a “**second separation stage**,” and a **shroud 235**, with “an apertured annular wall mounted coaxially inside the **chamber 205**.” Ex1006, 6:23-30, 7:11-26. Organ teaches “**chamber 205** [] is removable from the **remainder of the separator unit 20**,” but the “**[t]ube-shaped part 206 together with the fins 207 and shroud 235** all form part of the **remainder of the separator unit 20** and thus are not removable with the **chamber 205**....**Chamber 205** is removable in the direction shown by the **arrow X**”:



Ex1006, 12:1-10, Figs. 3&5. POSAs would have been motivated to modify Liddell with Organ's moveable second stage and screen and would have had a reasonable expectation of success. As Organ teaches, a "user may wish to remove chamber 205 in order to thoroughly clean the chamber 205, to gain access to the shroud 235...to remove any debris which has become trapped between the chamber 205 and the tube 206 or shroud 235." Ex1006, 12:4-7, 3:1-2; Ex1002, ¶¶167-68.

b. Organ's Second Stage That Can Move When The Bottom Door Is Open

Liddell teaches the second cyclonic cleaning stage is moveable relative to the sidewall of the first cyclonic cleaning stage when its bottom door is open. §VIII.A.3.

But to the extent PO argues it does not, Organ also teaches the second cyclonic cleaning stage is moveable relative to the sidewall of the first cyclonic cleaning stage while a bottom door is open. Organ teaches “**chamber 205** [] has a **door 210** at its base which can be opened” and that “**chamber [205]** is also separable from the separating apparatus...where i[t] connects with the **lower end of the cyclone assembly.**” Ex1006, Abstract, 8:23-25. However, “the **chamber [205]** cannot be removed unless the **door 210** is open” because “the latch for the door is hooked and is attached to the cyclone assembly.” *Id.*; 3:7-19, 12:7-16. Thus, “[a] user must first release the closure member [**base 210**] to deposit the dust...before separating the **collecting chamber [205]** from the remainder of the apparatus.” *Id.*, 3:21-25, Claim 1, 3:10-25.

POSAs would have been motivated to modify Liddell’s cylindrical bin 106 and its base 108 so that cylindrical bin 106 cannot be removed from the cyclonic separation apparatus 100 unless base 108 is open, as taught by Organ, so “a user cannot accidentally open the closure member and deposit dust on the floor if they decide to remove the collecting chamber from the remainder of the apparatus.” Ex1006, 3:21-23, Abstract; Ex1002, ¶¶172-73. POSAs would have had a reasonable expectation of success incorporating this feature into Liddell. Ex1002, ¶174.

c. **Organ’s Pre-Motor Filter**

Organ teaches a pre-motor filter: “the cleaned air outlets 244 of the cyclonic chambers 240 communicate with an outlet conduit such that...[c]leaned air...is recombined into a single flow and is channelled...through a *pre-motor filter*....” Ex1006, 7:3-5, 7:23-26. POSAs would have been motivated to incorporate Organ’s pre-motor filter in the fluid flow path between Liddell’s downstream cyclones 104/204 and its motor for its known functions: to further clean the air from the downstream cyclones and to prevent particles from interfering with the operation of the motor. Ex1002, ¶176. Liddell teaches “cleaned air is used to cool the motor located in the motor casing 14 before being exhausted from the vacuum cleaner 10.” Ex1005, 5:12-14. POSAs would have had a reasonable expectation of success incorporating this feature into Liddell because Liddell already teaches a pre-motor chamber (chambers in downstream ducting and motor casing 14, *id.*, 4:26-5:14, 8:7-14), and incorporating Organ’s pre-motor filter into that chamber merely required applying a known technique for its known functions of cleaning air prior to it reaching the motor, which would also further Liddell’s goal of using “cleaned air...to cool the motor.” Ex1002, ¶¶177.

2. [1]/[12]/[13]/[11]

a. [1pre]/[12pre]/[13pre]

If the preambles are found limiting, Liddell teaches them, §VIII.A.1.a, and if PO argues Liddell does not teach a “hand carriable” surface cleaning apparatus, it

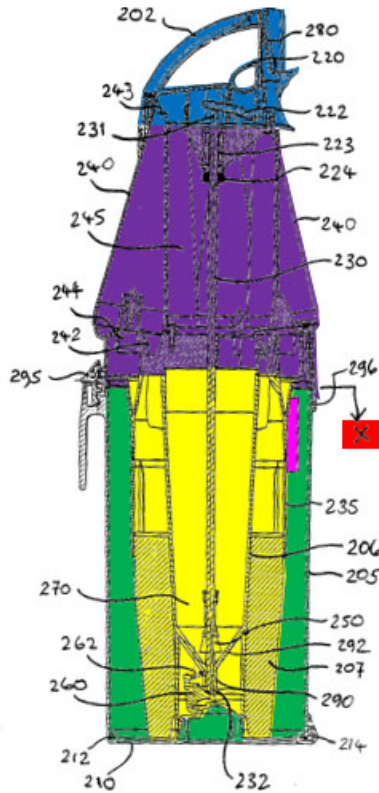
would have been obvious for POSAs to reduce Liddell's weight to be even more "maneuver[able]," further promote "above-the-floor cleaning function, eg on stairs, upholstery, etc.," and make it even easier for the "cyclonic separation apparatus 100 [to] be carried." Ex1005, 4:16-23, 5:20-31, 6:16-18; Ex1002, ¶¶179-80. POSAs would have had a reasonable expectation of success, because it would have involved simply manufacturing Liddell's vacuum with lighter weight materials or reducing the size of certain components, which would make Liddell's cleaner lighter and more easily hand carried. Ex1002, ¶180.

b. [1a]/[12a]/[13a]/[1b]/[12b]/[13b]/[1d]/[12d]/[13d]/[1e]/
[12e]/[13e]/[1f]/[1g]/[13f]

Liddell teaches these limitations. §§ VIII.A.1.b-c, VIII.A.1.e-h, VIII.A.1.k; Ex1002, ¶¶181-82, 192-95, 206.

c. [1c]/[12c]/[12f]/[13c]/[11]

Liddell teaches a second stage and screen that are moveable relative to (and removeable from) a first stage (§§VIII.A.1.d, VIII.A.9), but if PO argues Liddell does not, Liddell combined with Organ renders them obvious. Ex1002, ¶¶183-91. Like Liddell, Organ teaches "**chamber 205** [] is removable from the **remainder of the separator unit 20**," and that "[**c**]**hamber 205** is removable in the direction shown by the **arrow X**":



Ex1006, 12:1-9, Fig. 3, 6:24-25, Abstract, 2:29-3:2, Claims 1-3. With respect to the claimed “screen” of claim 13, like Liddell, Organ teaches a **shroud 235** with “an apertured annular wall” between the **first separation stage** and the **second separation stage**. *Id.* 6:22-31. Organ teaches “**chamber 205** [] is removable from the remainder of the separator unit 20,” but the “[t]ube-shaped part 206 together with the fins 207 and **shroud 235** all form part of the remainder of the separator unit 20 and thus are not removable with the chamber 205.” Ex1006, 12:1-16, Fig. 3. As described above, POSAs would have been motivated to combine Organ’s teaching of this feature with Liddell, and would have had a reasonable expectation of success.

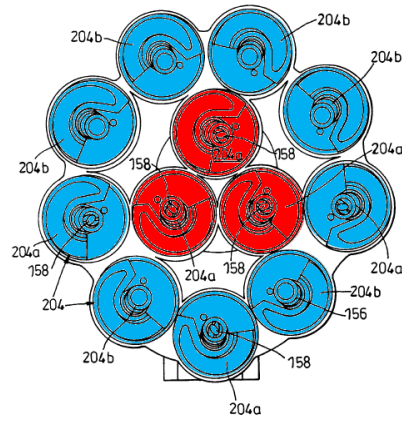
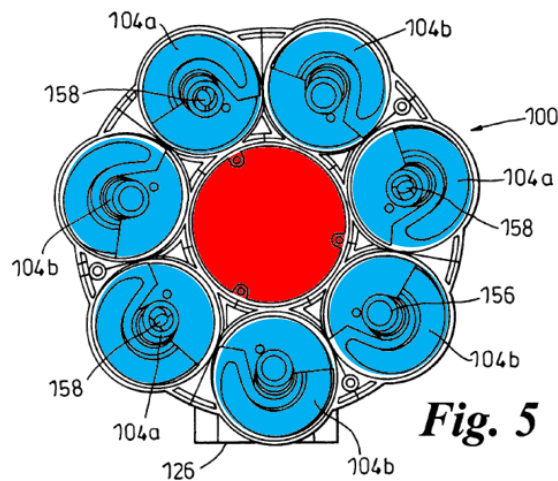
§VIII.B.1.a.

d. [1h]

Liddell teaches this limitation. §VIII.A.1.i. Liddell teaches a single vacuum system, with all elements arranged as in the challenged claims, and therefore anticipates. §VIII.A.1. However, if PO argues Liddell’s teachings regarding cyclones 104 are somehow different than embodiments depicting cyclones 204, POSAs would have found it obvious to apply Liddell’s teachings about cyclones 204 to the embodiment describing cyclones 104 and vice versa. Ex1002, ¶¶196-205.

Liddell teaches its invention is not “limited to the precise features of the embodiments described” and that “[o]ther variations and modifications will be apparent to a skilled reader.” Ex1005, 10:22-24. POSAs would have been motivated to incorporate Liddell’s “inner ring” and “outer ring” of cyclones 204 with Liddell’s teachings regarding cyclones 104 because using an inner ring of cyclones is a space-efficient arrangement of increasing the number of downstream cyclones, which enhances the cleaning productivity of small debris from dirty air. Ex1002, ¶199. It also would have been obvious because these embodiments were known techniques for arranging secondary cyclones downstream from a first cyclone. *Id.*; Ex1005, 1:28-31, 10:5-12. POSAs would have had a reasonable expectation of success because each embodiment incorporates similar components (*e.g.*, centrebody 158, vortex finder 156), and Liddell’s embodiments without an inner ring of cyclones

(Figs. 5-6) have an **empty space** in the middle of cyclones 104 which would efficiently incorporate an **inner ring** of cyclones like in Fig. 7:



Ex1005, Figs. 5&7; Ex1002, ¶200.

To the extent PO argues Liddell’s “inner ring” or “outer ring” of cyclones 204 are not a “ring” as claimed, it would have been obvious to increase the number of cyclones in Liddell’s “inner ring” or “outer ring.” Ex1002, ¶¶202-05. Liddell teaches **first cyclones 204a** are in the “inner ring,” and **second cyclones 204b** are in the “outer ring,” and explains “the number of first cyclones can be significantly higher than the number of second cyclones or vice versa.” Ex1005, 10:25-26. GB2,385,292A to Dummelow, cited by Liddell (Ex1005, 10:9), teaches several arrangements of inner and outer rings of parallel cyclones, including one with five cyclones arranged in an inner ring:

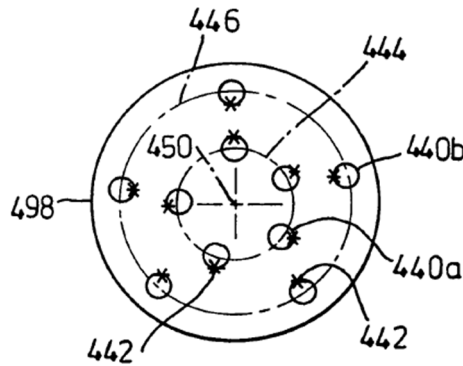


Fig. 13

Ex1011, Fig. 13, 6.

POSAs would have understood smaller cyclones are more efficient at separating smaller dust particles, and by shrinking the size of Liddell's cyclones (and increasing their number), they would achieve better separation of finer dust particles. Ex1002, ¶¶205. POSAs would have been motivated to modify Liddell to use a larger number of smaller cyclones to optimize fine dust collection for environments with higher levels of fine dust. *Id.*

3. [6]/[7]/[8]/[9]

Liddell alone and combined with Organ renders obvious claim 1 (§VIII.B.2) and Liddell teaches the limitations of these claims. §§VIII.A.4-7; Ex1002, ¶¶223-26.

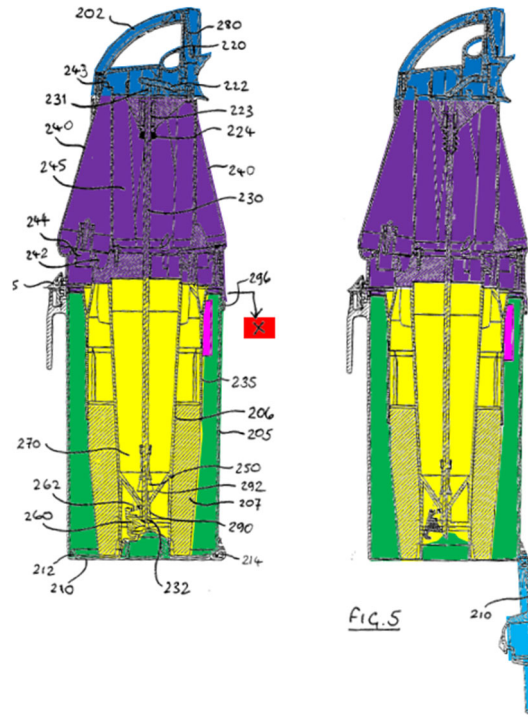
4. [3]

Liddell alone and combined with Organ renders obvious claim 1 (§VIII.B.2) and Liddell teaches the limitation of claim 3. §§VIII.A.2. To the extent PO argues

the upper end of Liddell's downstream cyclone unit 103 does not overlie the entire upper end of Liddell's upstream cyclone unit 101, it would have been obvious to modify Liddell so that it does. POSAs would have been motivated to make Liddell's downstream cyclone unit larger, for example to incorporate more secondary cyclones to increase cleaning efficiency. Ex1002, ¶¶207-11. POSAs would have understood using a larger second stage was one of a limited number of options for arranging first and second stages in a vertical configuration—the upper end of the second stage could be smaller, larger, or the same size as the upper end of the first stage, and the latter two meet the claims—and would have at least been obvious to try, with a reasonable expectation of success. *Id.*, ¶¶209-11.

5. [4]

Liddell alone and combined with Organ renders obvious claim 1 (§VIII.B.2), and Liddell teaches the limitation of claim 4. §VIII.A.3. To the extent PO argues Liddell does not expressly teach the second cyclonic cleaning stage is moveable relative to the sidewall while the bottom door is open, this limitation is obvious in view of Liddell combined with Organ, which expressly teaches this function. Ex1002, ¶¶212-16. Organ teaches a second cyclonic cleaning stage (**second separation stage**) is moveable relative to the sidewall (sidewall of **cyclonic chamber 205 of first separation stage**) while the bottom door (**base 210**) is open by releasing the chamber 205 in the direction of the **letter x**:



Ex1006, Figs. 3&5.

Organ teaches “**chamber 205** [] has a **door 210** at its base which can be opened” and “**chamber [205]** is also separable from the separating apparatus...where i[t] connects with the **lower end of the cyclone assembly.**” *Id.*, Abstract, 8:23-25. However, “the **chamber [205]** cannot be removed unless the **door 210** is open” because “the latch for the door is hooked and is attached to the cyclone assembly.” *Id.*; 3:7-19, 12:7-16. Thus, “user[s] must first release the closure member [**base 210**] to deposit the dust...before separating the **collecting chamber [205]** from the remainder of the apparatus.” *Id.*, 3:21-25, Claim 1, 3:10-25. POSAs would have been motivated to combine this feature with Liddell. §VIII.B.1.

6. [5]

Liddell alone and combined with Organ renders obvious claim 1 (§VIII.B.2), and Liddell combined with Organ teaches claim 5. Ex1002, ¶¶217-22. Liddell teaches each second cyclone (downstream cyclones 104/204) has a respective air outlet (fluid outlet 156) that is in fluid communication (via outlet port 126 and downstream ducting 26) with a pre-motor chamber (chambers in downstream ducting and motor casing 14). Ex1005, Abstract, Figs. 6-7, 4:26-5:14, 8:7-14. Liddell is silent as to presence of a pre-motor filter, but Organ teaches one. Ex1002, ¶¶220-22.

Organ teaches “each of the cleaned air outlets 244 of the cyclonic chambers 240 communicate with an outlet conduit such that...[c]leaned air...is recombined into a single flow and is channelled out of the separator unit 20...through a pre-motor filter, fan and post-motor filter before finally being exhausted from the cleaner.” Ex1006, 7:3-5, 7:23-26, 6:3-4. As described, POSAs would have been motivated to combine Organ’s pre-motor filter into Liddell’s pre-motor chamber. §VIII.B.1.

7. [10]

Liddell alone and combined with Organ renders obvious claim 1 (§VIII.B.2) and Liddell teaches the limitation of claim 10. §VIII.A.8. To the extent PO argues Liddell does not teach an openable lid moveable between closed and open positions

as claimed, it would have been obvious to modify Liddell with such an openable lid so the downstream cyclones 104/204 could be accessed for maintenance. Ex1002, ¶¶227-30. Liddell states “[t]he upper portion 120 and the surfaces of the downstream cyclones 104[/204] together define an axially extending passageway or dust channel 154....It is thus possible for dirt and dust which exits the smaller ends of the downstream cyclones 104[/204] to pass...to the collection space 134 via the dust channel 154.” Ex1005, 7:28-8:5. POSAs would have been motivated to make **upper portion 120** openable so the downstream cyclones 104/204 can be serviced and the dust channel 154 can be cleaned of dust. Ex1002, ¶230. Further, POSAs would have had a reasonable expectation of success because Liddell already provides fastener holes by which the **upper portion 120** can be secured and released from **downstream cyclone unit 103**. *Id.*; Ex1005, Figs. 2c&4a.

