

Petition for *Inter Partes* Review of U.S. Patent No. 11,910,984

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. IPR2024-01151

U.S. PATENT NO. 11,910,984

PETITION FOR *INTER PARTES* REVIEW

TABLE OF CONTENTS

	<u>Page</u>
I. INTRODUCTION	1
II. STANDING (§42.104(a)).....	2
III. RELIEF REQUESTED (§42.104(b)).....	2
IV. OVERVIEW OF THE '984Patent.....	3
A. The Specification.....	3
B. The Prosecution History.....	4
V. OVERVIEW OF PRIOR ART.....	5
A. Dimbylow	5
B. Howes.....	7
C. IPVG.....	9
D. Nakai.....	10
E. Sunderland.....	11
VI. LEVEL OF ORDINARY SKILL IN THE ART	12
VII. CLAIM CONSTRUCTION.....	13
VIII. THE CHALLENGED CLAIMS ARE UNPATENTABLE.....	13
A. Ground 1: Dimbylow in Combination with Howes Renders Obvious Claims 1-18.....	13
1. A POSA Would Have Combined Dimbylow and Howes	13
a. Scope and Content of the Prior Art	13
b. Motivation to Combine.....	17
c. Reasonable Expectation of Success.....	21

	<u>Page</u>
2. [1]/[10]	21
a. [1pre]/[10pre].....	21
b. [1a]/[10a]	22
c. [1b]/[10b]/[10d]	23
d. [1c]/[10c]	26
e. [1d]/[10e]	29
3. [2]	34
4. [3]/[13]	34
5. [4]/[14]	37
6. [5]/[15]	38
7. [6]/[11]	39
8. [7]/[12]	46
9. [8]/[17]	47
10. [9]/[18]	48
11. [16]	49
 B. Ground 2: IPVG in Combination with Nakai Renders Obvious Claims 1-18	 50
1. A POSA Would Have Combined IPVG and Nakai.....	50
a. Scope and Content of the Prior Art	50
b. Motivation to Combine.....	53
c. Reasonable Expectation of Success.....	60
2. [1]/[10]	64
a. [1pre]/[10pre].....	64

	<u>Page</u>
b. [1a]/[10a]	66
c. [1b]/[10b]/[10d]	67
d. [1c]/[10c]	71
e. [1d]/[10e]	77
3. [2]	81
4. [3]/[13]	81
5. [4]/[14]	85
6. [5]/[15]	86
7. [6]/[11]	87
8. [7]/[12]	89
9. [8]/[17]	90
10. [9]/[18]	93
11. [16]	94
C. Ground 3: IPVG in Combination with Nakai and Sunderland Renders Obvious Claims 1-18.....	94
1. A POSA Would Have Combined IPVG, Nakai, and Sunderland	94
a. Scope and Content of the Prior Art	94
b. Motivation to Combine.....	96
c. Reasonable Expectation of Success.....	103
2. [1]/[2]/[8]/[9]/[10]/[17]/[18]	104
3. [3]/[13]	105
4. [4]/[14]	106

	<u>Page</u>
5. [5]/[15]	108
6. [6]/[11]	110
7. [7]/[12]	112
8. [16]	113
IX. DISCRETIONARY FACTORS FAVOR INSTITUTION	113
A. §314(a).....	113
B. §325(d)	114
X. SECONDARY CONSIDERATIONS	117
XI. MANDATORY NOTICES UNDER 37 C.F.R. §42.8.....	117
A. Real Parties-in-Interest.....	117
B. Related Matters.....	117
C. Lead and Backup Counsel, Service, and Power of Attorney	118
XII. PAYMENT OF FEES UNDER 37 C.F.R. §42.103.....	119

TABLE OF AUTHORITIES

	Page(s)
Cases	
<i>Advanced Bionics, LLC v. Med-El Elektromedizinische Geräte GmbH,</i> IPR2019-01469, Paper 6 (PTAB Feb. 13, 2020).....	114, 115, 116
<i>Becton, Dickinson, & Co. v. B. Braun Melsungen AG,</i> IPR2017-01586, Paper 8 (PTAB Dec. 15, 2017)	114
<i>Fasteners for Retail, Inc. v. RTC Indus., Inc.,</i> IPR2019-00994, Paper 9 (PTAB Nov. 5, 2019).....	115
<i>Google LLC v. Valtrus Innovations Ltd.,</i> IPR2022-01197, Paper 12 (PTAB Mar. 29, 2023)	117
<i>Mylan Pharms. Inc. v. Merck Sharp & Dohme Corp.,</i> IPR2020-00040, Paper 21 (PTAB May 12, 2020)	117
<i>Reflex USA LLC v. Longyear TM, Inc. et al.,</i> IPR2023-00642, Paper 11 (PTAB Sept. 26, 2023).....	115
<i>SharkNinja, Inc. v. Dyson Technology Limited,</i> IPR2023-01322, Paper 7 (PTAB Feb. 27, 2024).....	116
<i>Wellman, Inc. v. Eastman Chem. Co.,</i> 642 F.3d 1355 (Fed. Cir. 2011)	13, 14, 40
Statutes	
35 U.S.C. §311	2
Other Authorities	
37 C.F.R. § 42.6(e)(4)(i)	2
37 C.F.R. §42.8	117
37 C.F.R. § 42.10(b)	118
37 C.F.R. § 42.24	1

Petition for *Inter Partes* Review of U.S. Patent No. 11,910,984

37 C.F.R. §42.100(b)	13
37 C.F.R. §42.103	119
37 C.F.R. § 42.105(b)	2

LIST OF EXHIBITS

Exhibit No.	Description
Ex1001	U.S. Patent No. 11,910,984 (“’984Patent”)
Ex1002	Declaration of Robert Giachetti
Ex1003	<i>Curriculum Vitae</i> of Robert Giachetti
Ex1004	Excerpted File History of U.S. 11,910,984 (App. No. 18/376,975)
Ex1005	U.S. Patent Publication No. US 2017/0079489 (“Dimbylow”)
Ex1006	U.S. Patent No. 8,021,453 (“Howes”)
Ex1007	U.K. Patent Publication No. GB283,179 to Inventia Patent-Verwertungs-Gesellschaft (“IPVG”)
Ex1008	U.S. Patent No. 7,175,682 to Nakai et al. (“Nakai”)
Ex1009	Spanish Patent No. ES43816 to Dayer SA (“DayerES”)
Ex1010	Japanese Patent Publication No. JPS48107459U to Tsukuji (“TsukujiJP”)
Ex1011	French Patent No. 1,094,603 to Martelliere (“MartelliereFR”)
Ex1012	Certified English translation of French Patent No. 1,094,603 to Martelliere (“Martelliere”)
Ex1013	International Publication No. WO 02/067753 to Vuijk (“Vuijk”)
Ex1014	Swiss Patent No. CH203,675 to Peter (“PeterCH”)
Ex1015	Certified English translation of Swiss Patent No. CH203,675 to Peter (“Peter”)
Ex1016	PCT Publication No. 2007/084543 to Butler et al. (“Butler”)
Ex1017	PCT Publication No. 2013/117901 to Sunderland et al. (“Sunderland”)