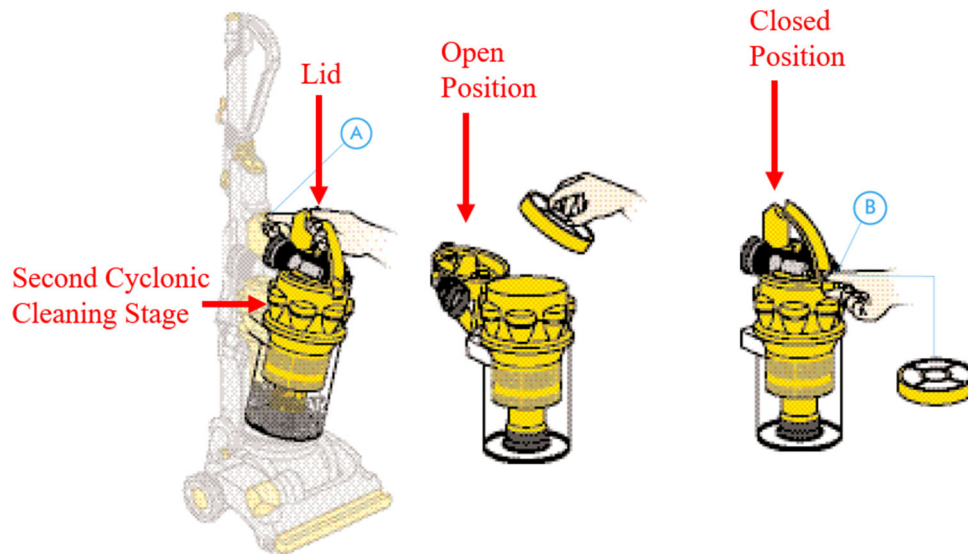
C. Ground 3: Liddell Combined With Organ And DC14Manual Renders Obvious Claim 10

To the extent PO argues Liddell does not teach the claimed openable lid of claim 10, POSAs would have combined Liddell with DC14Manual’s openable lid. Ex1002, ¶¶231-39.

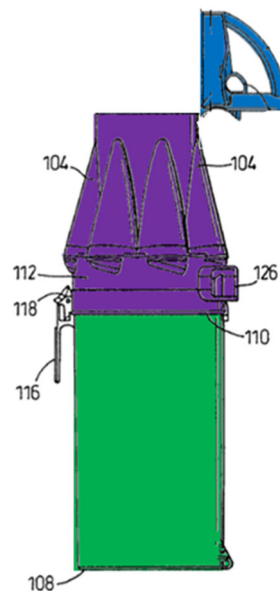
1. Motivation to Combine

POSAs would have been motivated to modify Liddell’s “upper portion 120” with DC14Manual’s openable lid. Ex1002, ¶¶232-35. DC14Manual teaches a

cyclonic vacuum with a lid on a “cyclone pack” that can be opened and closed as shown:



Ex1009, 10. Liddell teaches an openable lid, §VIII A.8, but if PO argues otherwise, POSAs would have been motivated to modify Liddell’s “**upper portion 120**” with DC14Manual’s openable lid to access **downstream cyclone unit 103**:

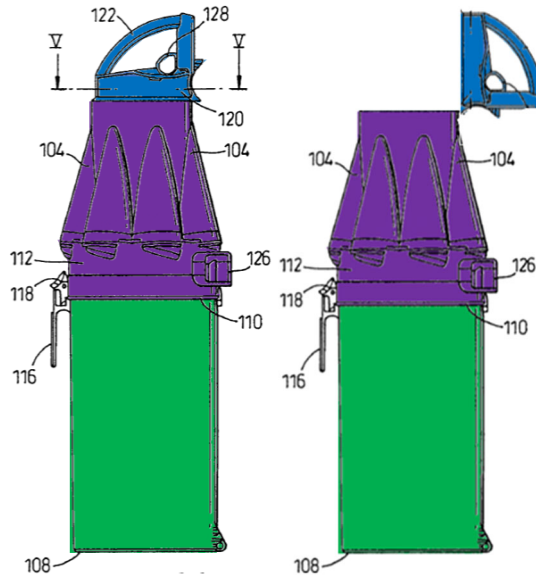


Ex1005, Fig. 2b(modified); Ex1002, ¶234.

POSAs would have been motivated to make this combination so that Liddell's **downstream cyclone unit 103** could be accessed for maintenance, including as taught by DC14Manual, which teaches one benefit of its openable lid is for accessing its filter for washing. Ex1009, 10; Ex1002, ¶235. POSAs would have had a reasonable expectation of success combining the teachings of Liddell and DC14Manual because incorporating an openable lid merely required applying a known technique to improve a similar device in the same way. *Id.*

2. [10]

Liddell anticipates claims 1 and 10, and alone or combined with Organ renders obvious claims 1 and 10, and in further combination with DC14Manual also renders obvious claim 10. §§VIII.A.1, VIII.A.8, VIII.B.2, VIII.B.7; Ex1002, ¶¶236-39. Liddell teaches “uppermost ends of the downstream cyclones 104[/204] project inside [] **upper portion 120.**” Ex1005, 6:14-16, Figs. 2c, 3b, 4a-4c. Thus, Liddell combined with Organ and DC14Manual teach a lid (DC14Manual's openable lid) that is moveable between a closed position, in which the lid overlies a second cyclonic cleaning stage (**downstream cyclone unit 103**), and an open position in which the second cyclonic cleaning stage is accessible, as shown below.



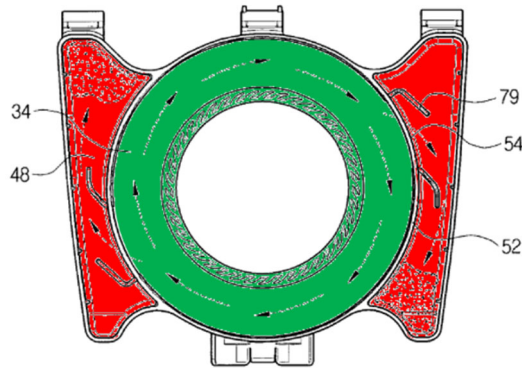
Ex1005, Fig. 2b(modified); Ex1002, ¶239.

D. Ground 4: Liddell Combined with Lim, and Liddell Combined With Organ and Lim Renders Obvious Claim 14

Liddell alone and combined with Organ teaches all limitations of claim 14, except for limitation [14f], which requires the first cyclonic cleaning stage have “a first cyclone chamber and a first dirt collection chamber that comprises the dirt collection region and is external to the first cyclone chamber.” Limitations [14pre]-[14e] are identical to limitations [1pre]-[1e]/[12pre]-[12e]/[13pre]-[13e] and are satisfied for the same reasons provided for Liddell alone and combined with Organ. §§VIII.A-B. Lim teaches the “dirt collection chamber” of limitations [14b] and [14f] and POSAs would have been motivated to combine it with Liddell and Organ. Ex1002, ¶¶240-49.

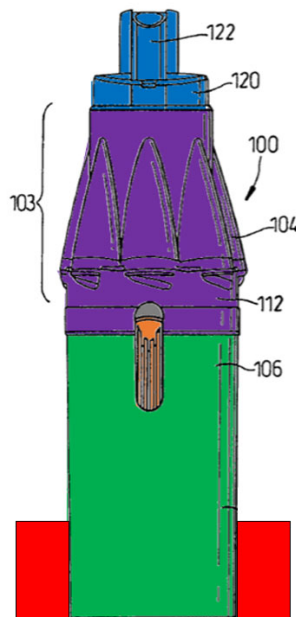
Lim teaches a cyclone dust-collecting apparatus where “**dust-collecting chambers 48** are partitioned off from the **cyclone chamber 34** by a partition 52.”

Ex1010 [0053]. Lim also teaches dirt from the cyclone “flows into the plurality of **dust-collecting chamber 48** formed in both sides of the lower casing 40 of the cyclone body 20 through the connecting port 54.” *Id.* [0066].



Ex1010, Fig. 5.

POSAs would have been motivated to combine Lim’s external **dust-collecting chambers 48** with Liddell’s cyclonic separating apparatus 100, as shown:



Ex1005, Fig. 2a(modified).

POSAs would have been motivated to combine Lim's **chambers 48** with Liddell and Organ to create a more compact-sized vacuum, as taught by Lim. Ex1002, ¶¶245-46. Lim teaches that, in conventional upright vacuums, a “dust-collecting chamber [] must be disposed right under” the cyclone, increasing the vacuum's height. Ex1010 [0016]-[0018]. But with Lim's external **chambers 48**, the “total height [of the vacuum] is reduced” and “a compact-sized product can be realized.” *Id.* [0069], [0071].

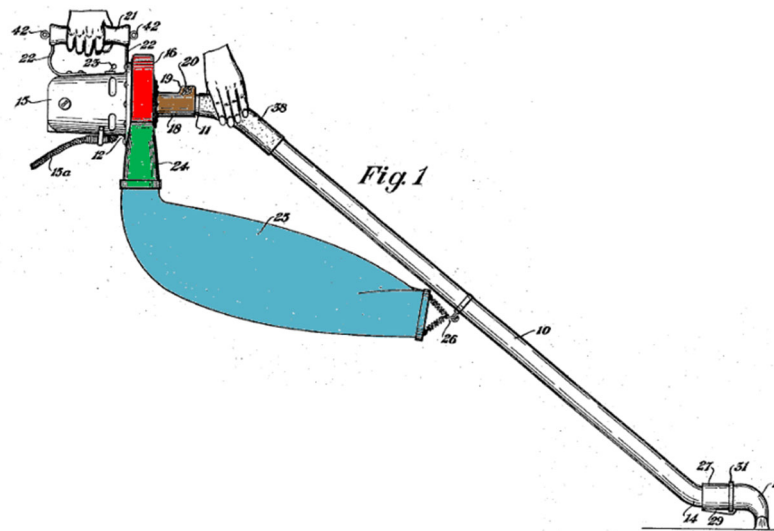
Further, as taught by Lee769, a 2005 publication, conventional cyclonic vacuums had “a problem that...dust piled up at a lower part of the dust collecting container...lower[s] dust collecting efficiency.” Ex1031 [0090]. POSAs would have been motivated to combine Lim's **chambers 48** with Liddell and Organ to increase the dust collecting efficiency of **upstream cyclone unit 101**. Ex1002, ¶¶247-48.

In combination, Liddell, Organ, and Lim render obvious a first cyclonic cleaning stage (**upstream cyclone unit 101**) having a first cyclone chamber (**upstream cyclone 102**) and a first dirt collection chamber (Lim's **chamber 48**) that has a dirt collection region that is external to the first cyclone chamber. Ex1002, ¶249.

E. Ground 5: Simpson Combined With Liddell Renders Obvious Claims 1-4 and 6-13

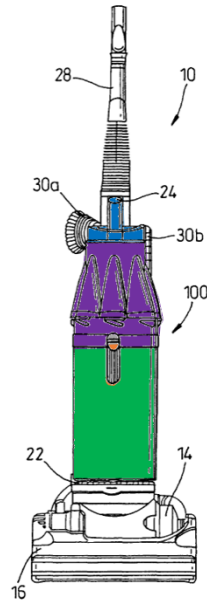
1. Motivation to Combine

POSAs would have been motivated to combine Simpson with Liddell. Ex1002, ¶¶250-67. Simpson teaches a handheld vacuum with a vertically-oriented separation unit that deposits dust vertically into a dust bag:



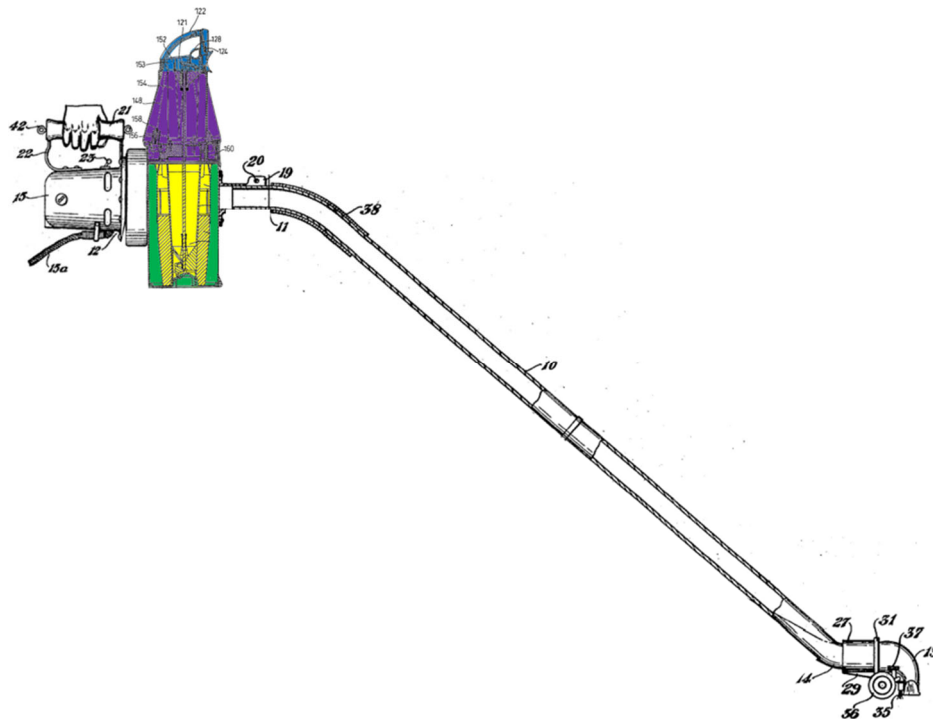
Ex1007, Fig. 1, 1:45-58, 2:65-84. In operation, air entering **inlet neck 18** is directed through **fan casing 16** and **outlet neck 24** where it is filtered through “**dust collecting bag 25**.” *Id.*, 3:46-52, 1:101-107, 2:17-23; Ex1002, ¶252.

Liddell teaches a vertically-oriented cyclonic separation unit and dirt collection bin:



Ex1005, Fig. 1a, 4:26-28; §VIII.A.1.

POSAs would have been motivated to modify Simpson to use Liddell's cyclonic separating apparatus, as shown:



Ex1007, Fig. 1(modified); Ex1002, ¶254.

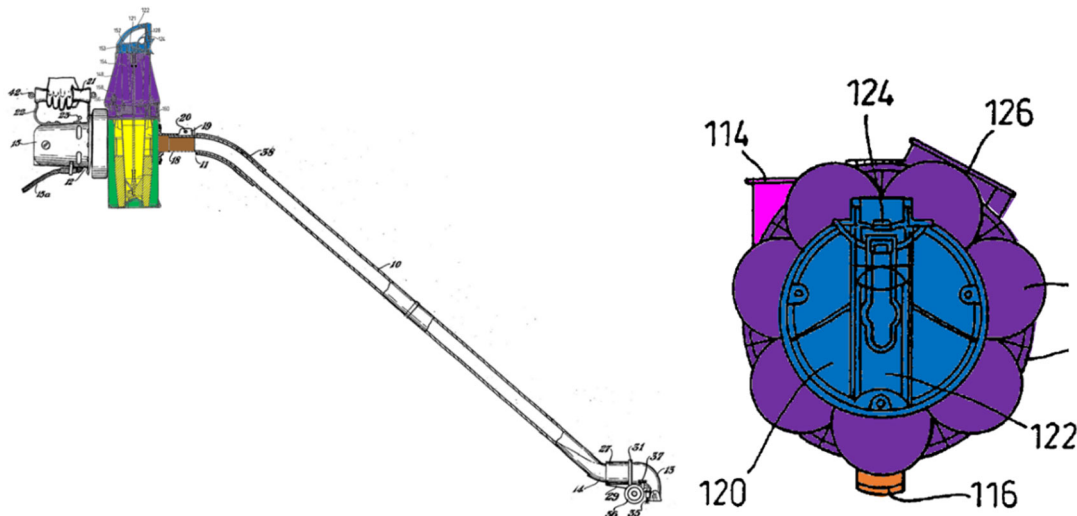
POSAs would have been motivated to substitute Simpson's dust separation system with Liddell's cyclonic separating apparatus. Ex1002, ¶¶255-61. POSAs would have understood that Simpson's non-cyclonic separator and Liddell's cyclonic separator were interchangeable solutions for separating dirt from air, and would have been motivated to substitute Liddell's cyclonic separator in place of Simpson's outlet neck 24 and dust collector bag 25 for the benefits of cyclonic separation, including maintaining steady suction as the separator fills with dirt. *Id.*, ¶256-59.

For example, Organ teaches, before the '607Patent, bagless vacuums like "cyclonic" vacuums were "becoming increasingly popular" because "[b]y avoiding the use of a filter bag as the primary form of separation, it [was] found possible to maintain a consistently high level of suction, even as the collecting chamber fills with dirt." Ex1006, 1:8-13. POSAs would have been motivated to substitute Simpson's dust separation system with a bagless cyclonic separator for the same reason. Ex1002, ¶261.

POSAs would have been further motivated to substitute Simpson's dust separation system for Liddell's because of their common vertical orientation, which Simpson teaches is beneficial because it causes "dirt and foreign matter picked up by the cleaner...to accumulate by the action of gravity in the lower portions of the bag away from the outlet neck 24 leaving the same unrestricted." Ex1007, 3:53-72;

Ex1002, ¶262. The same benefit extends to Liddell's cyclonic separating apparatus 100 by preventing accumulated debris from clogging **inlet port 114** on bin 106. *Id.*

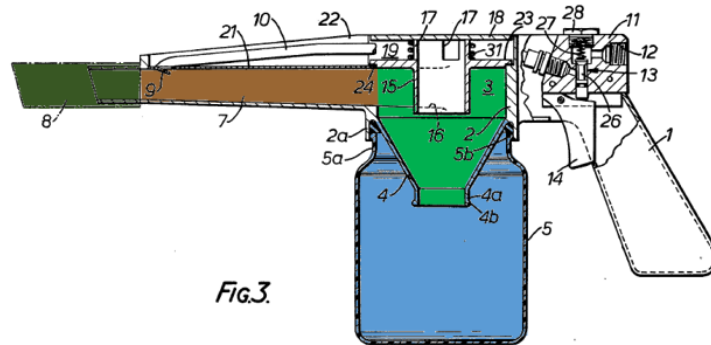
Further, Liddell's **inlet port 114** is oriented tangentially to bin 106 to generate cyclonic airflow within **upstream cyclone unit 101** (Ex1005, 9:7-14) and orienting cyclonic separating apparatus 100 vertically would have further motivated POSAs to simply connect Liddell's **inlet port 114** with Simpson's **inlet neck 18** to introduce tangential airflow into **upstream cyclone unit 101**, as shown:



Ex1007, Fig. 1(modified); Ex1005, Fig. 2c; Ex1002, ¶263.

POSAs would be further motivated to combine Liddell's cyclonic separator with Simpson in a vertical orientation because vertically oriented cyclonic separators were used in other prior art handheld cyclonic suction devices, like Merritt. Ex1002, ¶264. Merritt teaches a suction device where air entering **inlet nozzle 8** and “**suction pipe 7** enters the **cyclone chamber 3** tangentially” creating “normal centrifugal

cyclone separation” in the **chamber 3** and separated debris falls into the “**container 5** which can be detached and emptied when full:”



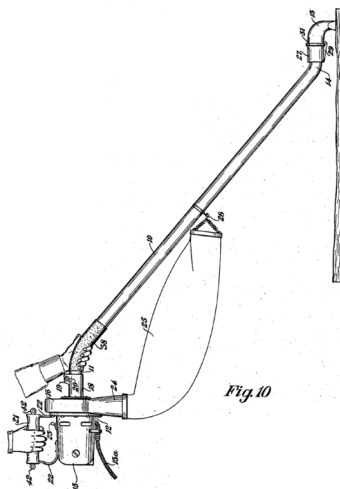
Ex1021, 1:97-102, 1:107-118, 2:55-65, Fig. 3.

Clean air exits Liddell’s cyclonic separating apparatus 100 from outlet port 126 through downstream ducting 26 to Liddell’s motor and out the vacuum at a post-motor outlet. §VIII.A.1.b. Similarly, when substituting Liddell’s separator in place of Simpson’s, POSAs would understand that air would flow rearwardly from Liddell’s separator into Simpson’s motor 15 casing and out of the vacuum at a post-motor outlet, thereby preserving the fluid flow path taught by Liddell. Ex1002, ¶266. POSAs would have been motivated to make this modification “[i]n order for the cyclonic separation apparatus 100 to be brought into operation,” as taught by Liddell, and so that “cleaned air is used to cool the motor,” which would have prevented overheating. Ex1005, 5:5-14; Ex1002, ¶267.

2. [1]/[12]/[13]

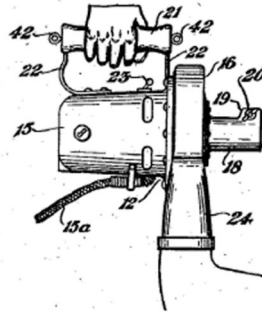
a. [1pre]/[12pre]/[13pre]

To the extent the preambles are limiting, Simpson combined with Liddell teaches them. Ex1002, ¶¶268-74. Simpson's figures show its vacuum being hand carried and teaches "handle 21 may be grasped in the right hand and the left hand placed upon the grip 38" such that the "weight of the motor-fan exhausting unit is freely carried by the handle." Ex1007, 2:65-84, 1:45-58, Figs. 1&10. Simpson also explains its vacuum can be hand carried in a "vertical position and supported by the operator grasping the handle 21 in one hand, the other hand grasping the tubular shank" "[i]n order to clean draperies, walls or the like:"



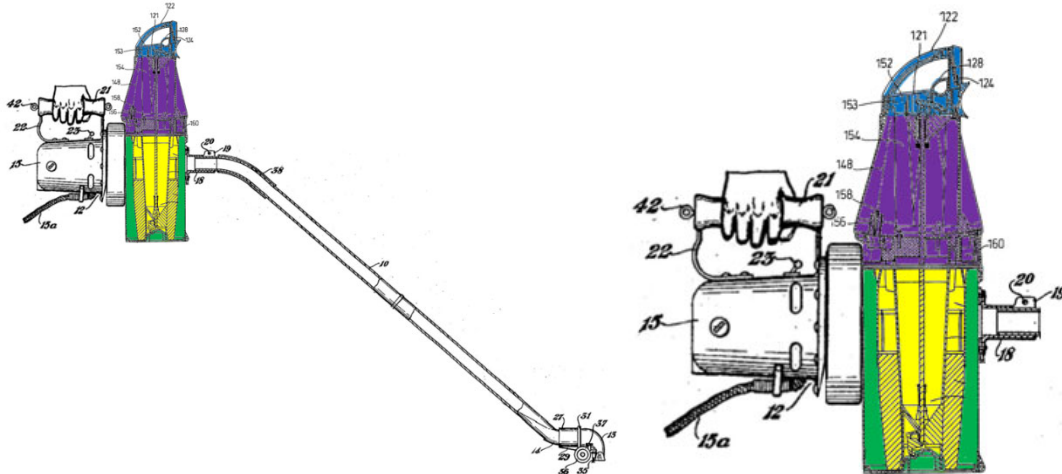
Id., Fig. 10, 2:78-84.

Simpson also teaches "tubular shank [10] may be detached from the inlet neck [18]" (illustrated below), making it even more portable and allowing an operator "to clean upholstered furniture or the like". Ex1007, 2:99-107, 2:150-3:4.



Ex1007, Fig. 1(modified). Simpson further teaches its “portable electric cleaner” is an improvement over “ordinary stationary cleaning systems” like “stationary cleaners which require piping, installation and expensive exhausting” and can be “difficult to properly manipulate.” *Id.* 1:16-26, 2:139-149.

The combination of Simpson and Liddell would remain hand carriable, with or without tube 10:



Ex1007, Fig. 1(modified); Ex1002, ¶¶273-74.

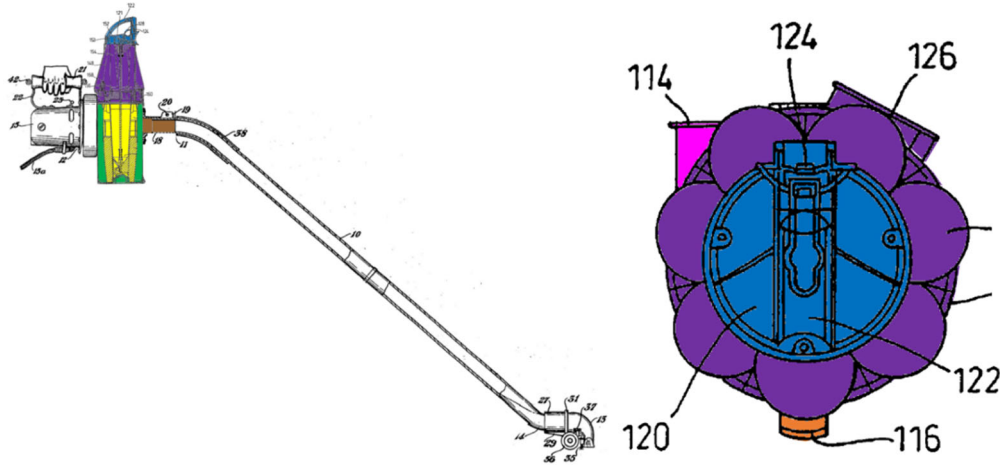
b. [1a]/[12a]/[13a]

Simpson combined with Liddell teaches these limitations. Ex1002, ¶¶275-77.

When combined, Simpson’s **inlet neck 18** and Liddell’s **inlet port 114** collectively

form a dirty air inlet for introducing dirty air into **upstream cyclone unit 101**.

Ex1007, 1:101-107, 3:53-58; Ex1005, 5:26-30.

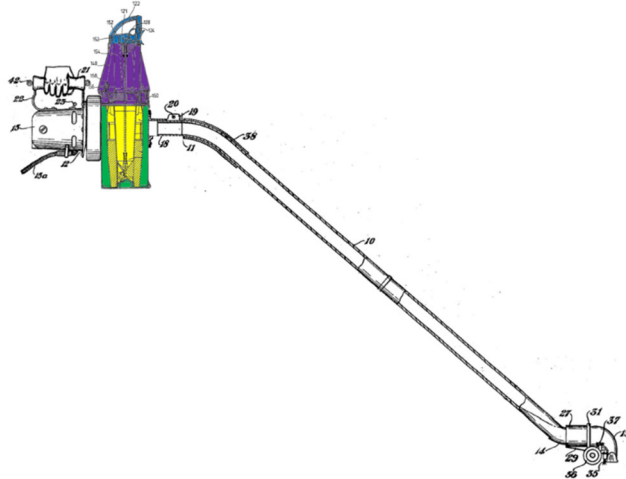


Ex1007, Fig. 1(modified); Ex1005, Fig. 2c.

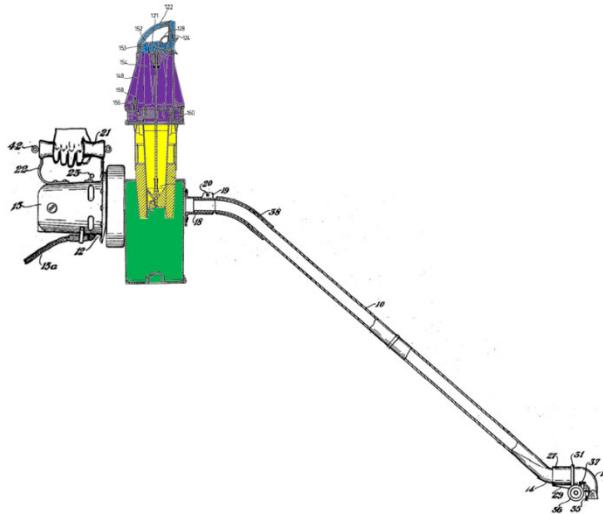
When combined, Simpson (modified with Liddell's post-motor clean air outlet) has a fluid flow path extending from Simpson's **inlet neck 18** and Liddell's **inlet port 114** to the post-motor outlet. §§VIII.A.1.b, VIII.E.1; Ex1002, ¶277.

c. [1b]/[12b]/[13b]/[1c]/[12c]/[13c]/[1f]/[1g]/[1h]/[12f]/[13f]

Liddell teaches or renders obvious these limitations. §§VIII.A.1.c-d, VIII.A.1.g-k. The combination of Simpson and Liddell likewise renders obvious these limitations. Ex1002, ¶¶278-82. When combined, Simpson's separator is replaced with Liddell's cyclonic separator and post-motor air outlet:



Ex1007, Fig. 1(modified); Ex1002, ¶279; §VIII.E.1. Liddell's teachings apply equally when combined with Simpson. Ex1002, ¶¶280-82. With respect to limitations [1c]/[12c]/[13c]/[13f], POSAs would understand the second cyclonic cleaning stage and screen remain moveable, as taught by Liddell, because when a user disengages handle 116 and catch 118, **downstream cyclone unit 103** and **shroud 140** (with perforated portion 144) are released from the sidewall of **upstream cyclone unit 101** and the remainder of the vacuum, as illustrated:

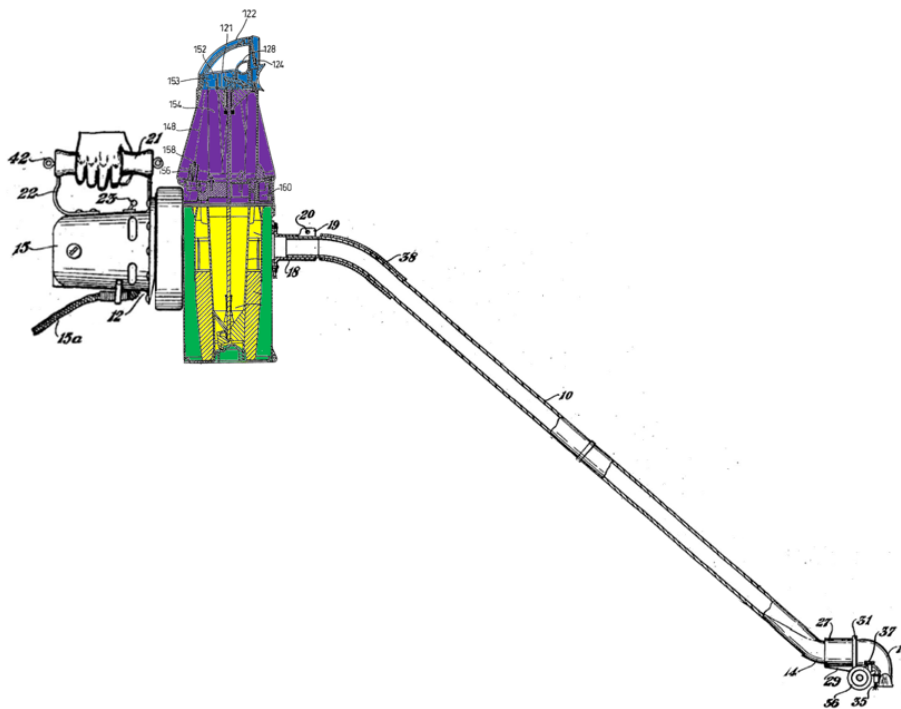


Ex1007, Figs. 1(modified); Ex1002, ¶282.

d. **[1d]/[12d]/[13d]**

Simpson combined with Liddell teaches these limitations. Ex1002, ¶¶283-85.

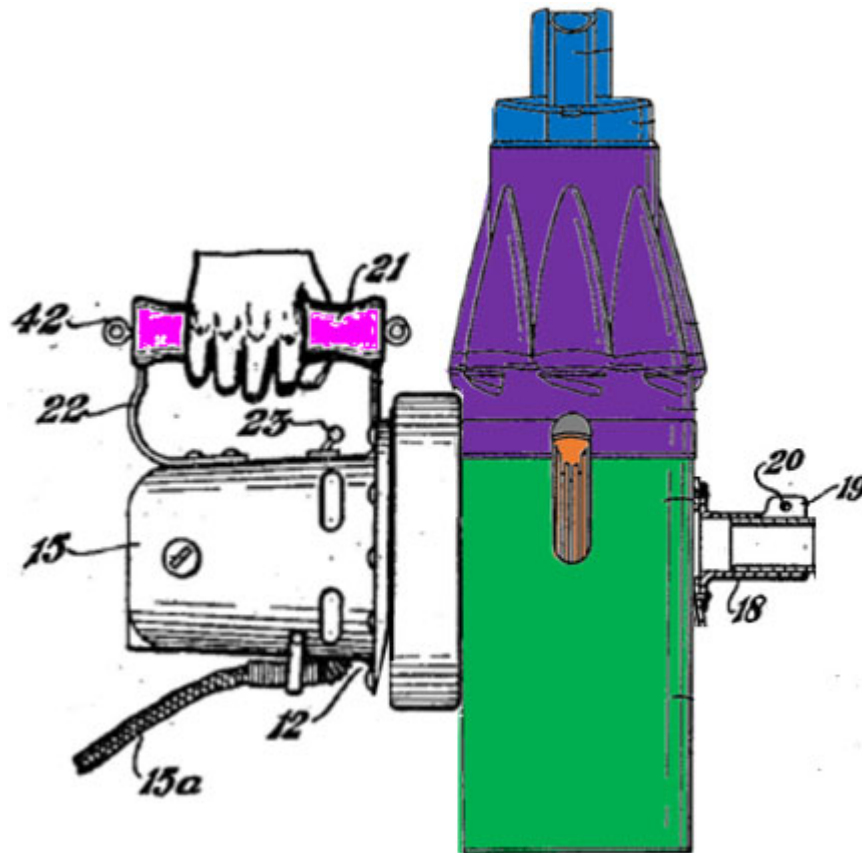
Simpson teaches a suction motor 15. Ex1007, 1:101-107, 2:7-10. When combined, Simpson's motor 15 is positioned in the fluid flow path downstream from Liddell's second cyclonic cleaning stage (**downstream cyclone unit 103**) and upstream from a post-motor outlet, as taught by Liddell:



Ex1007, Fig. 1(modified); Ex1002, ¶284. Further, Liddell teaches a suction motor, which “draw[s air] into the vacuum” and out a post-motor outlet, and it would have been obvious to modify Simpson with Liddell’s motor “[i]n order for the cyclonic separation apparatus 100 to be brought into operation,” as taught by Liddell. Ex1005, 5:5-14; Ex1002, ¶285.

e. [1e]/[12e]/[13e]

Simpson and Liddell each teach these limitations, as does their combination. Ex1002, ¶¶286-88. Simpson teaches a “**handle 21**” and Liddell teaches a “**handle 116**,” as does their combination:

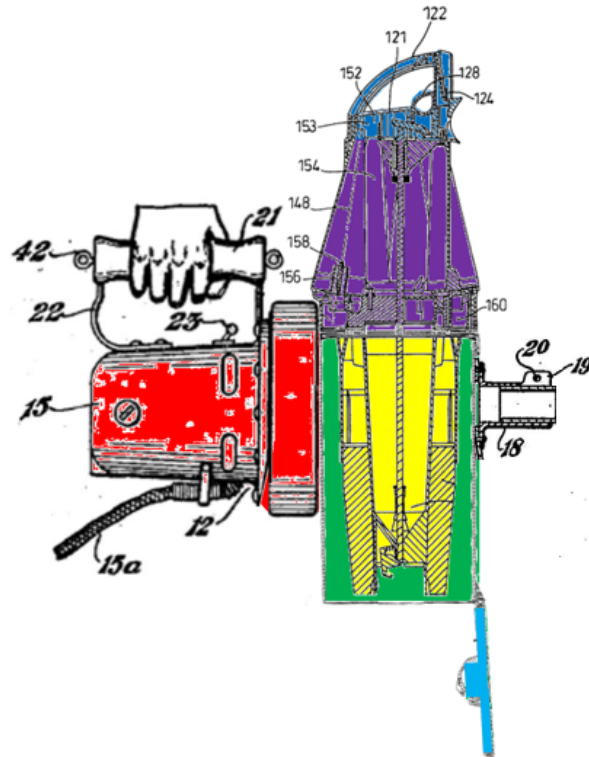


Ex1007, 2:65-84, Fig. 1(modified); Ex1005, 5:30-6:2, Fig. 2a; Ex1002 ¶288. Further, for limitations [1e] and [12e], Liddell’s **handle 122** also satisfies this limitation. §VIII.A.1.a.