Exhibit No.	Description
Ex1018	Complainants' Exhibit 29, Infringement Claim Chart regarding the '984Patent, <i>In the Matter of Certain Surface Cleaning Devices and Components Thereof</i> ; Inv. No. 337-TA-1404
Ex1019	U.S. Patent No. 1,908,834 to Engberg et al. ("Engberg")
Ex1020	U.S. Patent No. 2,099,172 to McCabe et al. ("McCabe")
Ex1021	Japanese Patent Publication No. JPH0580451U to Uchida et al. ("UchidaJP")
Ex1022	Certified English translation of Japanese Patent Publication No. JPS48107459U to Tsukuji ("Tsukuji")
Ex1023	Certified English translation of Japanese Patent Publication No. JPH0580451U to Uchida et al. ("Uchida")
Ex1024	https://www.metmuseum.org/art/collection/search/24952
Ex1025	Certified English Translation of Spanish Patent No. ES43816 to Dayer SA ("Dayer")
Ex1026	Excerpted File History of U.S. 10,722,086 (App. No. 15/642,781)
Ex1027	U.S. Patent No. 10,743,733 to Stickney ("Stickney")
Ex1028	German Patent No. DE1691786 to Boehmler ("BoehmlerDE")
Ex1029	Certified English Translation of German Patent No. DE1691786 to Boehmler ("Boehmler")
Ex1030	Korean Patent Publication No. KR19980020751 ("MoonKR")
Ex1031	Certified English Translation of Korean Patent Publication No. KR19980020751 ("Moon")
Ex1032	German Patent Publication No. DE1680208 to Rebel ("RebelDE")
Ex1033	Certified English Translation of German Patent Publication No. DE1680208 to Rebel ("Rebel")

LIST OF CHALLENGED CLAIMS

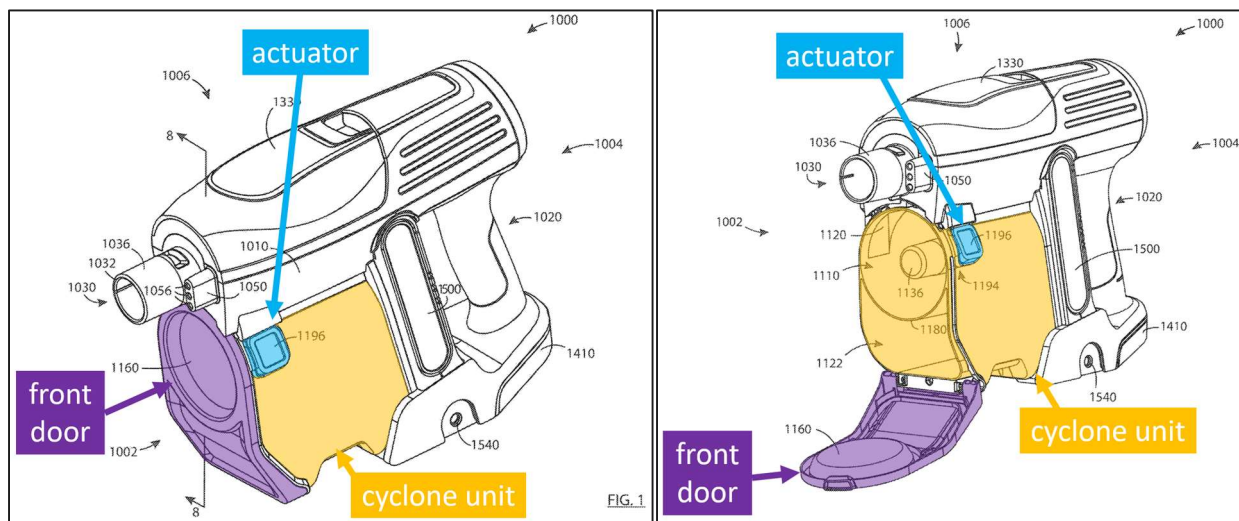
Reference Number	Claim Limitation
Claim 1	
[1pre]	A hand vacuum cleaner having a front end, a rear end, an upper side and a lower side, the hand vacuum cleaner comprising:
[1a]	(a) an air flow passage extending from a dirty air inlet provided at the front end to a clear air outlet provided at the rear end;
[1b]	(b) a vacuum cleaner body comprising a suction motor positioned in the air flow passage, a front end, a rear end and a handle;
[1c]	(c) a cyclone unit positioned in the air flow passage upstream from the suction motor, the cyclone unit comprising a cyclone having a front end, a rear end, a cyclone axis of rotation extending between the front and rear ends of the cyclone, the cyclone unit further comprising an axially extending cyclone unit wall which extends to a front end of the cyclone unit, the front end of the cyclone unit comprising a front door that is moveable between a closed position and an open position; and,
[1d]	(d) a lock securing the front door in the closed position, the lock comprising an actuator, wherein the actuator is spaced towards the rear end of the cyclone.
Claim 2	
[2]	The hand vacuum cleaner of claim 1 further comprising a pistol grip handle wherein the actuator is located at an elevation of an upper end of the pistol grip handle and forward of the pistol grip handle.
Claim 3	
[3]	The hand vacuum cleaner of claim 2 further comprising a battery pack wherein the actuator is axially located adjacent a forward end of the battery pack.
Claim 4	
[4]	The hand vacuum cleaner of claim 3 further comprising an enclosed finger grip area.
Claim 5	
[5]	The hand vacuum cleaner of claim 4 wherein a battery pack mount forms part of the enclosed finger grip area.
Claim 6	
[6]	The hand vacuum cleaner of claim 2 wherein a pistol grip axis extends through the pistol grip handle from a lower end of the pistol

Reference Number	Claim Limitation
	grip handle to an upper end of the pistol grip handle and the pistol grip axis intersects the suction motor.
Claim 7	
[7]	The hand vacuum cleaner of claim 6 wherein the pistol grip axis and the cyclone axis of rotation intersect within the hand vacuum cleaner.
Claim 8	
[8]	The hand vacuum cleaner of claim 1 wherein the front door has a door first end which is rotatably mounted to a front end of the cyclone unit wall and an opposed securable end and the lock further comprises a latch that is located at an elevation of the opposed securable end.
Claim 9	
[9]	The hand vacuum cleaner of claim 1 wherein the cyclone unit wall terminates at an open end, the open end is closed by the front door, wherein all of the open end is opened when the front door is in the open position.
Claim 10	
[10pre]	A hand vacuum cleaner having a front end, a rear end, an upper side and a lower side, the hand vacuum cleaner comprising:
[10a]	(a) an air flow passage extending from a dirty air inlet provided at the front end to a clear air outlet provided at the rear end;
[10b]	(b) a vacuum cleaner body comprising a suction motor positioned in the air flow passage, a front end and a rear end and a handle;
[10c]	(c) a cyclone unit positioned in the air flow passage upstream from the suction motor, the cyclone unit comprising a cyclone having a front end, a rear end, a cyclone axis of rotation extending between the front and rear ends of the cyclone, the cyclone unit further comprising an axially extending cyclone unit wall which extends to a front end of the cyclone unit, the front end of the cyclone unit comprising a front door that is moveable between a closed position and an open position;
[10d]	(d) a pistol grip handle; and,
[10e]	(e) a lock securing the front door in the closed position, the lock comprising an actuator, wherein the actuator is located at an elevation of an upper end of the pistol grip handle and forward of the pistol grip handle.

Reference Number	Claim Limitation
Claim 11	
[11]	The hand vacuum cleaner of claim 10 wherein a pistol grip axis extends through the pistol grip handle from a lower end of the pistol grip handle to the upper end of the pistol grip handle and the pistol grip axis intersects the suction motor.
Claim 12	
[12]	The hand vacuum cleaner of claim 11 wherein the pistol grip axis and the cyclone axis of rotation intersect within the hand vacuum cleaner.
Claim 13	
[13]	The hand vacuum cleaner of claim 10 further comprising a battery pack wherein the actuator is axially located adjacent a forward end of the battery pack.
Claim 14	
[14]	The hand vacuum cleaner of claim 13 further comprising an enclosed finger grip area.
Claim 15	
[15]	The hand vacuum cleaner of claim 14 wherein a battery pack mount forms part of the enclosed finger grip area.
Claim 16	
[16]	The hand vacuum cleaner of claim 14 wherein the actuator is spaced towards the rear end of the cyclone.
Claim 17	
[17]	The hand vacuum cleaner of claim 10 wherein the front door has a door first end which is rotatably mounted to a front end of the cyclone unit wall and an opposed securable end and the lock further comprises a latch that is located at an elevation of the opposed securable end.
Claim 18	
[18]	The hand vacuum cleaner of claim 10 wherein the cyclone unit wall terminates at an open end, the open end is closed by the front door, wherein all of the open end is opened when the front door is in the open position.

I. INTRODUCTION

The '984Patent relates to “surface cleaning apparatus[es],” specifically, “hand vacuum cleaner[s]” with “a **cyclone unit** compris[ing] a **front door**” and a door “lock secur[ing] the **front door** in the closed position.” Ex1001, Abstract, 1:21-24. “[A] user may unlock the assembly door lock” “by depressing the **actuator**”:



Id., 23:16-19, Figs. 1, 6¹; Ex1002 ¶¶43-45.

The '984Patent's claims' remaining elements concern well-known features (e.g., suction motors, cyclone units, battery packs, and pistol-grip handles), the combination of which do not purport to provide any technical benefit or solve any

¹ 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.

purported problem. Ex1001. That is because Patent Owner (“PO”) wrote its claims not to solve a technical problem, but in a failed attempt to read on Petitioners’ accused products in co-pending litigation.

II. STANDING (§42.104(A))

Petitioners certify the ’984Patent is available for IPR, and Petitioners are not barred/estopped from requesting IPR to challenge the claims on the grounds herein.

III. RELIEF REQUESTED (§42.104(B))

Petitioners respectfully request review and cancellation under 35 U.S.C. §311 of claims 1-18 as follows²:

Prior Art	Basis
U.S. Patent Publication No. 2017/0079489 (“Dimbylow”); filed 09/16/2016; published 03/23/2017	AIA 102(a)(1) and 102(a)(2)
U.S. Patent No. 8,021,453 (“Howes”); issued 09/20/2011	
U.K. Patent Publication No. GB283,179 (“IPVG”); published 08/09/1928	
U.S. Patent No. 7,175,682 (“Nakai”); issued 02/13/2007	

² Petitioners do not concede that any claims satisfy other requirements for patentability that cannot be raised in IPR, including §§101 and 112.

Prior Art	Basis
PCT Publication No. WO2013/117901 (“Sunderland”); published 08/15/2013	

Grounds	Claims	Basis
1	1-18	§103; Dimbylow and Howes
2	1-18	§103; IPVG and Nakai
3	1-18	§103; IPVG, Nakai, and Sunderland