3. [2]

Simpson combined with Liddell renders obvious claim 1 (§VIII.E.2) and the limitation of claim 2. Ex1002, ¶¶289-91. Simpson combined with Liddell

(illustrated below) has a housing containing the suction motor (casing for **motor 15** and **fan casing 16**) and clean air outlet (post-motor outlet, taught by Liddell), wherein the bottom door (**base 108**) is openable while the sidewall of the first cyclonic cleaning stage (**upstream cyclone unit 101**) is connected to the housing:



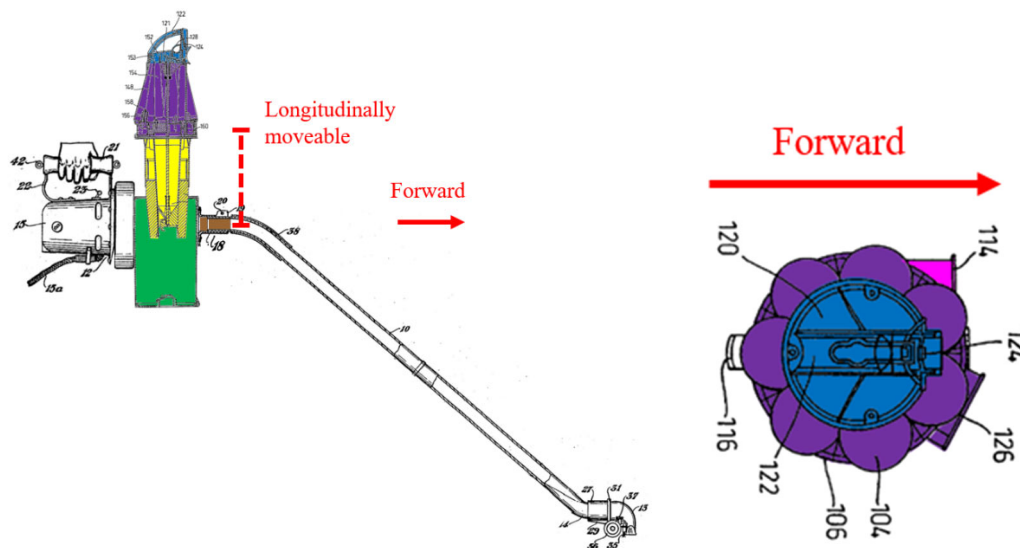
Ex1007, Fig. 1(modified); §§VIII.A.1.a-d; Ex1002, ¶290.

4. [3]/[4]/[6]/[10]/[11]

Simpson combined with Liddell renders obvious claim 1 (§VIII.E.2), and the limitations of these claims. Ex1002, ¶¶292-97, 305-08; §VIII.A.2-4, VIII.B.4, VIII.B.7, VIII.A.8-9.

5. [7]

Simpson combined with Liddell renders obvious claim 1 (§VIII.E.2) and the limitation of claim 7. Ex1002, ¶¶298-99. The combination of Simpson and Liddell has a dirty air inlet (Simpson's **inlet neck 18** and Liddell's **inlet port 114**) that has a conduit (airways within **inlet neck 18** and **inlet port 114**) extending forwardly from the first cyclonic cleaning stage (**upstream cyclone unit 101**), and wherein the second cyclonic cleaning stage (**downstream cyclone unit 103**) is longitudinally moveable relative to the conduit:

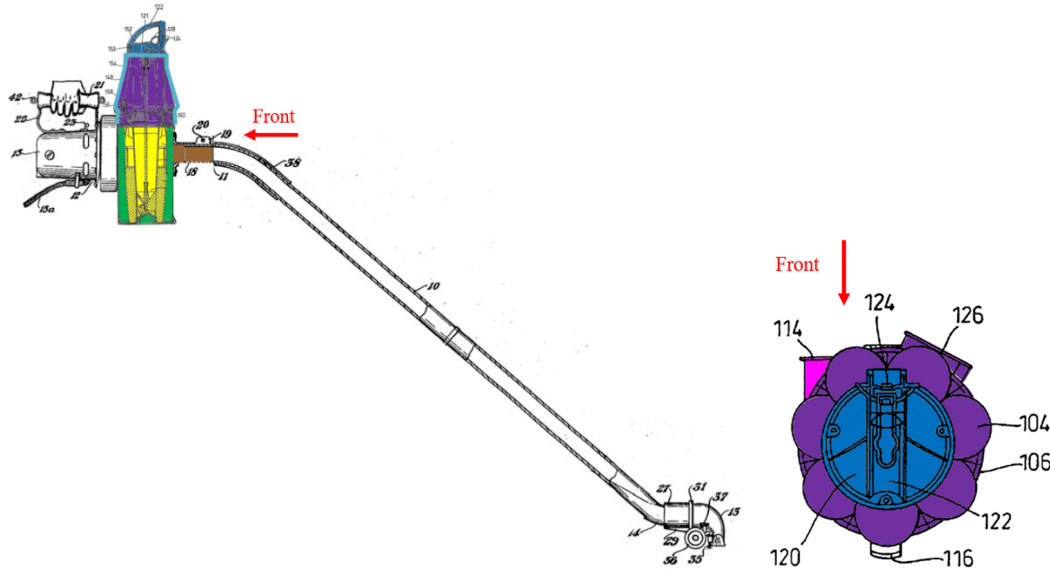


Ex1007, Fig. 1(modified); Ex1005, Fig. 2c; §§VIII.A.1.d, VIII.A.5-7; Ex1002, ¶299.

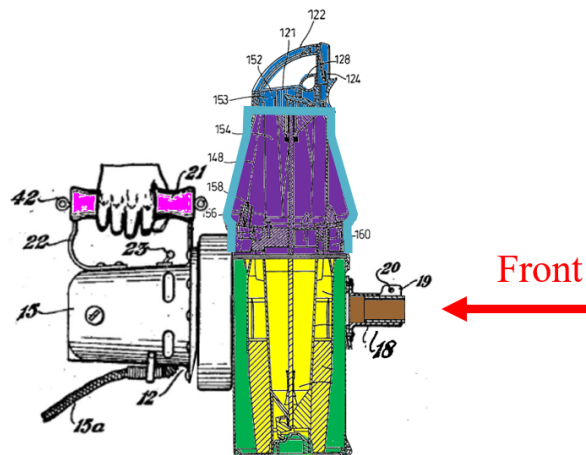
6. [8]

Simpson combined with Liddell renders obvious claim 7 (§VIII.E.5) and the limitation of claim 8. Ex1002, ¶¶300-02. The combination of Simpson and Liddell has a dirty air inlet (Simpson's **inlet neck 18** and Liddell's **inlet port 114**) that is located at a front end of the hand carriable surface cleaning apparatus and the upper

end of the second cyclonic cleaning stage (**upper surface** of **downstream cyclone unit 103**) is located above the dirty air inlet:



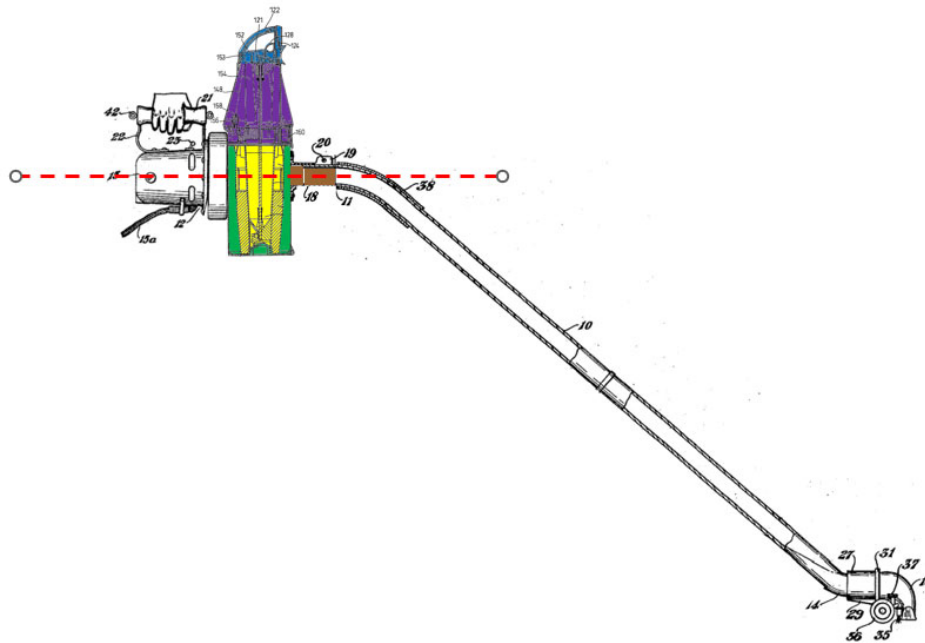
Ex1007, Fig. 1(modified); Ex1005, Fig. 2c; Ex1002, ¶301. Simpson also teaches “tubular shank [10 and cleaning tool 13] may be detached from the inlet neck [18]” such that **inlet neck 18** is the front of the vacuum:



Ex1007, 2:99-107, 2:150-3:5, Fig. 1(modified); Ex1002, ¶302.

7. [9]

Simpson combined with Liddell renders obvious claim 7 (§VIII.E.5) and the limitation of claim 9. Ex1002, ¶¶303-04. The combination of Simpson and Liddell has a conduit (airways within Simpson's **inlet neck 18** and Liddell's **inlet port 114**) that defines an **axis** that intersects Liddell's **upstream cyclone unit 101**:



Ex1007, Fig. 1(modified).

F. Ground 6: Simpson Combined With Liddell And Organ Renders Obvious Claims 1-13

1. Motivation to Combine

Organ teaches certain features POSAs would have been motivated to combine with Simpson and Liddell: Organ's a) ability to move a second stage and screen relative to a first stage, b) ability to move a second stage while a bottom door on a first stage is open, and c) pre-motor filter chamber. Ex1002, ¶¶309-10. POSAs would

have been motivated to incorporate these features in the Simpson and Liddell combination for the same reasons POSAs would have been motivated to combine Organ and Liddell. §VIII.B.1.

2. [1]/[2]/[3]/[6]/[7]/[8]/[9]/[10]/[11]/[12]/[13]

Simpson combined with Liddell renders obvious these claims. *See* §VIII.E; Ex1002, ¶¶311-12. To the extent PO argues they do not render obvious a moveable second stage (limitations [1c]/[12c]/[13c]/[7]/[11]) or screen (limitation 12[f]), these claims are obvious in view of the combination of Simpson, Liddell, and Organ for the same reason Liddell combined with Organ renders those limitations obvious. *See* §VIII.B.

3. [4]

Simpson combined with Liddell renders obvious claim 1 (§VIII.E.2), and Simpson combined with Liddell and Organ renders obvious the limitation of claim 4. Ex1002, ¶¶313-15. The modifications to Liddell's cyclonic separating apparatus 100 taught by Organ apply equally when combined with Simpson. *Id.*; *see* §VIII.B.5.

4. [5]

Simpson combined with Liddell renders obvious claim 1 (§VIII.E.2), and Simpson combined with Liddell and Organ renders obvious the limitation of claim 5. Ex1002, ¶¶316-20. The combination of Simpson, Liddell, Organ teaches a pre-motor filter chamber (chamber housing Organ's pre-motor filter) positioned in the fluid flow path between the second cyclonic cleaning stage (downstream cyclone

unit 103) and the suction motor (motor 15), and wherein each second cyclone (downstream cyclones 104/204) has a respective air outlet that is in fluid communication with the pre-motor filter chamber. §VIII.B.6. POSAs would have been motivated to add Organ's pre-motor filter at or after Liddell's outlet port 126, but before the motor to further clean the air before reaching the motor. Ex1002, ¶¶319-20; §VIII.B.1.c.

G. Ground 7: Simpson Combined With Liddell And DC14Manual; and Simpson Combined With Liddell, Organ, And DC14Manual Renders Obvious Claim 10

1. Motivation to Combine

The combination of Simpson and Liddell uses Liddell's cyclonic separator, including upper portion 120 and downstream cyclone unit 103. §VIII.E. POSAs would have been motivated to modify Liddell's cyclonic separator with DC14Manual's openable lid. *See* §VIII.C.1; Ex1002, ¶¶321-22.

2. [10]

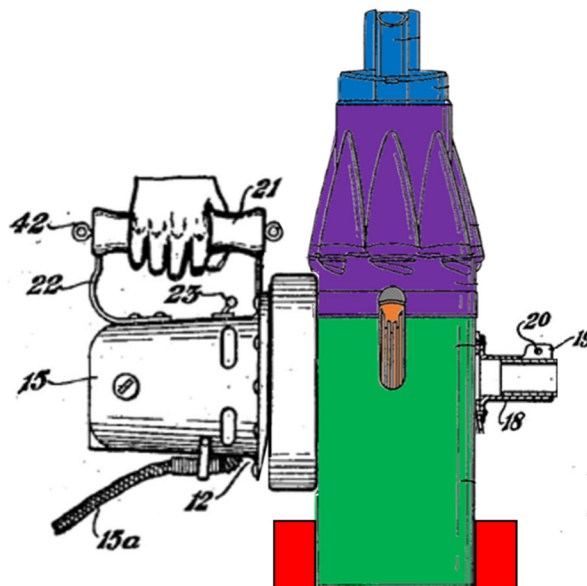
Simpson combined with Liddell and Simpson combined with Liddell and Organ render obvious claim 1 (§VIII.E.2), and Simpson combined with Liddell and DC14Manual teaches the limitation of claim 10. Ex1002, ¶¶323-26.

Simpson combined with Liddell and DC14Manual has a lid (DC14Manual's lid) that is moveable between a closed position, in which the lid overlies a second cyclonic cleaning stage (downstream cyclone unit 103), and an open position in which the second cyclonic cleaning stage is accessible. §VIII.C.

H. Ground 8: Simpson Combined With Liddell And Lim; And Simpson Combined With Liddell, Organ, And Lim Renders Obvious Claim 14

Simpson combined with Liddell teach all limitations of claim 14 except limitation [14f], which is taught by Lim. *See* §§VIII.E.2, VIII.D. Lim teaches the “dirt collection chamber” of limitations [14b] and [14f] and POSAs would have been motivated to combine it with Simpson and Liddell and Simpson, Liddell, and Organ for the same reasons POSAs would have been motivated to combine it with Liddell’s upstream cyclone unit 101. §VIII.D; Ex1002, ¶¶327-29.

In combination, Simpson, Liddell, and Lim teach a first cyclonic cleaning stage (Liddell’s **upstream cyclone unit 101**) having a first cyclone chamber and a first dirt collection chamber (Lim’s **chamber 48**) that has a dirt collection region and is external to the first cyclone chamber, as shown below.

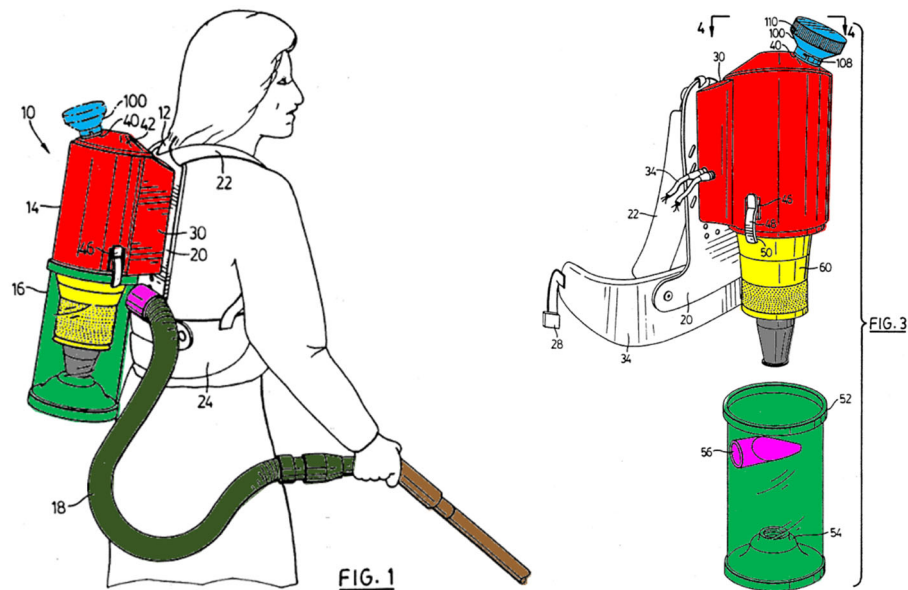


Ex1007, Fig. 1(modified).

I. Ground 9: Soler Combined With Liddell Renders Obvious Claims 1-4, 6-9, And 11-13

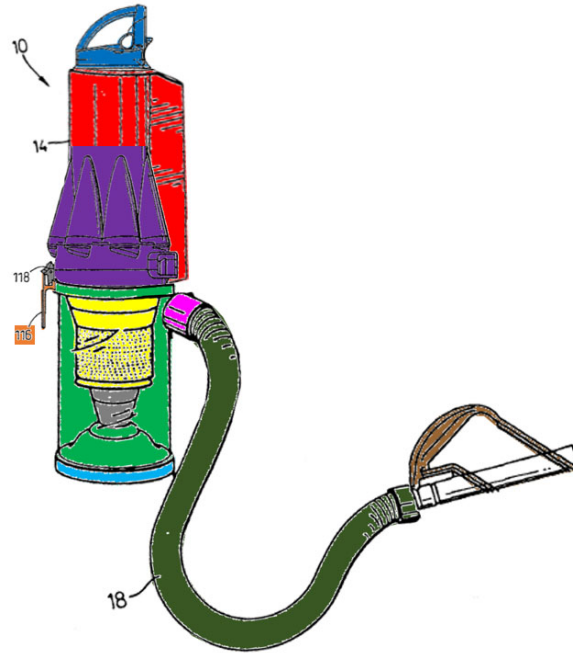
1. Motivation to Combine

POSAs would have been motivated to combine Soler and Liddell. Ex1002, ¶330-36. Soler teaches a backpack vacuum cleaner with “a **first cyclone** and a **second cyclone** in series.” Ex1008, 1:9-11, 3:18-19. Soler teaches a “**lower casing 16**,” which contains “**first cyclone chamber 62**,” “is releasably mounted on **upper casing 14**,” which contains “**second cyclone chamber [64]/74**,” such that **second cyclone chamber 64/74** is moveable relative to **first cyclone chamber 62**:



Id., 5:46-47, 6:5-37, Figs. 1&3.

POSAs would have been motivated to combine certain features taught by Liddell with Soler, including: Liddell’s **openable base 108**, **downstream cyclone unit 103**, and **handles 28, 116, 122**, as shown:

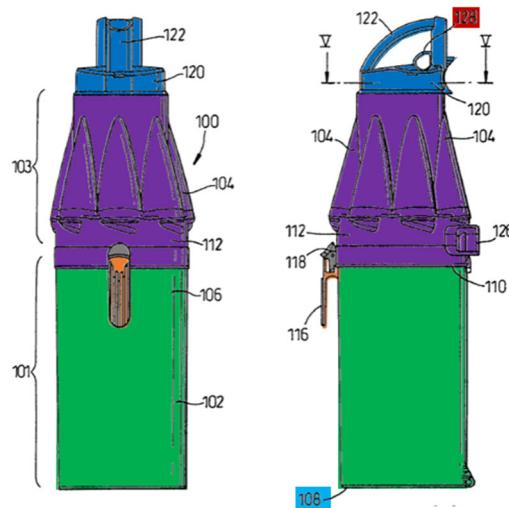


Ex1008, Fig. 1(modified); Ex1002, ¶¶332.

a. **Liddell's Openable Base**

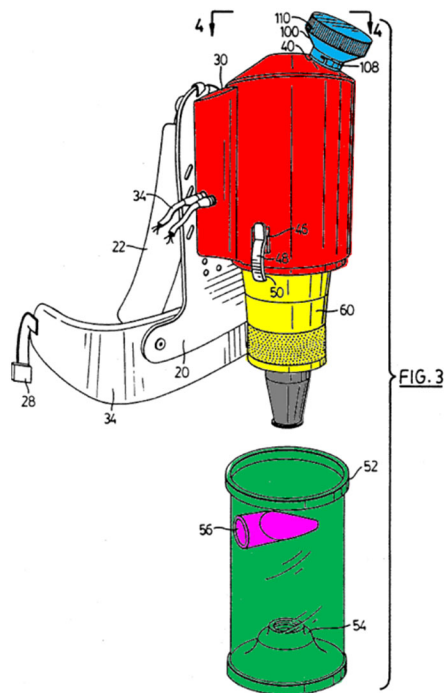
Liddell teaches “[t]he **upper portion 120** [] carries an **actuating lever 128** designed to activate a mechanism for opening the **base 108**...for emptying.”

Ex1005., 6:23-6:25, 7:3-6, 9:11-14.



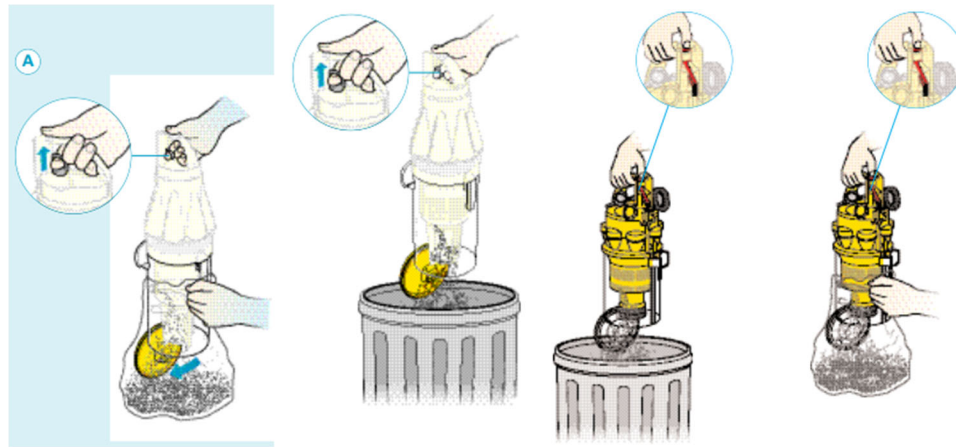
Id., Figs. 2a-2b.

POSAs would have been motivated to combine these features with Soler and would have had a reasonable expectation of success. Ex1002, ¶¶338-42. POSAs would have been motivated to combine Liddell's openable **base 108** and **upper portion 120** with Soler to make it easier to empty Soler's **lower casing 16**. *Id.* Soler's **lower casing 16** can be emptied by removing it from **upper casing 14** (see below) and dumping its contents. *Id.*



Ex1008, Figs. 1&3.

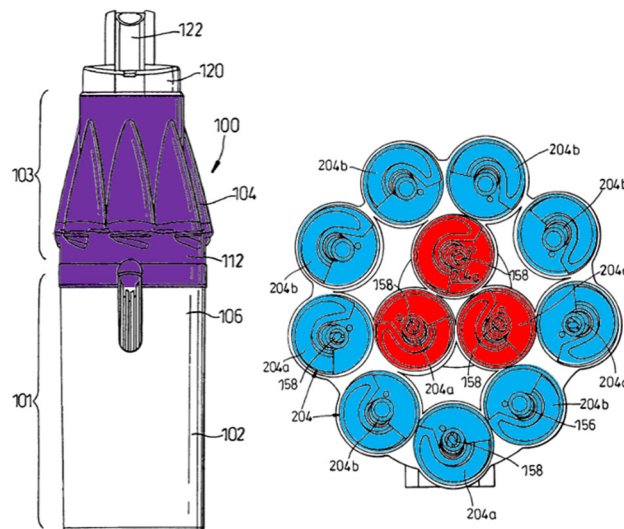
Liddell's openable base conveniently allows **lower casing 16** to be emptied before or after removing it from **upper casing 14**, as shown in prior art Dyson product manuals:



Ex1002, ¶340; Ex1014, 9; Ex1009, 8. This would reduce the likelihood of spilling debris while carrying **lower casing 16** to the trash. Ex1002, ¶341.

b. Liddell's Downstream Cyclone Unit 103

Liddell teaches a **downstream cyclone unit 103** having a plurality downstream cyclones 104/204 arranged in an **inner** and **outer** ring:

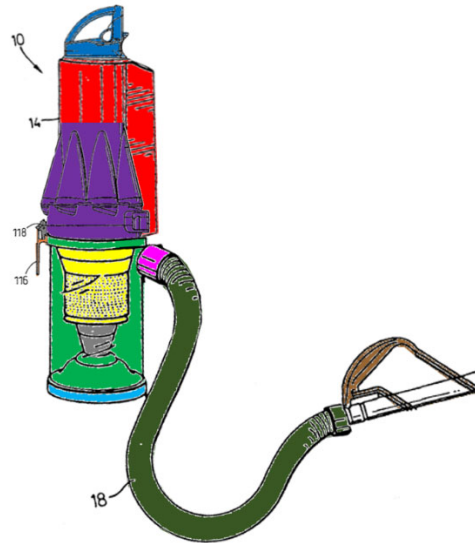


Ex1005, 10:5-10:20, Figs. 2a&7; §§VIII.A.1, VIII.B.2.d.

POSAs would have been motivated to incorporate Liddell's downstream cyclone unit containing cyclones 104/204 in Soler's vacuum to improve its cleaning

efficiency. Ex1002, ¶¶344-48. POSAs would have known cyclones of different sizes could be arranged in series to remove different sized dirt particles from the air. *Id.*; Ex1008, 2:29-35 (“[T]he [smaller] second or inner cyclone is used to remove the finer and lighter particles which are entrained in the exhaust air from the first cyclone”). It was also known that arranging smaller cyclones in parallel could help remove even finer dust particles while maintaining a high volume of airflow and overall suction. Ex1002, ¶¶345-46.

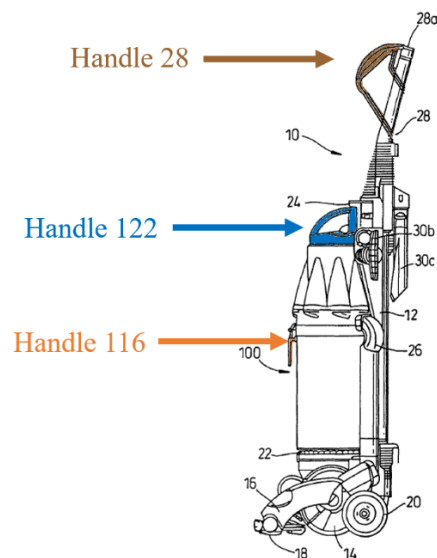
POSAs would have had a reasonable expectation of success in making this modification. *Id.*, ¶347. To combine Liddell’s **downstream cyclone unit 103** with Soler, POSAs simply would have directed air from Soler’s **first cyclone chamber 62** passing through **perforations 69** to Liddell’s **downstream cyclones 104/204**. *Id.* Also, POSAs would have simply directed cleaned air exiting Liddell’s **downstream cyclone unit 103** from **outlet port 126** through an extension of **upper casing 14** to motor 80 so that it could be exhausted from Soler’s air exit port 40, thereby maintaining Soler’s fluid flow path. *Id.* Soler’s **second cyclone chamber** would therefore no longer perform cyclonic separation, but would continue to funnel dust separated by **downstream cyclone unit 103** to Soler’s **receiving chamber 54** similar to Liddell’s collection space 134 so dust could be disposed of when Liddell’s **base 108** is opened.



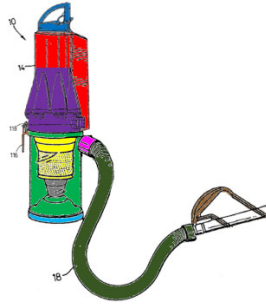
Ex1008, Fig. 1(modified); Ex1005, 7:2-6, 7:30-8:5.

c. **Liddell's Handles 28, 116, 122**

Liddell teaches a handle: **hose/wand assembly 28**, **handle 116**, and **handle 122**. Ex1005, 4:16-21, 5:30-6:2, 6:16-18.



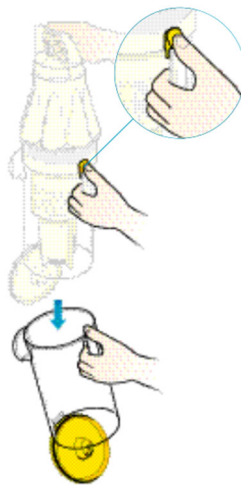
Ex1005, Fig. 1b. POSAs would have been motivated to incorporate these handles on Soler's vacuum to improve the ergonomics and useability of the vacuum and would have had a reasonable expectation of success. Ex1002, ¶¶350-58.



Ex1008, Fig. 1(modified).

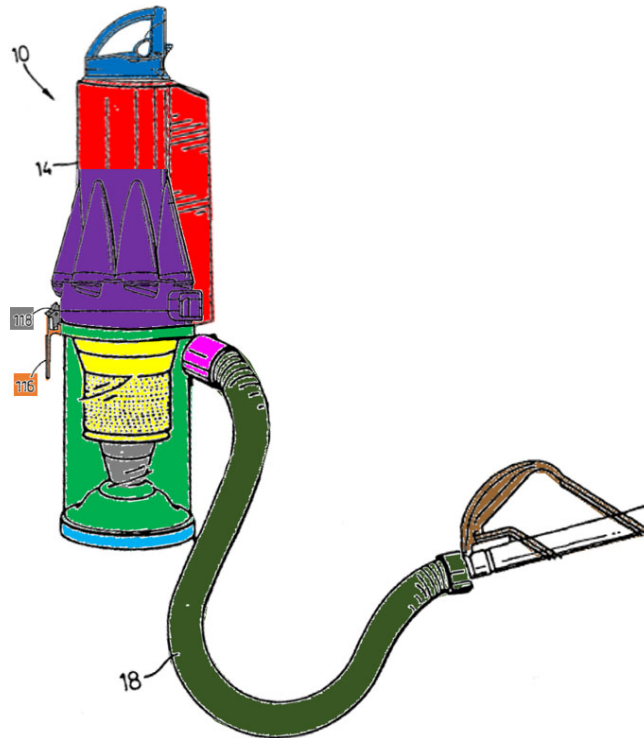
POSAs would have been motivated to incorporate **handle 122** to provide an alternative means of carrying Soler's vacuum 10, such that **handle 122** is held with one hand and a cleaning head is held with another. Ex1002, ¶¶351-53. This also would have made it easier to empty the vacuum through **base 108**, as explained. § VIII.I.1.a.

POSAs would have been motivated to incorporate **handle 116** on Soler's **lower casing 16** so it could be easily carried by one hand, as was done in the prior art:



Ex1014, 10; Ex1002, ¶354.

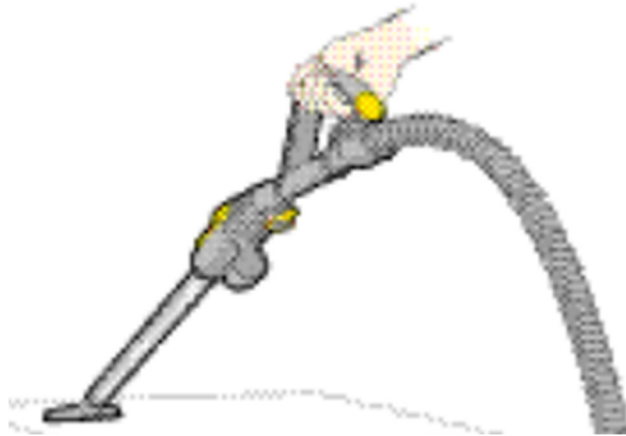
Further, POSAs would have been motivated to use **handle 116** to secure Soler's **lower casing 16** to **catch 118** on Liddell's **downstream cyclone unit 103** so Soler's **lower casing 16** could continue to be releasably secured to the remainder of the vacuum, as shown:



Ex1008, Fig. 1(modified); Ex1002, ¶355.

POSAs would have been motivated to incorporate **handle 28** at the end of **hose 18** to provide an ergonomic means of manipulating the vacuum's cleaning head. Ex1002, ¶356. Soler teaches “[h]ose 18 may be of any desired length and, preferably, is designed to receive a variety of interchangeable cleaning heads.” Ex1008, 4:14-16. Liddell explains “**hose and wand assembly 28**...function[s] as a handle” and “may be released to allow the distal end 28a of the wand to...perform

an above-the-floor cleaning function.” Ex1005, Fig. 4:16-21. Incorporating handles at the end of a suction hose was common prior to the ’607Patent, as shown in Dyson’s DC07Manual, and would have motivated POSAs to make such a combination:



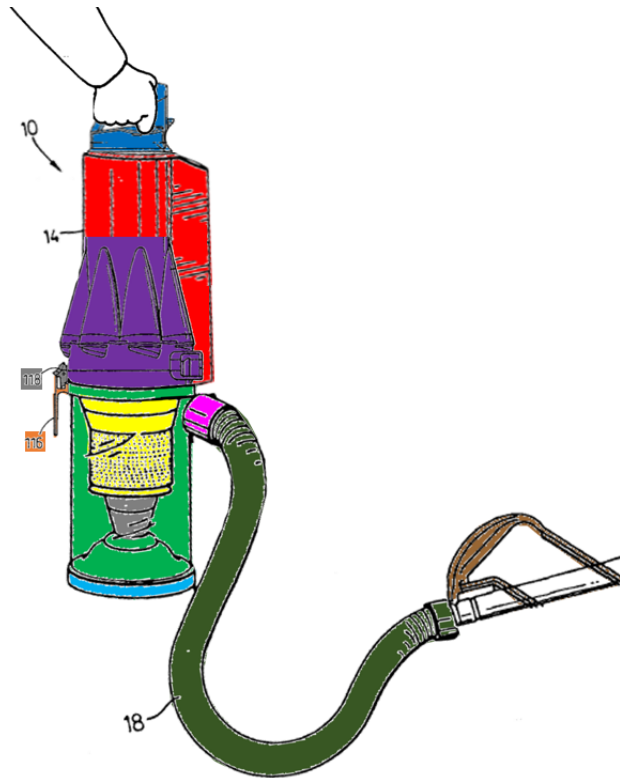
Ex1014, 8; Ex1002, ¶¶357-58.