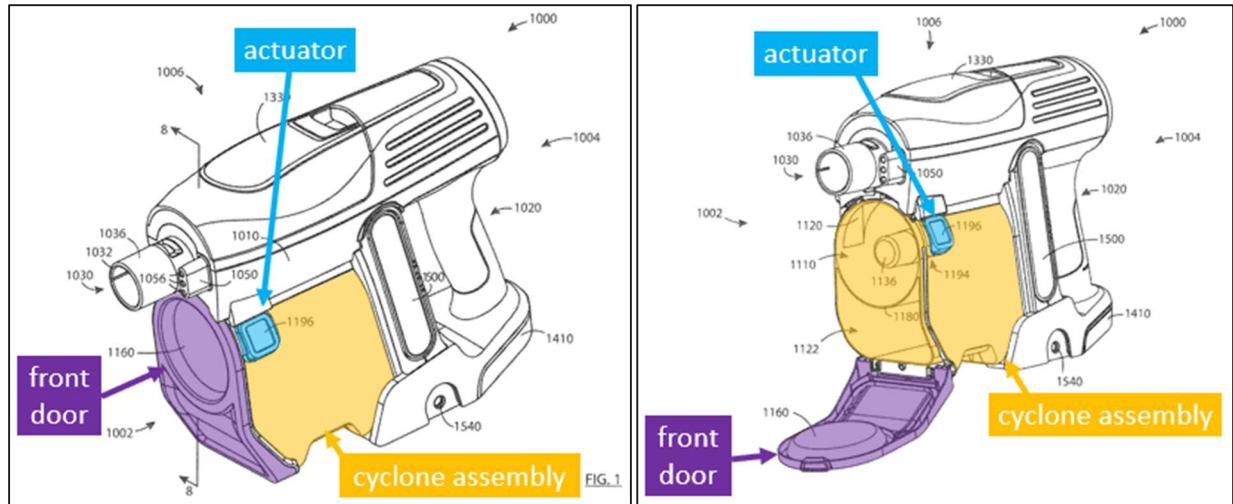
IV. OVERVIEW OF THE ’984PATENT

The ’984Patent, titled “Handheld Surface Cleaning Apparatus,” issued from Application No. 18/376,975, filed 10/05/2023, and claims priority through several applications to Application No. 15/642,781, filed 07/06/2017.³ Ex1001, Cover.

A. The Specification

The ’984Patent relates to cyclonic “hand vacuums” having “an openable **front door**” “secured in the closed position” by an “assembly door lock.” Ex1001, 1:21-24, 22:52-56, 23:13-23. The ’984Patent’s “assembly door lock” includes an “**actuator**” “provided on the **cyclone assembly**...or on any other portion of the hand vacuum”:

³ Petitioners reserve the right to challenge any alleged priority date in co-pending litigation.



Id., 23:16-23, Figs. 1, 6; Ex1002 ¶¶52-53.

The '984Patent's claimed vacuums also include a mix-and-match of well-known, interchangeable features and configurations. Ex1001, Claims. These include "a dirty air inlet provided at the front end," "a clear air outlet provided at the rear end," "a suction motor positioned in the air flow passage," "a cyclone unit positioned...upstream from the suction motor," "a battery pack," and "a pistol grip handle"—the combination of which solves no purported problem. *Id.*

B. The Prosecution History

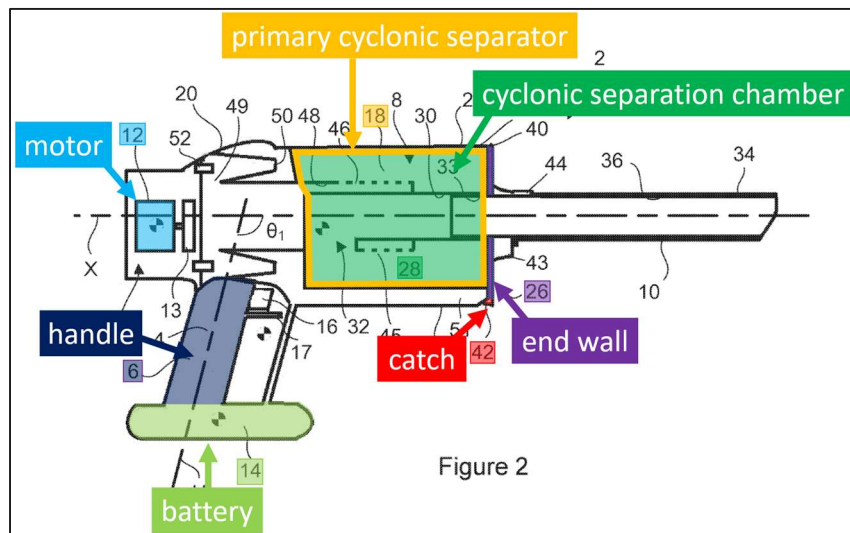
During prosecution, the Examiner allowed the '984Patent's claims without any prior-art-based rejections. Ex1004. The Examiner's Reasons for Allowance stated the of-record prior art failed to teach "the lock feature" recited in [1d]/[10e]: "a lock securing the front door in the closed position, the lock comprising an actuator." *Id.*, 375. However, this feature was well-known (as were the '984Patent's

other recited claim limitations) and was disclosed in prior art that was not before the Examiner.

V. OVERVIEW OF PRIOR ART

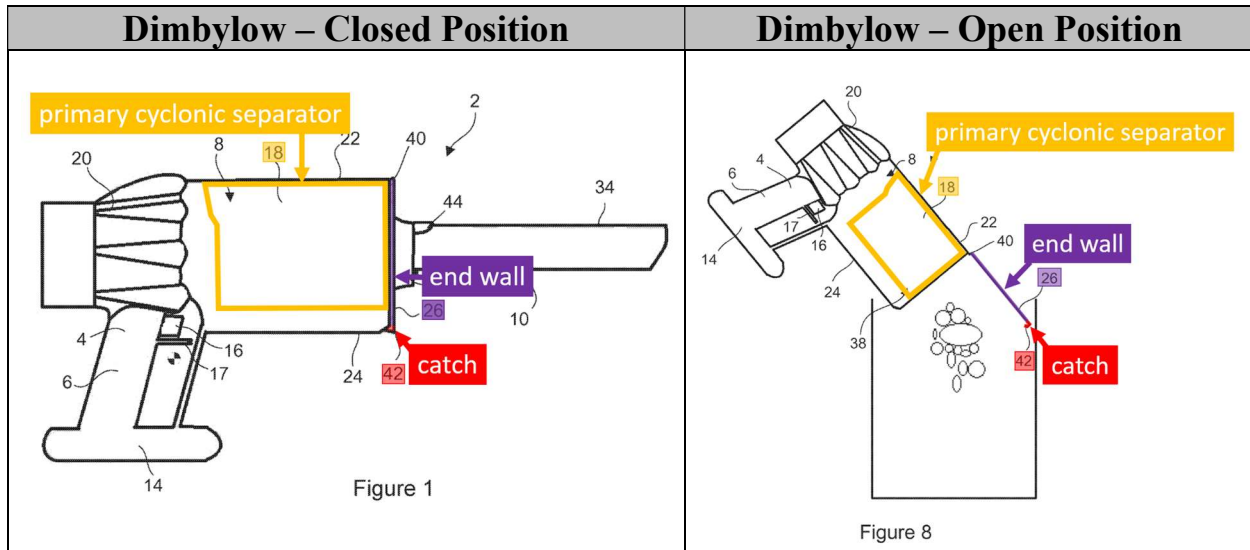
A. Dimbylow

Dimbylow is a 2017 Dyson publication. Ex1005, Cover. Dimbylow teaches a “handheld vacuum cleaner.” *Id.* ¶8. Dimbylow’s vacuum has a “primary cyclonic separator 18” with a “cyclonic separation chamber 28,” “handle 6,” “battery 14,” “motor 12,” and an “end wall 26,” which “is held in a closed position by a user-operable catch 42”:

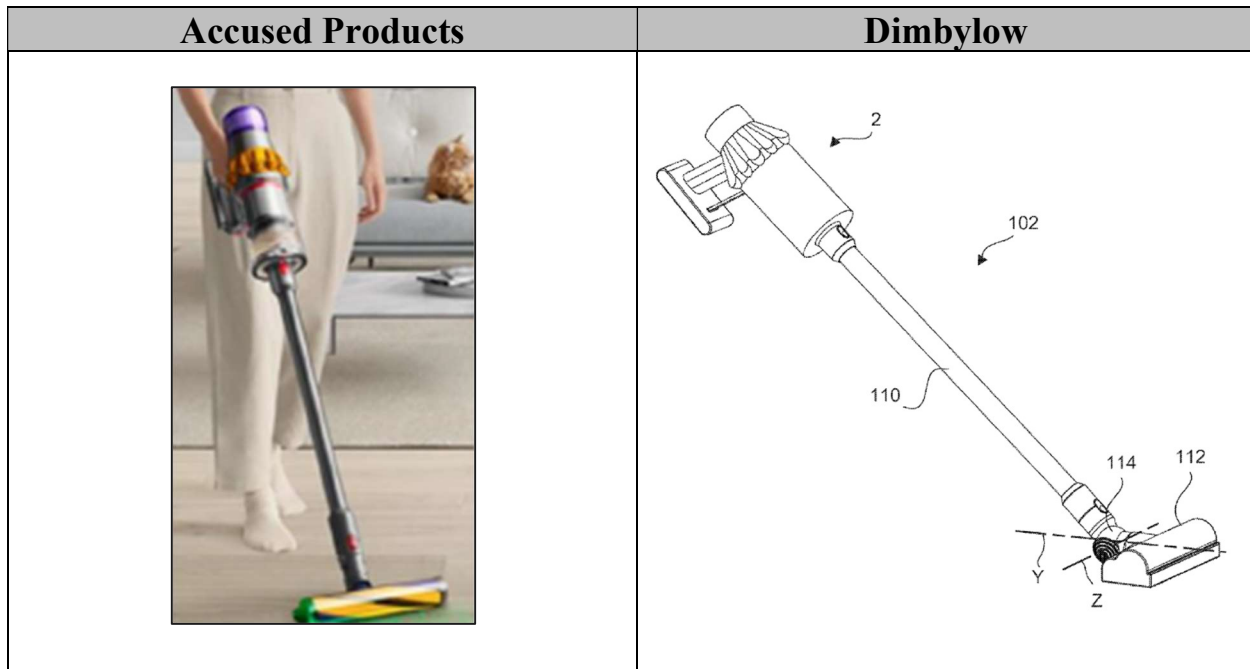


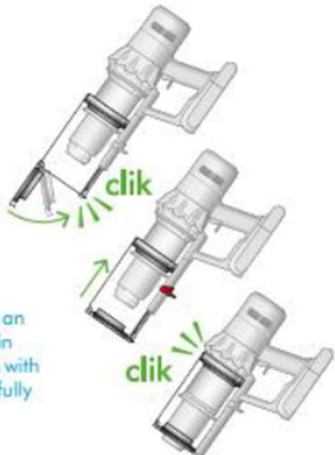
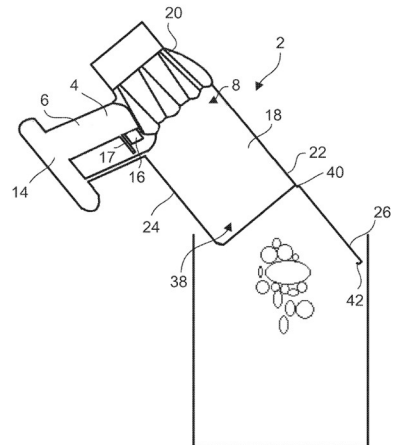
Id. ¶¶31-33, 37, 48, Fig. 2; Ex1002 ¶61.

To open “primary cyclonic separator 18” “the user” “release[s]” “catch 42” “and the end wall 26 [is] pivoted from its closed position into its open position”:



Ex1005 ¶48, Figs. 1, 8; Ex1002 ¶62. In the co-pending litigation, PO accuses products resembling Dimbylow’s configuration of infringing claims 1-18:

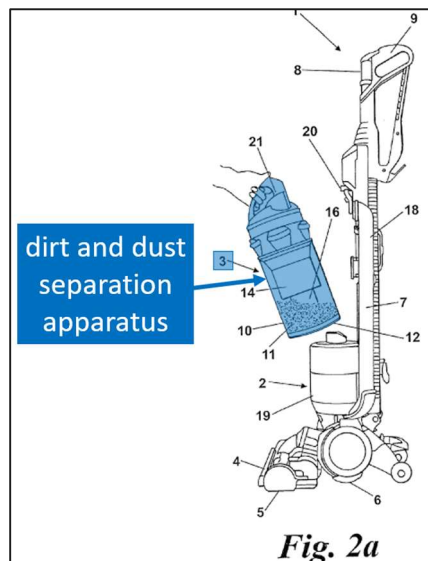


Accused Products	Dimbylow
 The bin lid closing with an audible click and the bin being pushed upwards with another click once it is fully in place.	

Ex1005, Figs. 6, 8; Ex1018, 1, 10.