2. [1]/[12]/[13]

a. [1pre]/[12pre]/[13pre]

To the extent the preambles are construed as limiting, Soler combined with Liddell teaches them. Ex1002, ¶¶359-61. Soler teaches a “light weight” backpack vacuum design “so that it may be worn for an extended period of time.” Ex1008, 3:49-50. POSAs would understand Soler’s vacuum is hand carriable; by hand carrying Soler’s vacuum by the harness 12, like an ordinary backpack can be hand carried by the strap. Ex1002, ¶360. The combination of Liddell and Soler would likewise remain hand carriable. *Id.*

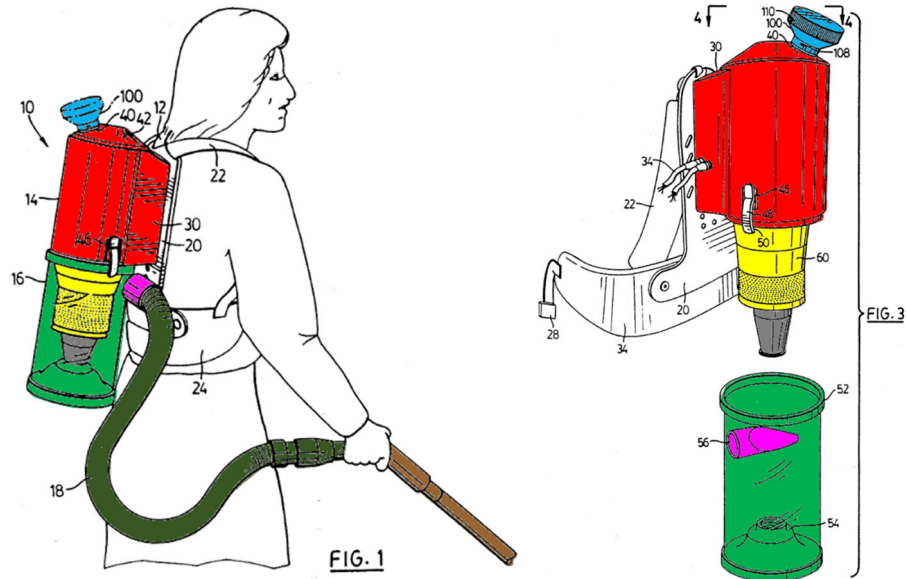
Similarly, when combined, Liddell's **handle 122** also provides a convenient means to hand carry Soler's cleaner 10, as shown below.



Ex1008, Fig. 1(modified). Further, even without using a handle, the combined vacuum can be hand carried with two hands; *e.g.*, by gripping opposite sides of the vacuum. *Id.*

b. [1a]/[12a]/[13a]

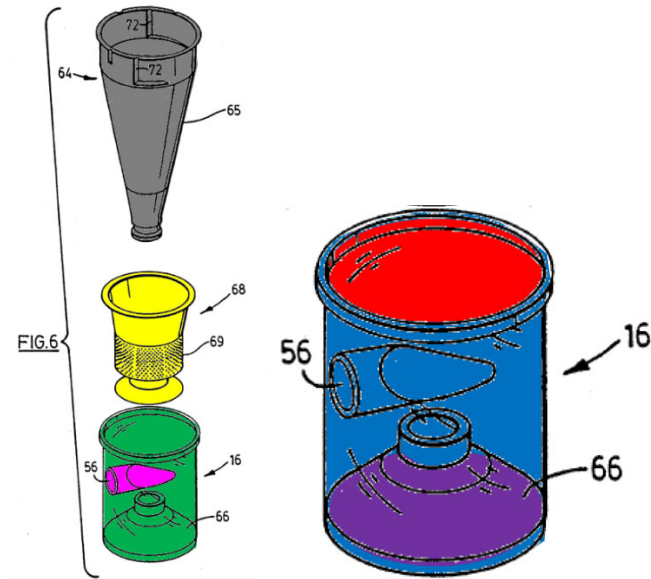
Soler combined with Liddell teaches these limitations. Ex1002, ¶¶362-68. Soler teaches vacuum cleaner 10 has a dirty air inlet (collectively, **hose 18** and **entry port 56**), a clean air outlet (**air exit port 40** and an “**after filter**”), and a fluid flow path therebetween. Ex1008, 4:14-16, 5:60-65, 4:63-65, 6:65-7:5, Figs. 1&3-4.



Id., Figs. 1&3. The combination of Soler and Liddell maintains Soler's fluid flow path. §VIII.I.1; Ex1002, ¶¶366-68.

c. [1b]/[12b]/[13b]

Soler combined with Liddell teaches these limitations. Ex1002, ¶¶369-72. Soler teaches a first cyclonic cleaning stage (**first cyclone chamber 62**) positioned in the fluid flow path downstream from the dirty air inlet (**entry port 56** and **hose 18**), the first cyclonic cleaning stage having an upper end (**upper end** of **lower casing 16**), a bottom end (**bottom end** of **lower casing 16**) spaced longitudinally below the upper end and a side wall (**side wall** of **lower casing 16**) extending therebetween, and a dirt collection region (**lower portion 66** of **lower casing 16**).



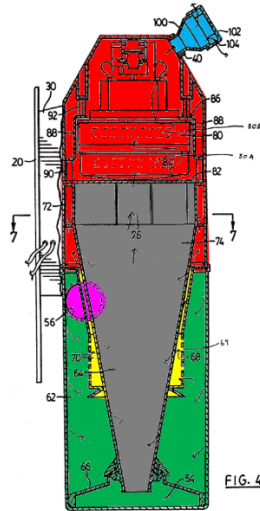
Ex1008, Fig. 6, Fig. 6 (excerpted), 6:21-25. Soler teaches “[a]ir entry port 56...receive[s] hose assembly 18” and “suppl[ies] dirt laden air tangentially to...lower casing 16” where “larger and heavier dirt is deposited in the lower portion [66] of lower casing 16.” *Id.*, 5:59-65, 6:20-25.

Liddell teaches a bottom door (base 108) that is openable to empty the dirt collection region, and as explained, POSAs would have been motivated to incorporate it on the bottom of Soler’s casing 16 along with Liddell’s mechanism for opening it. *See* §§VIII.A.1.c, VIII.I.1.

d. [1c]/[12c]/[13c]

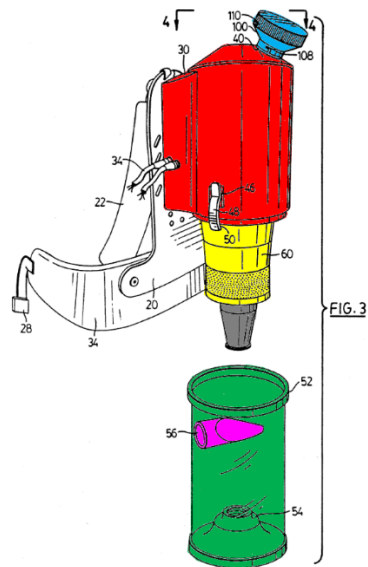
Soler teaches these limitations, Liddell teaches these limitations, and so does their combination. Ex1002, ¶¶373-77. Soler teaches a second cyclonic cleaning stage (second cyclone chamber 64/74) that is positioned in the fluid flow path downstream from the first cyclonic cleaning stage (first cyclone chamber 62).

Ex1008, 4:14-16, 5:60-65, 4:63-65, 6:65-7:5, Fig. 4. Soler further teaches the second cyclonic cleaning stage (**second cyclone chamber 64/74**) has an upper end which is positioned above the upper end of the first cyclonic cleaning stage (**first cyclone chamber 62**):



Id., Fig. 4.

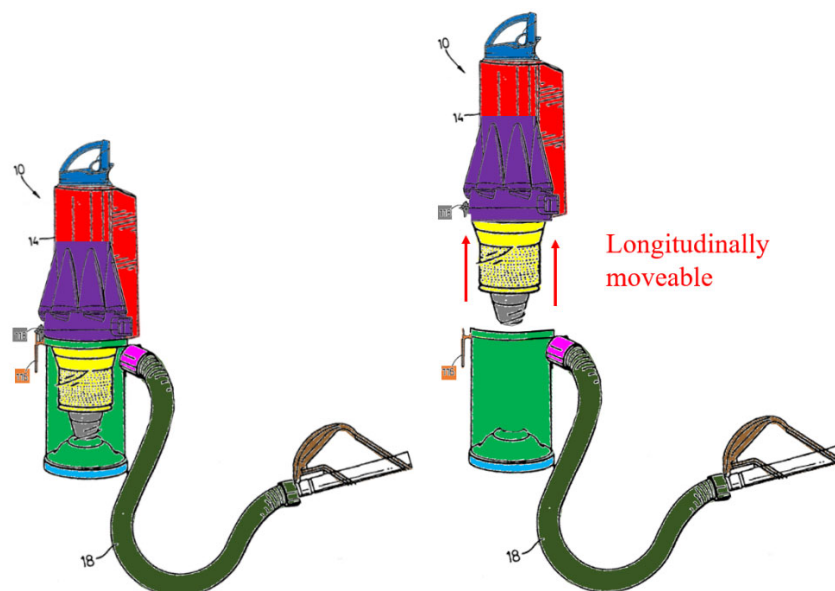
Soler teaches the second cyclonic cleaning stage (**second cyclone chamber 64/74**) is longitudinally moveable relative to all of the sidewall of the first cyclonic cleaning stage (sidewall of lower casing 16 of **first cyclone chamber 62**). Ex1002, ¶¶374-75. “**Lower casing 16** [which houses **first cyclone chamber 62**] is releasably mounted on **upper casing 14** [which houses **second cyclone chamber 64/74**]” using latches 46. Ex1008, 5:46-54. When **latches 46** are disengaged, the **lower casing 16** is released from **upper casing 14**, and **second cyclone chamber 64/74** is longitudinally moveable relative to all of the sidewall of **first cyclone chamber 62**:



Id., Fig 3.

Liddell also teaches this limitation. §VIII.A.1.d; Ex1002, ¶376.

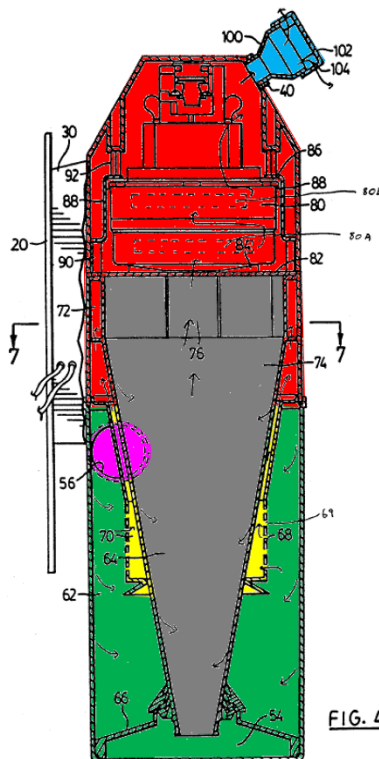
The combination of Soler and Liddell also teaches this limitation, *e.g.*, by disengaging **handle 116** from **catch 118** to release Soler's **lower casing 16** from Liddell's **downstream cyclone unit 103**:



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

e. [1d]/[12d]/[13d]

Soler teaches these limitations and Soler combined with Liddell teaches these limitations. Ex1002, ¶¶378-80. Soler teaches a suction motor (**motor 80**) positioned in the fluid flow path downstream from the second cyclonic cleaning stage (**second cyclone chamber 64/74**). Ex1008, 6:57-64.

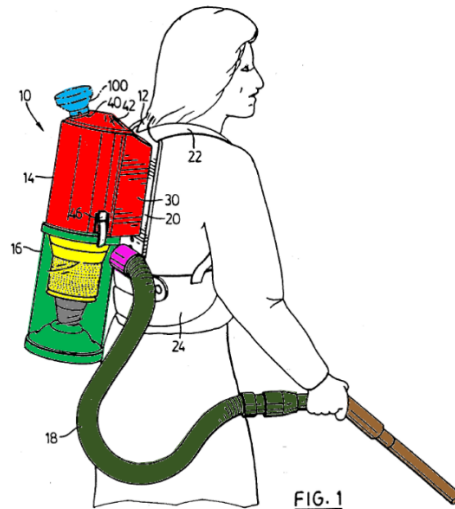


Id., Fig. 4. When Liddell is combined with Soler, Soler's motor 80 is downstream from Liddell's downstream cyclone unit 103. §VIII.I.1.b; Ex1002, ¶380.

f. [1e]/[12e]/[13e]

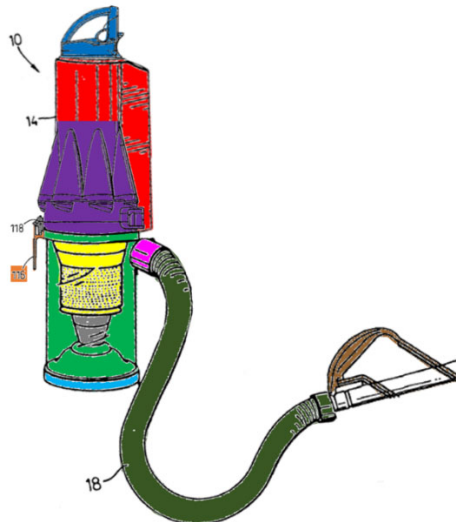
Soler teaches these limitations, Liddell teaches these limitations, and so does their combination. Ex1002, ¶¶381-84. Soler teaches **hose assembly 18**, which

receives a cleaning head, which are each a handle by which users manipulate the **suction inlet** of the vacuum:



Ex1008, 4:13-16., Fig. 1.

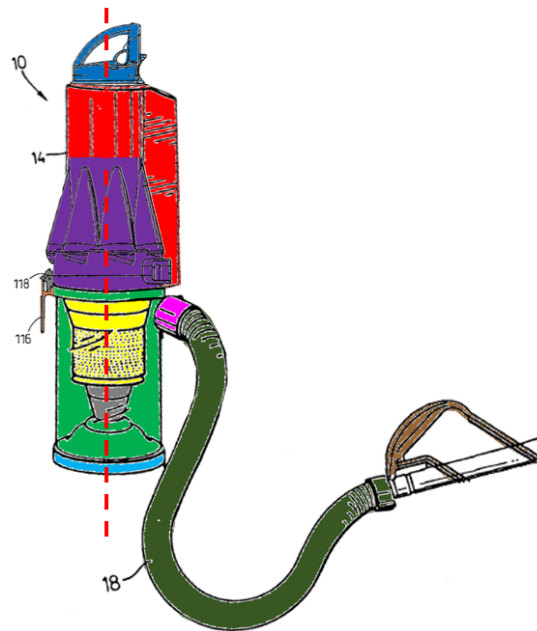
Liddell also teaches a “handle;” **handle 28** and **handle 116** (§VIII.A.1.f), which are retained in the combination:



Ex1008, Fig. 1(modified); Ex1002, ¶383. Further, Liddell’s **handle 122** is a “handle” for limitations [1e]/[12e]. §VIII.A.1.a.

g. [1f]/[1g]/[1h]

Soler combined with Liddell teaches these limitations. Ex1002, ¶¶385-90. When combined, Liddell's downstream cyclone unit 103 has an inner and outer ring of **second cyclones 104/204** arranged in parallel around a central longitudinal axis that extends through Liddell's openable **base 108** on Soler's **lower casing 16**:

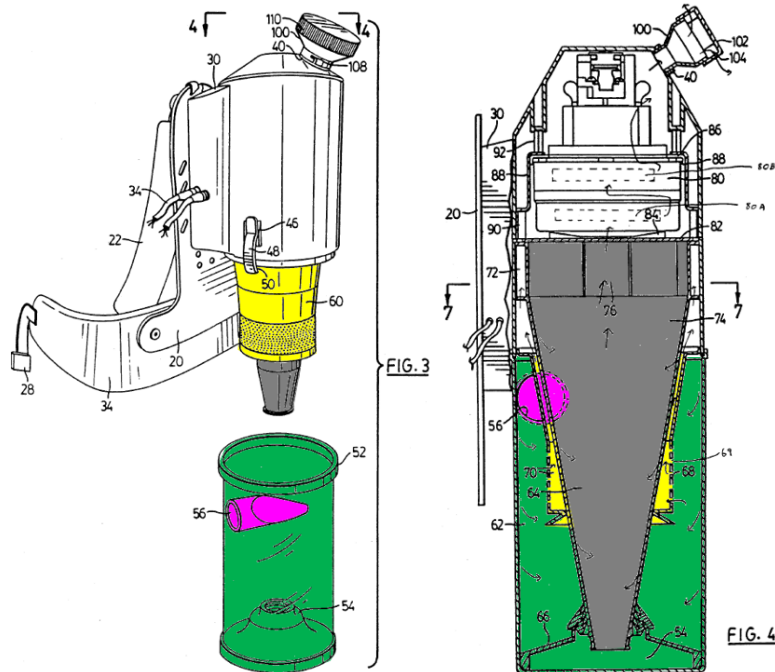


Ex1008, Fig. 1(modified); §§VIII.A.1.g-i, VIII.B.2.d; Ex1002, ¶¶389-90.

h. [12f]

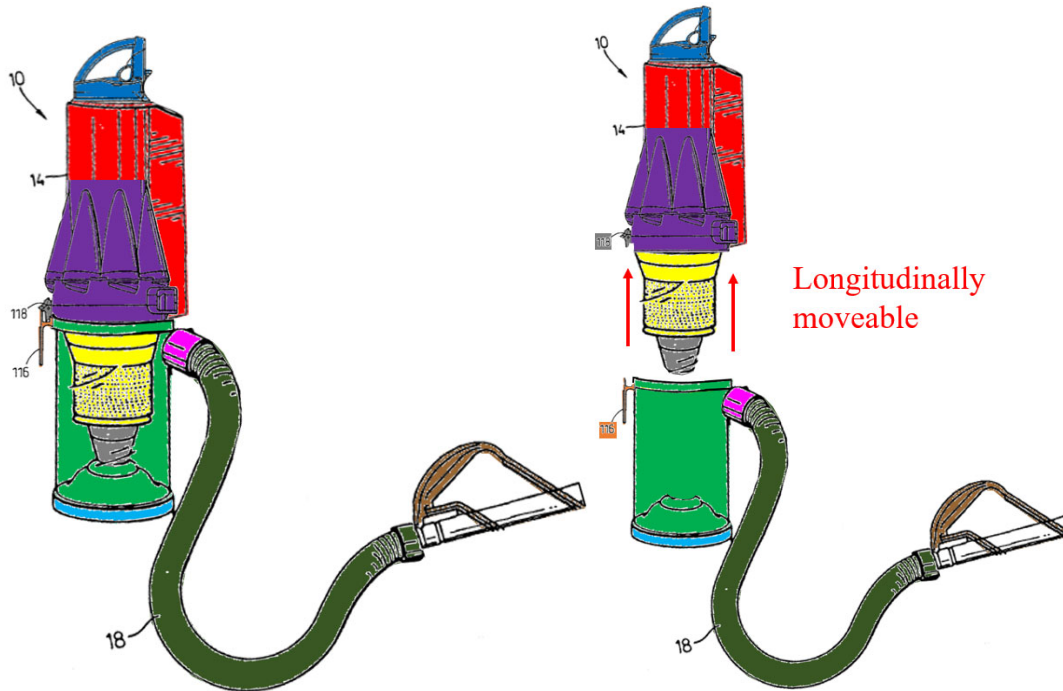
Soler teaches this limitation and Soler combined with Liddell teaches this limitation. Ex1002, ¶¶391-96. Soler teaches the first cyclonic cleaning stage (**first cyclone chamber 62**) has a first stage air inlet (**air entry port 56**) and that each cyclone of the second cyclonic cleaning stage (**second cyclone chamber 64/74**) has a second stage air inlet (**second air entry port 72**) downstream from the first stage air inlet, and that the hand carriable surface cleaning apparatus (vacuum cleaner 10)

further has a screen (**perforations 69** in first cyclone air exit 68) positioned in the fluid flow path between the first stage air inlet and the second stage air inlet, wherein the screen is longitudinally moveable relative to the sidewall (sidewall of **lower casing 16**), as shown:



Ex1008, Figs. 3&4, 6:65-7:5, 5:59-67, 6:16-34.

Further, Soler combined with Liddell has a second cyclonic cleaning stage (**downstream cyclone unit 103**) with a second stage air inlet (Liddell's inlets 146) downstream from **entry port 56** on **first cyclone chamber 62**. Ex1002, ¶395; §§VII.A.1.j, VIII.I.2.b. Soler's **perforations 69** are positioned in the fluid flow path between the inlets 146 in **downstream cyclone unit 103** and **entry port 56** and are longitudinally moveable relative to **lower casing 16**:

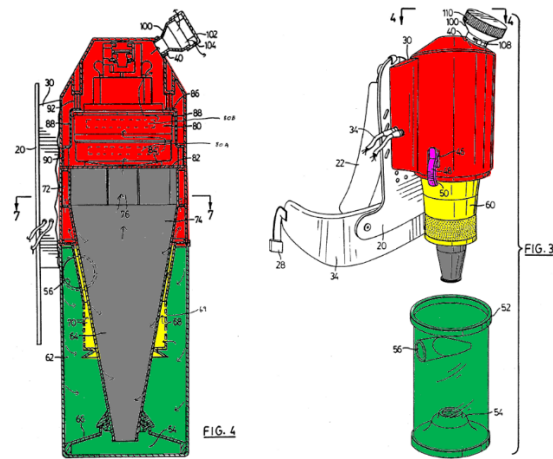


Ex1008, Fig. 1(modified); §§VIII.A.1.h, VIII.I.2.d; Ex1002, ¶¶395-96.

i. [13f]

Soler teaches these limitations, Liddell teaches these limitations, and so does their combination. Ex1002, ¶¶397-401; §VIII.A.1.k. Soler's **latches 46** are a second stage handle because they are on the **second cyclone chamber 64/74** housing and are pulled by hand to release **upper casing 14** from **lower casing 16**. Ex1008, 5:46-58.⁹

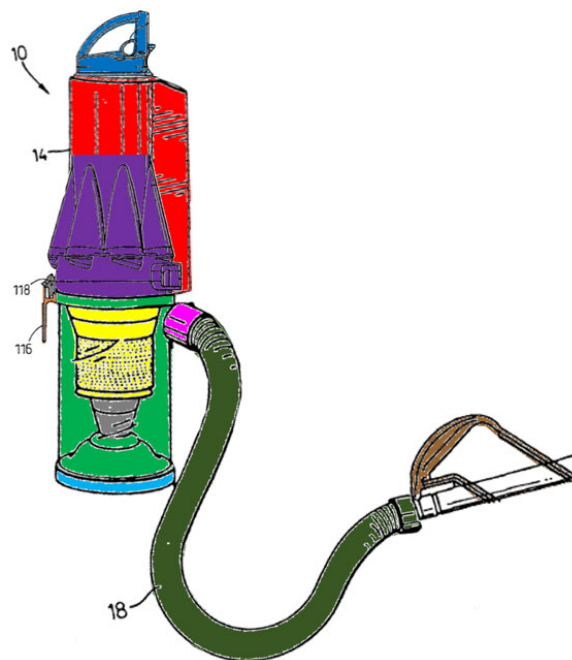
⁹ Like Soler, the accused Dyson V8 vacuum has a bin release catch that, when pulled, releases the alleged second stage from the first stage. Ex1017, 28-29; Ex1016. If the V8's bin release catch is a second stage handle, so are Soler's latches 46. Ex1002, ¶¶399-400.



Id., Figs. 4&3.

Further, Liddell's **handle 122** is a second stage handle when combined with Soler because it is on the housing containing **downstream cyclone unit 103** (Soler's **upper casing 14**) and is pulled to release **upper casing 14** from **lower casing 16**.

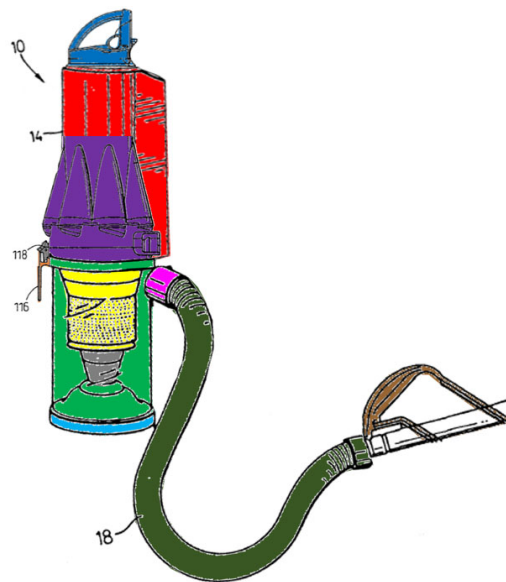
Ex1002, ¶401.



Ex1008, Fig. 1(modified).

3. [2]

Soler combined with Liddell teaches claim 1 (§VIII.I.2) and the limitation of claim 2. Ex1002, ¶¶402-04. Soler combined with Liddell has a housing (**upper casing 14**) containing the suction motor (motor 80) and clean air outlet (air exit port 40 and “after filter”), wherein the bottom door (Liddell’s **base 108**) is openable while the sidewall of the first cyclonic cleaning stage (**first cyclone chamber 62**) is connected to the housing:

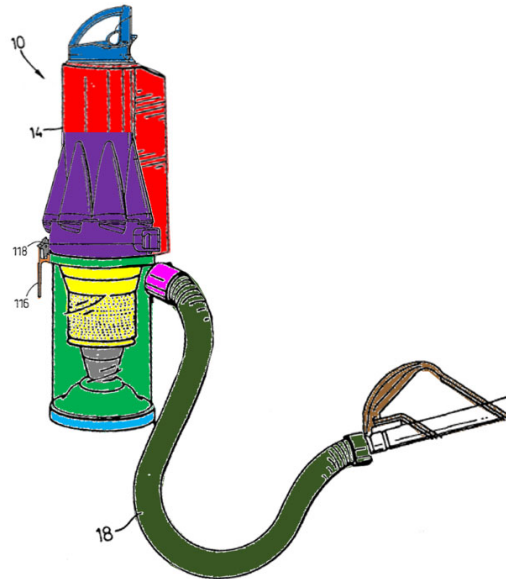


Ex1008, 5:46-48, Fig. 1(modified). This limitation is also met when **first cyclone chamber 62** is connected to Liddell’s **downstream cyclone unit 103** because **upper casing 14** houses **downstream cyclone unit 103**. Ex1002, ¶404.

4. [3]

Soler combined with Liddell teaches claim 1 (§VIII.I.2), and the limitation of claim 3. Ex1002, ¶¶405-08. Soler combined with Liddell teaches the upper end of

the second cyclonic cleaning stage (Liddell's **downstream cyclone unit 103**) overlies the entire upper end of the first cyclonic cleaning stage (Soler's **first cyclone chamber 62**):



Ex1008, Fig. 1(modified). Like Liddell alone, in the combination, the upper surface of **downstream cyclone unit 103** is an upper end that completely overlies the top of **first cyclone chamber 62**. §VIII.A.2. To the extent PO argues the upper end of **downstream cyclone unit 103** does not overlie the entire upper end of the first stage, it would have been obvious to modify Liddell's **downstream cyclone unit 103** so that it does, as explained. Ex1002, ¶¶407-08; *see* §VIII.B.4.

5. [4]

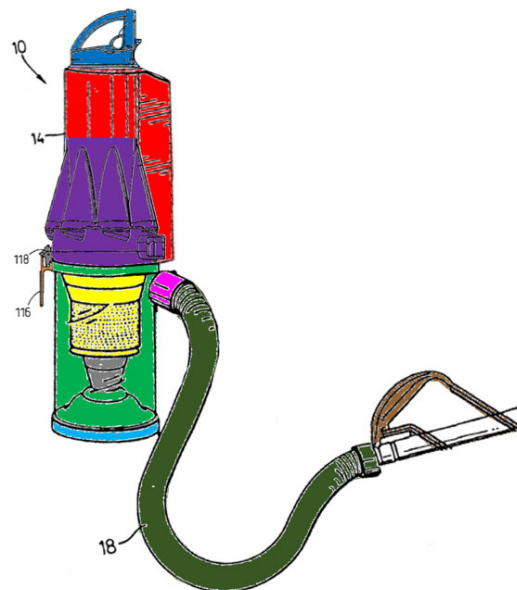
Soler combined with Liddell teaches claim 1 (§VIII.I.2), and the limitation of claim 4. Ex1002, ¶¶409-12. Soler combined with Liddell teaches the second

cyclonic cleaning stage (**downstream cyclone unit 103**) is moveable relative to the sidewall (**lower casing 16**) while the bottom door (**base 108**) is open.

Liddell teaches this function (§VIII.A.3), and the combination of Soler and Liddell has the same components for performing this function as Liddell alone (§VIII.I.1). The combination of Soler and Liddell teaches this function for the same reason. Ex1002, ¶¶411-12.

6. [6]

Soler combined with Liddell teaches claim 1 (§VIII.I.2), and the limitation of claim 6. Ex1002, ¶¶413-15. The combination of Soler and Liddell has Liddell's **downstream cyclone unit 103** (containing downstream cyclones 104/204), which meets this claim:

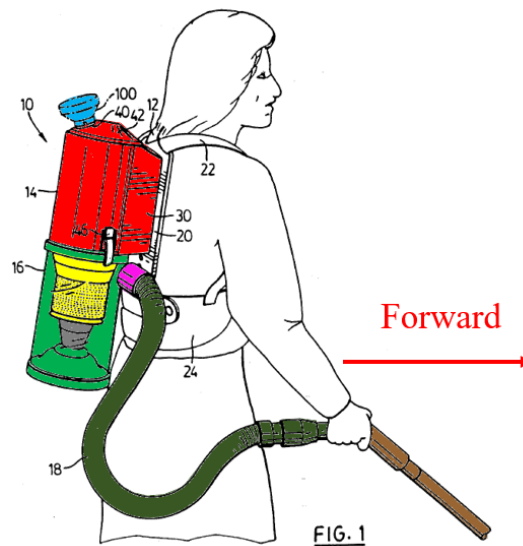


Id.; Ex1008, Fig. 1(modified); §VIII.A.4.

7. [7]

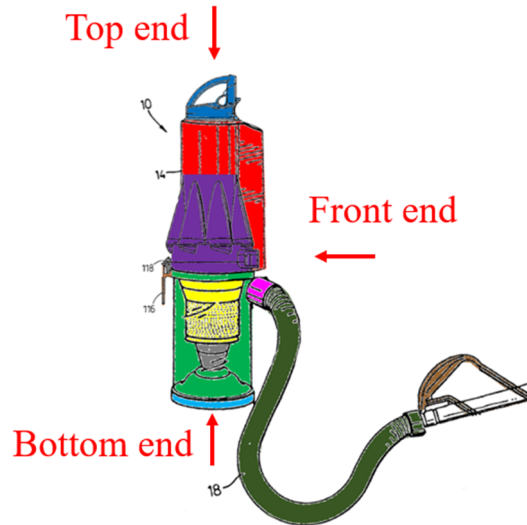
Soler combined with Liddell teaches claim 1 (§VIII.I.2), and the limitation of claim 7. Ex1002, ¶¶416-23. Soler combined with Liddell teaches the dirty air inlet (entry port 56 and hose 18) has a conduit (airways formed by entry port 56 and hose 18) extending forwardly from the first cyclonic cleaning stage (first cyclone chamber 62), and wherein the second cyclonic cleaning stage (Liddell's downstream cyclone unit 103) is longitudinally moveable relative to the conduit.

Soler's Fig. 1 shows the operator extending entry port 56 and hose 18 forwardly from the first cyclone chamber 62:



Ex1008, Fig. 1.

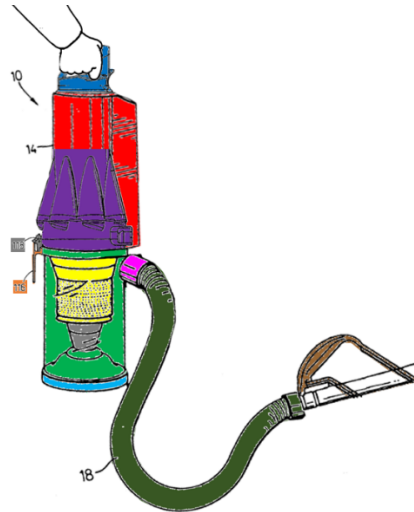
Further, Soler combined with Liddell has a cylindrical shape and has a top, bottom end, and front end therebetween:



Ex1008, Fig. 1(modified). POSAs would understand the side extending from top to bottom is the front of the vacuum. Ex1002, ¶¶419-20. The airways formed by **entry port 56** and **hose 18** extend from this front end and thus extend forwardly from the first stage. *Id.*

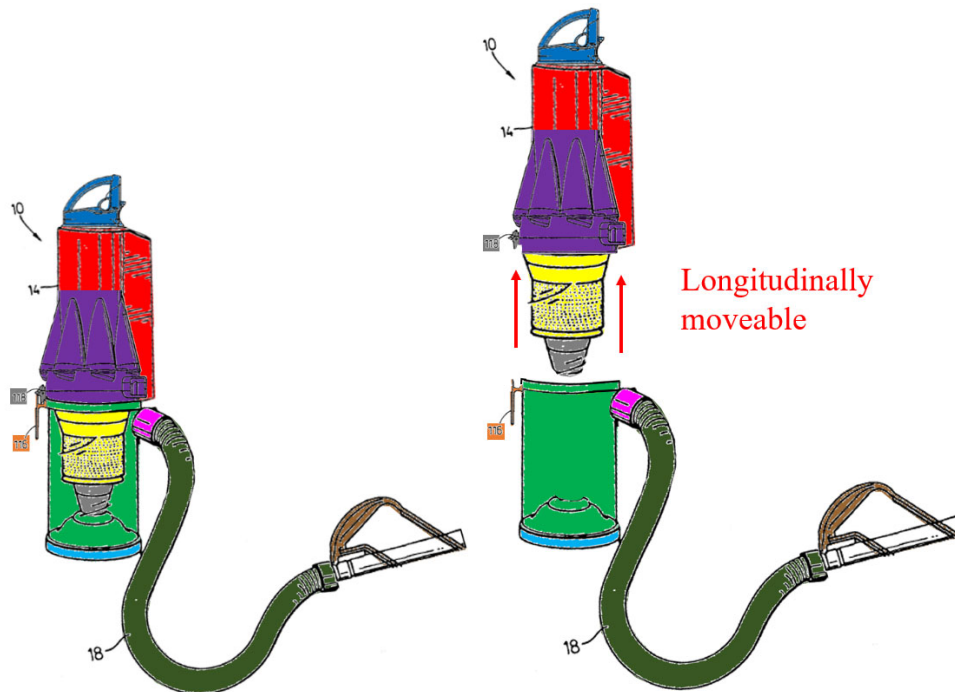
To the extent PO argues this is not “extending forwardly,” POSAs would understand that, in operation, **entry port 56** and **hose 18** are manipulated in many orientations as different surfaces are cleaned, including forwardly from the **first cyclone chamber 62**. *Id.*, ¶421.

Further, when the vacuum is held by Liddell’s **handle 122** (illustrated below), POSAs would have been motivated to design the vacuum such that **entry port 56** and **hose 18** point toward the surface being cleaned so both handles ergonomically point in the same direction. Ex1002, ¶422.



Ex1008, Fig. 1(modified).

Further, when combined, Liddell's **downstream cyclone unit 103** is longitudinally moveable relative to the conduit extending through **hose 18** to **entry port 56**:

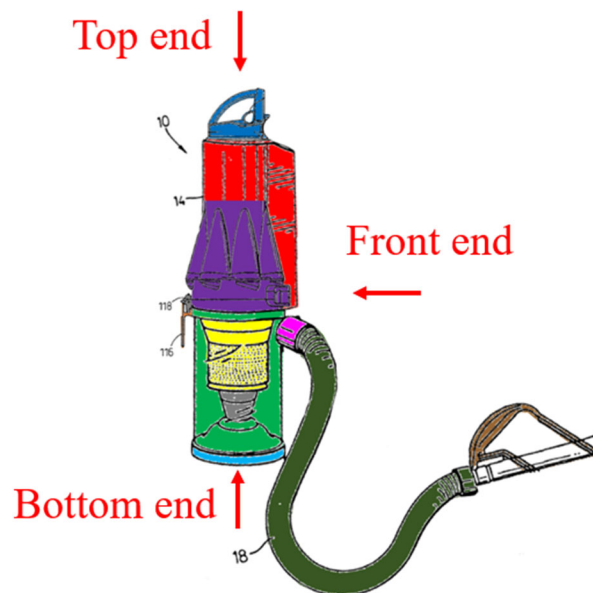


Ex1008, Fig. 1(modified); Ex1002, ¶423.

8. [8]

Soler combined with Liddell teaches claim 7 (§VIII.I.7), and the limitation of claim 8. Ex1002, ¶¶424-29. Soler combined with Liddell teaches the dirty air inlet (**entry port 56** and **hose 18**) is located at a front end of the hand carriable surface cleaning apparatus (vacuum cleaner 10) and the upper end of the second cyclonic cleaning stage (**downstream cyclone unit 103**) is located above the dirty air inlet.

Soler combined with Liddell has a cylindrical shape and has a top end, bottom end, and front end therebetween:



Ex1008, Fig. 1(modified).

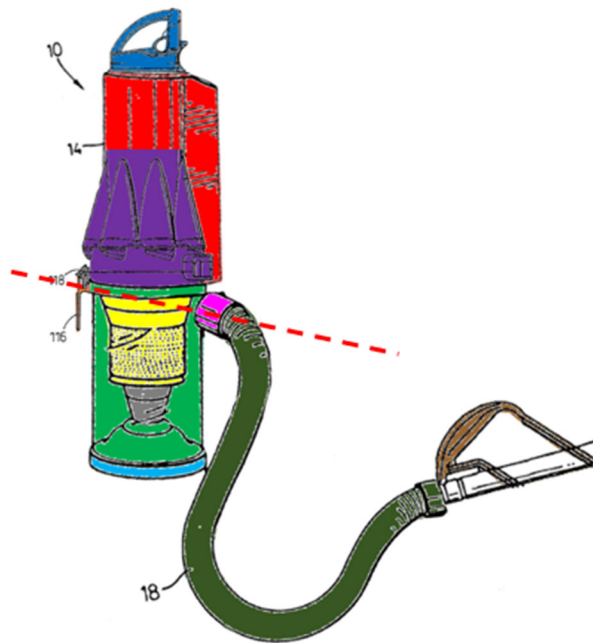
POSAs would understand the side extending from the top to the bottom is the “front end.” Ex1002, ¶¶426-27; § VIII.I.7.

Further, when the vacuum is held by **handle 122**, POSAs would have been motivated to design the vacuum such that **entry port 56** and **hose 18** point toward the surface being cleaned. Ex1002, ¶428; § VIII.I.7..

Finally, all of **downstream cyclone unit 103** (including its upper end) is located above **entry port 56** and **hose 18**, as shown above. Ex1002, ¶429.

9. [9]

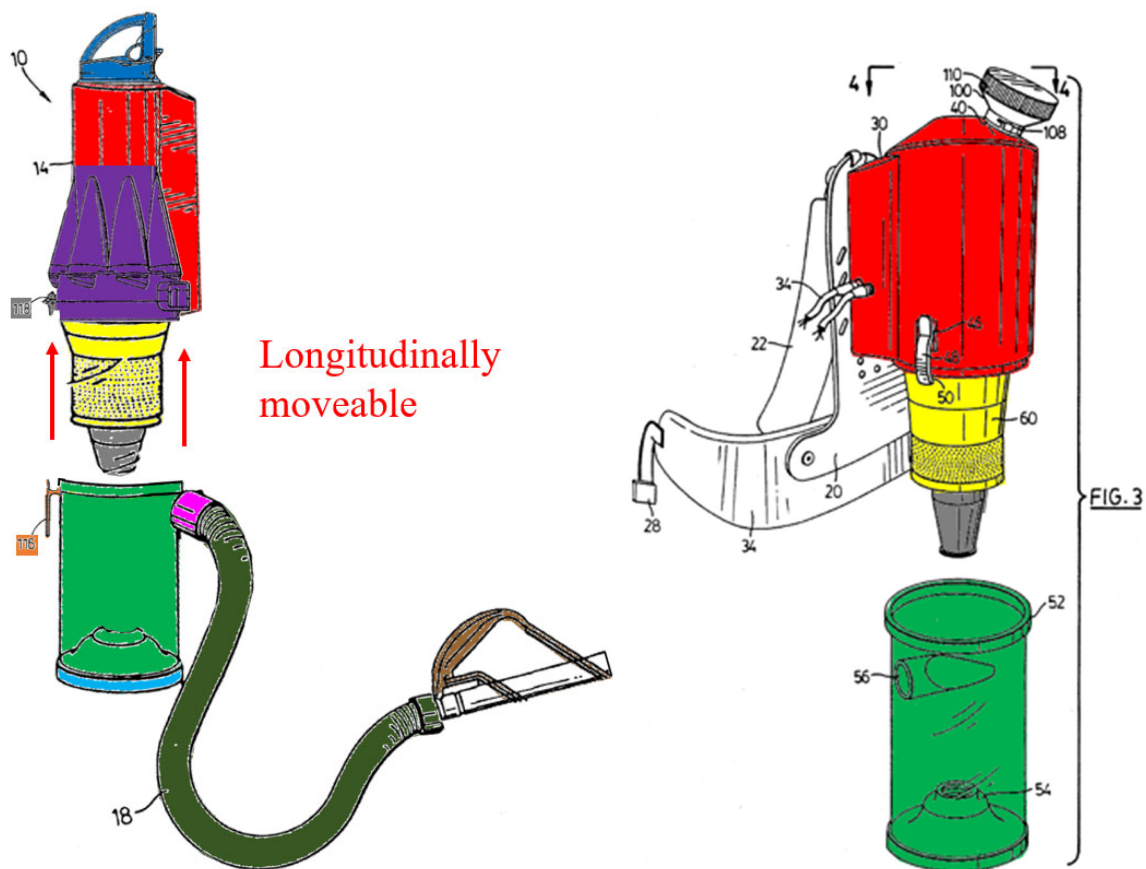
Soler combined with Liddell teaches claim 7 (§VIII.I.7), and the limitation of claim 9. Ex1002, ¶¶430-31. Soler combined with Liddell teaches the dirty air inlet conduit (airways in **hose 18** and **entry port 56**) defines an axis that intersects the first cyclonic cleaning stage (**first cyclone chamber 62**):



Ex1008, 5:62-64, Fig. 1(modified).

10. [11]

Soler combined with Liddell teaches claim 1 (§VIII.I.2), and the limitation of claim 11. Ex1002, ¶¶432-33. Soler combined with Liddell teaches the second cyclonic cleaning stage (**downstream cyclone unit 103**, which is integrated with **upper casing 14**) is removable from the first cyclonic cleaning stage (**first cyclone chamber 62**, which is within **lower casing 16**). See §VIII.I.2.d; Ex1008, 5:46-48 (“**Lower casing 16** is releasably mounted on **upper casing 14**.”)



Ex1008, Figs. 1(modified), 3.

J. Ground 10: Soler Combined With Liddell And Organ Renders Obvious Claims 4-5

1. Motivation to Combine

To the extent PO argues Soler combined with Liddell does not teach the ability to move a second stage while a bottom door on a first stage is open, POSAs would have been motivated to combine Organ's teachings of this feature with Soler and Liddell for the same reasons POSAs would have been motivated to add this feature to Liddell alone because the combination uses the same components to release **lower casing 16** and open **base 108** as Liddell alone. *See* §VIII.B.1.b; Ex1002, ¶¶434-37.

Similarly, POSAs would have been motivated to incorporate Organ's pre-motor filter chamber between Liddell's downstream cyclone unit 103 and Soler's motor 18 for the same reason POSAs would have been motivated to add this feature to Liddell alone. *See* §VIII.B.1.c; Ex1002, ¶438.

2. [4]

Soler combined with Liddell teaches claim 1 (§VIII.I.2), and Soler combined with Liddell and Organ teaches the limitation of claim 4. Ex1002, ¶¶439-440. The combination of Soler, Liddell, Organ has a second cyclonic cleaning stage (Liddell's **downstream cyclone unit 103**) that is moveable relative to the sidewall (**lower casing 16**) while the bottom door (**base 108**) is open. §VIII.B.5.

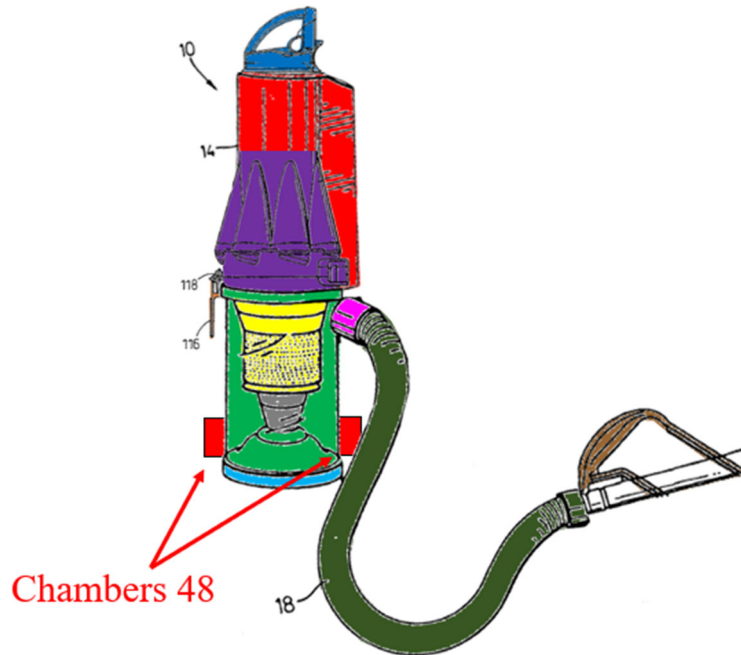
3. [5]

Soler combined with Liddell teaches claim 1 (§VIII.I.2), and Soler combined with Liddell and Organ teaches the limitation of claim 5. Ex1002, ¶¶441-42. The combination of Soler, Liddell, Organ teaches a pre-motor filter chamber (chamber housing Organ’s pre-motor filter) positioned in the fluid flow path between the second cyclonic cleaning stage (Liddell’s downstream cyclone unit 103) and the pre-motor filter chamber, and wherein each second cyclone (Liddell’s downstream cyclones 104/204) has a respective air outlet that is in fluid communication with the pre-motor filter chamber. §VIII.B.6.

K. Ground 11: Soler Combined With Liddell And Lim Renders Obvious Claim 14

Soler combined with Liddell teaches all limitations of claim 14 except limitation [14f], which is taught by Lim. *See* §§VIII.I.2, VIII.D. Lim teaches the “dirt collection chamber” of limitations [14b] and [14f] and POSAs would have been motivated to combine it with Soler and Liddell for the same reasons POSAs would have been motivated to combine it with Liddell alone. §VIII.D; Ex1002, ¶¶443-45.

In combination, Soler, Liddell, and Lim teach a first cyclonic cleaning stage (Soler’s **first cyclone chamber 62**) having a first cyclone chamber and a first dirt collection chamber (Lim’s **chambers 48**) that has a dirt collection region and is external to the first cyclone chamber:



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

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, 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 16 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). Ex1028. The district court litigation was filed on August 15,

2023, when the '607Patent was added to an Amended Complaint in Case No. 23-cv-11277, 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 No. 11 at 10 (PTAB Mar. 20, 2020) (precedential). No such substantive orders have issued with respect to the '607Patent, 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 '607Patent 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,

no depositions have yet been taken. Litigation, Dkts. 103–04. PO served its infringement contentions on December 15, 2023, and Petitioners filed this petition within 3.5 months of those contentions. Ex1027.

Factor 4 favors institution because there is little overlap between the two proceedings. This Petition challenges claim 14, which is 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. Ex1029.

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).

Factor 6 favors institution because, as shown in §VIII, this Petition presents a compelling case of invalidity, based entirely on art that was not of record during prosecution.

The *General Plastics* factors favor institution because this is the only petition against the '607Patent. *General Plastics Indus. Co., Ltd. v. Canon Kabushiki Kaisha*, IPR2016-01357, Paper 19, 9-10.

B. §325(d)

The §325(d) factors favor institution, as all six Becton Dickinson factors weigh in favor of institution. *Becton, Dickinson, & Co. v. B. Braun Melsungen AG*, IPR2017-01586, Paper 8 (PTAB Dec. 15, 2017); *see also Advanced Bionics, LLC v. Med-El Elektromedizinische Geräte GmbH*, IPR2019-01469, Paper 6 at 8 (PTAB Feb. 13, 2020).

None of the prior art asserted here was considered by the Office during prosecution. The Board has consistently “held that a reference that ‘was neither applied against the claims nor discussed by the Examiner’ does not weigh in favor of exercising [] discretion under §325(d).” *Fasteners for Retail, Inc. v. RTC Indus., Inc.*, IPR2019-00994, Paper 9 at 7-11 (PTAB Nov. 5, 2019). Soler was listed in an IDS during prosecution of the parent application of the ’607Patent (US9,545,181), but the Examiner did not apply or discuss it. Ex1020.

Further, “it is not enough to satisfy the first part of the *Advanced Bionics* framework that Patent Owner overcame the same or substantively similar art or arguments *for materially different claims* in different parent applications.” *Roofr Inc. v. Pictometry International Corp.*, IPR2023-00435, Paper 16 at 6 (PTAB Jul. 21, 2023). Here, the ’181Patent is directed to “a base,” a “portable cleaning unit [] supported by the base,” and an “energy storage member” and thus has materially different claims than the ’607Patent. Ex1019. Moreover, the Examiner did not

address the combination of Soler and Liddell, which is presented in this Petition. As noted, the '607Patent Examiner allowed the claims because “an inner...and outer ring” of second cyclones “was not found in the prior art,” but Liddell expressly teaches that configuration. Ex1004, 1044.

Because Petitioner “cannot be expected to anticipate every argument that may be raised by a patent owner” regarding §325(d), if PO raises such a challenge, Petitioner requests the opportunity to respond, including to address why such a challenge was not reasonably foreseeable; why the references that were not disclosed are non-cumulative; and/or why the Examiner misapprehended and/or overlooked the art at issue. *Google LLC v. Valtrus Innovations Ltd.*, IPR2022-01197, Paper 12 at 5 (PTAB Mar. 29, 2023).

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 Dyson Technology Limited and Dyson, Inc. 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 '607Patent has not been involved in any litigation or *inter*

partes or post-grant review prior to this proceeding.

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

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

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

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

Date: March 27, 2024

Respectfully submitted,

/s/ Christian Huehns

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Attorneys for Petitioner

CERTIFICATE OF COMPLIANCE

This Petition complies with the type-volume limitations as mandated in 37 C.F.R. §42.24, totaling 13,977 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 matters:

/s/ Sheryl A. Brongiel
Sheryl A. Brongiel