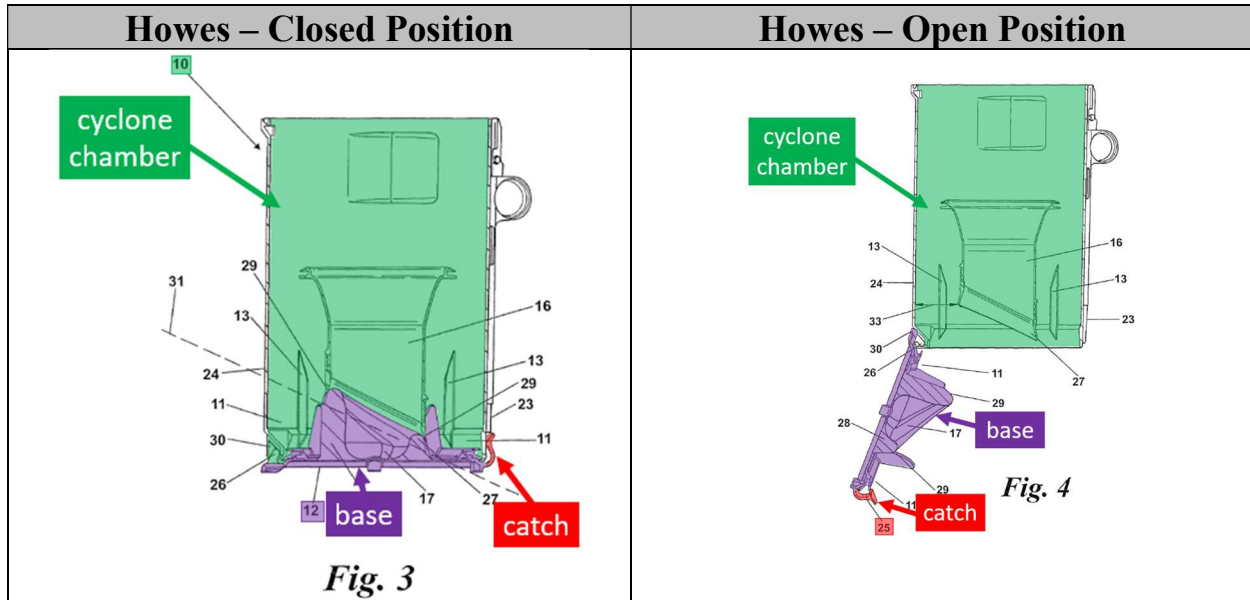
B. Howes

Howes is a 2011 Dyson patent. Ex1006, Cover. Howes teaches a detachable “**dirt and dust separation apparatus 3**” for a multi-cyclonic vacuum cleaner:

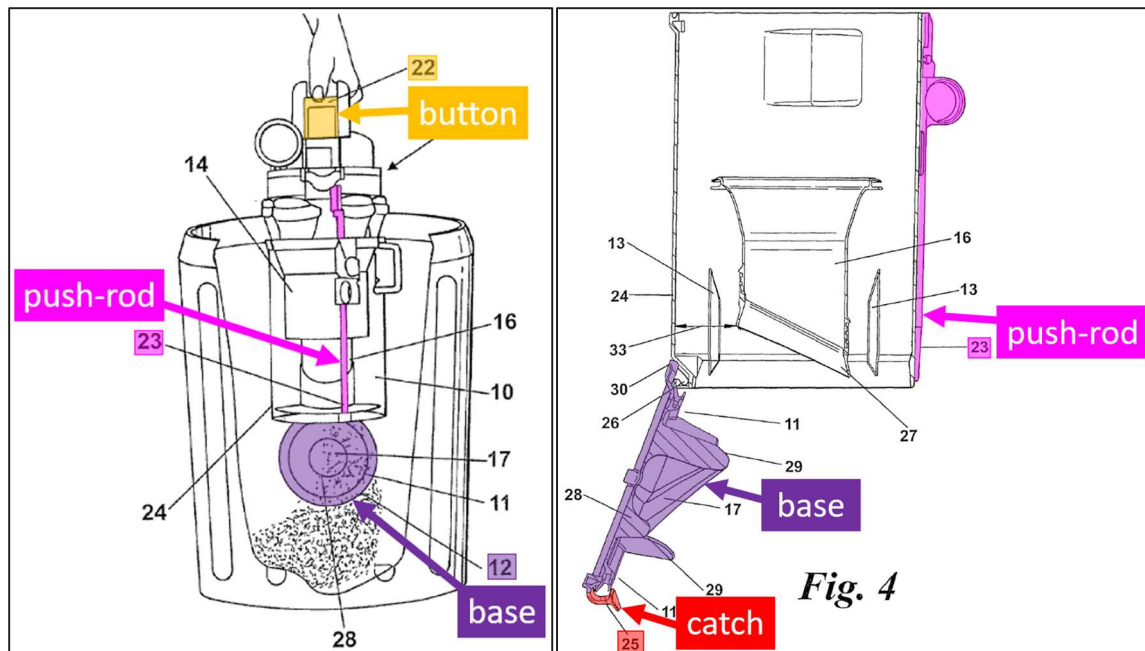


Ex1006, 3:3-5, Fig. 2a; Ex1002 ¶64. Like Dimbylow, Howes’s dirt collection chamber for its cleaner has a pivot-open door (“**base 12**”) held in place by a “**catch**”

that is released to empty the dirt. Ex1006, 4:8-13. Howes’s “**base 12**...attache[s] to the **cyclone chamber 10** by means of a **hinge 26** to allow pivotal movement of the **base 12** between the open and closed positions”:



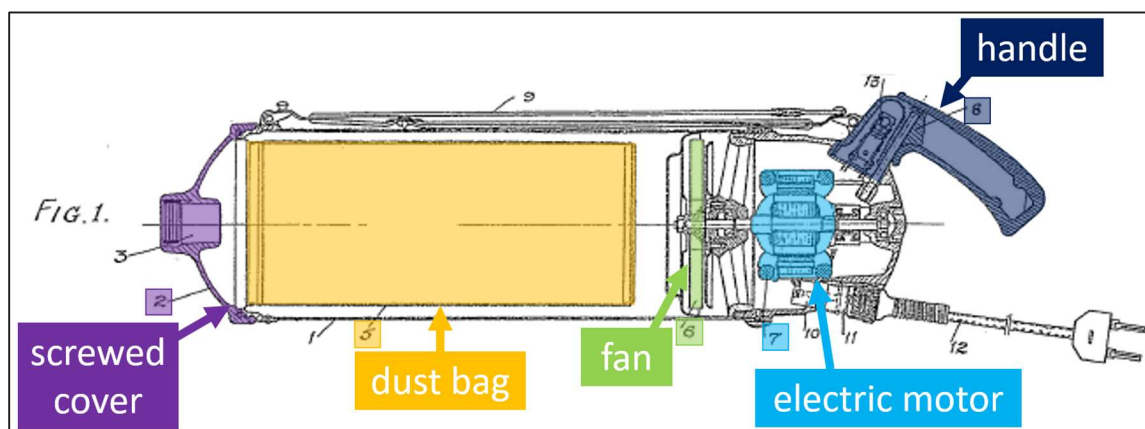
Ex1006, 4:11-13, Figs. 3-4; Ex1002 ¶65. While Howes and Dimbylow both use an identical or nearly identical “**catch**” to secure and open the chamber door, Howes differs from Dimbylow in that it has a more convenient and hygienic way to release the catch and open the door: “[T]he user presses the **button 22**,” such that the “**push-rod 23** is urged against [the] **catch 25**” and the “**base 12**...move[s] into the open position”:



Ex1006, 4:2-10, Figs. 2b, 4; Ex1002 ¶66.

C. IPVG

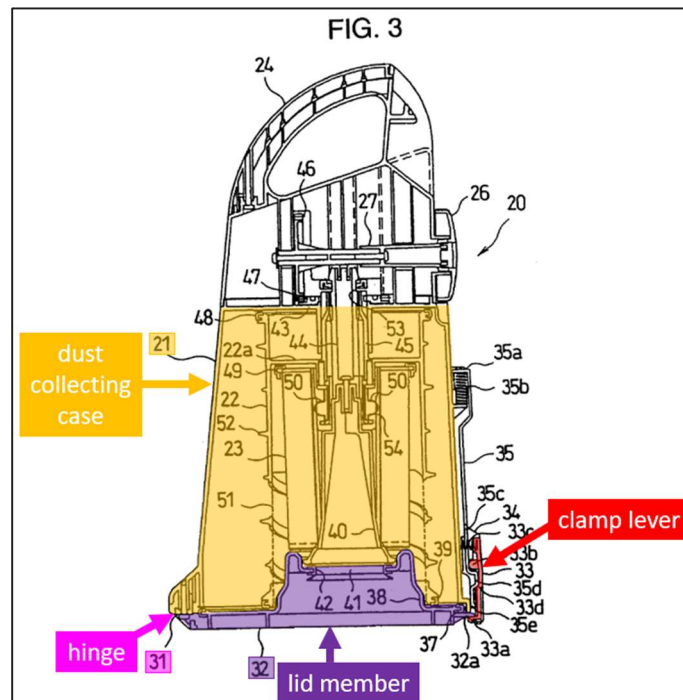
IPVG is a 1928 publication for a “portable dust suction apparatus” with “a dust bag [5] or like member,” “screwed cover 2,” “handle [8],” and “a fan 6 driven by an electric motor 7”:



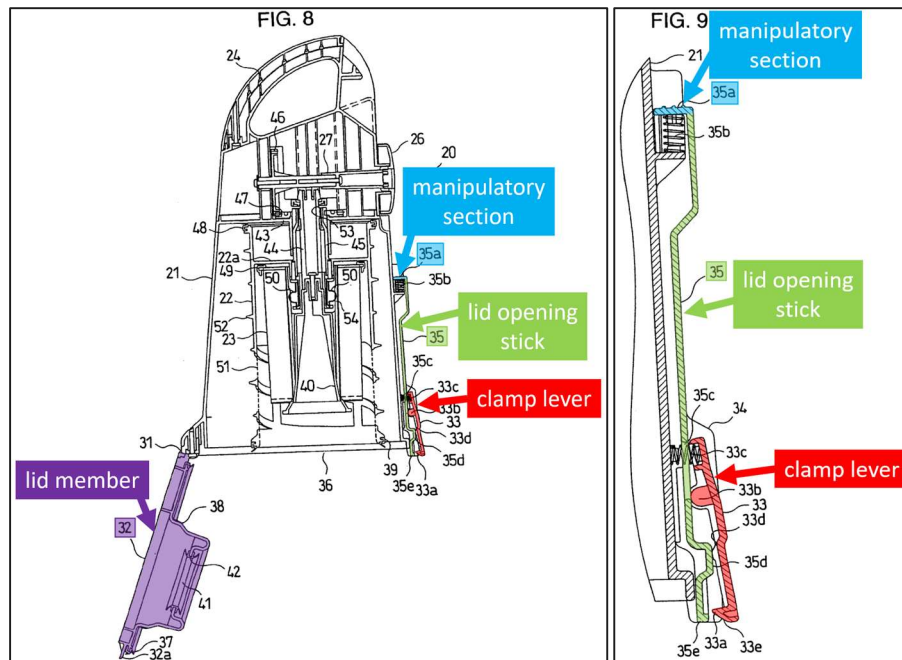
Ex1007, 1:10-12, 1:22-33, 1:51-62, Fig. 1; Ex1002 ¶67.

D. Nakai

Nakai is a 2007 patent for a vacuum cleaner. Ex1008, Abstract. Nakai's cleaner comprises a “**dust collecting case 21**,” where “dust sucked together with the air from the upper suction port is forcibly whirled downward, causing the dust to be accumulated and compacted on the bottom of the **lid member 32**”:



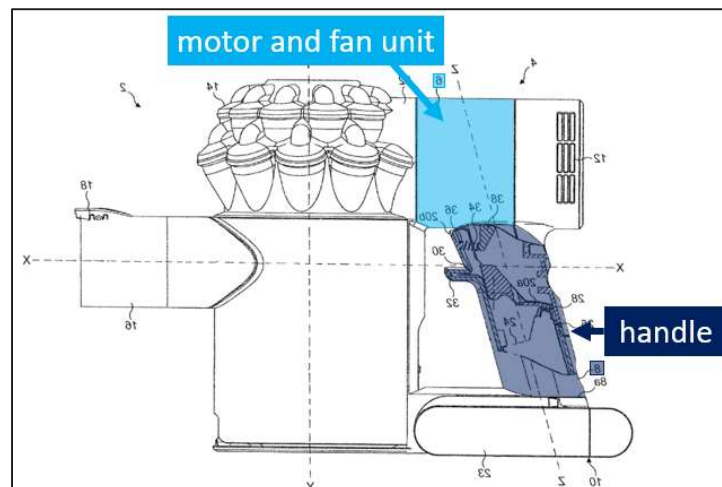
Id., Abstract, 6:24-29, Fig. 3; Ex1002 ¶68. “[L]id member 32” is “rotatably mounted on the bottom of the **dust collecting case 21**...via a **hinge 31**,” and is “locked by hooking up the clamp hook 33a formed on the lower end of the **clamp lever 33**.” Ex1008, 4:27-34, Fig. 3; Ex1002 ¶69. To open “**lid member 32**,” the “**manipulative section 35a** of the **lid opening stick 35** is forced down,” “thereby rotating the **clamp lever 33** away from the...**lid member 32**”:



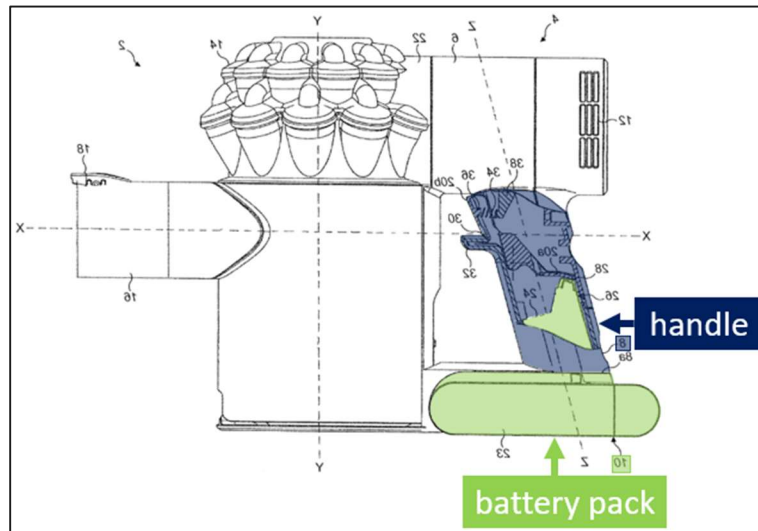
Ex1008, 7:11-24, Figs. 8-9; Ex1002 ¶70.

E. Sunderland

Sunderland is a 2013 Dyson publication for “a battery pack suitable for use in a battery-powered appliance such as a handheld vacuum cleaner.” Ex1017, 1:6-7. Sunderland’s “**motor and fan unit 6** is located above” a “**handle 8** [that] is oriented in a pistol-grip formation”:



Ex1017, 5:17-18, 6:11-12, Fig. 2; Ex1002 ¶71. Sunderland’s “handheld cleaning appliance includes a **removable battery pack [10]**...that is receivable in a dock opening in the end of [the] **handle [8]**” “so that the **battery pack 10** may be docked onto the vacuum cleaner 2”:



Ex1017, 1:19-22, 7:13-14, Fig. 2; Ex1002 ¶72.

VI. LEVEL OF ORDINARY SKILL IN THE ART

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

VII. CLAIM CONSTRUCTION

Petitioners are unaware of any “prior claim construction determination” related to the ’984Patent. 37 C.F.R. §42.100(b). “[C]laim terms need only be construed to the extent necessary to resolve the controversy.” *Wellman, Inc. v. Eastman Chem. Co.*, 642 F.3d 1355, 1361 (Fed. Cir. 2011) (internal quotes and citation omitted). Petitioners do not believe any claim construction is necessary to resolve the parties’ controversy in this Petition, and the claims should be given their plain and ordinary meaning for purposes of this IPR.⁴

VIII. THE CHALLENGED CLAIMS ARE UNPATENTABLE

A. Ground 1: Dimbylow in Combination with Howes Renders Obvious Claims 1-18

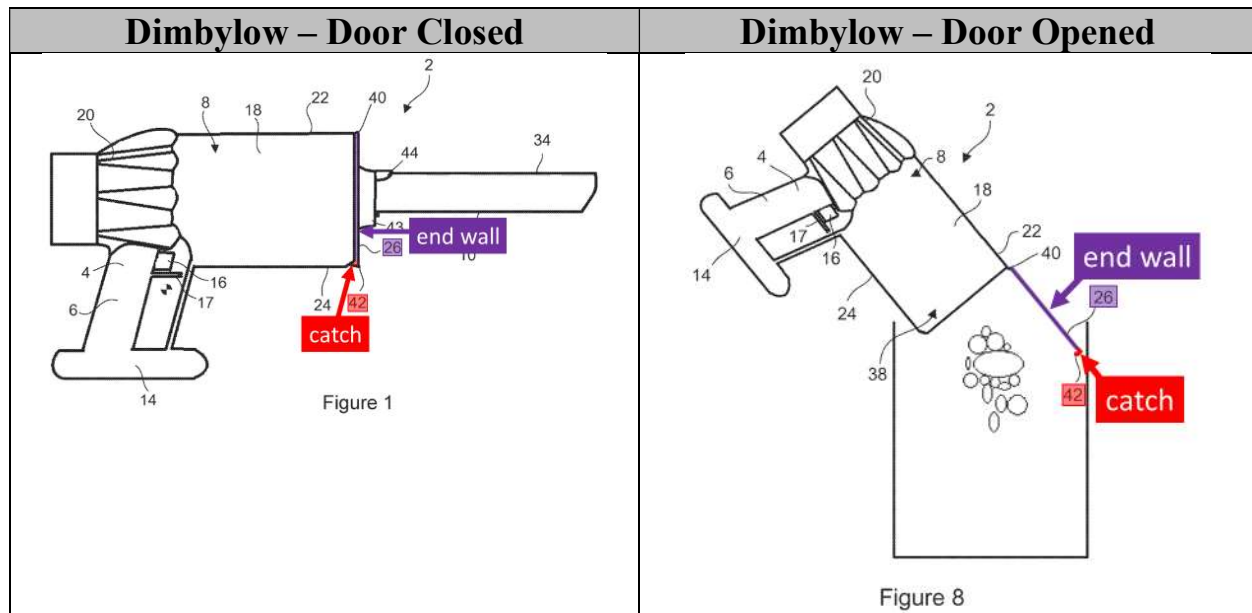
1. A POSA Would Have Combined Dimbylow and Howes

a. Scope and Content of the Prior Art

Dimbylow, a 2017 Dyson publication, teaches “[a] handheld vacuum cleaner.” Ex1005, Abstract. Dirt collected by a “cyclonic separating unit” is emptied by “point[ing] the vacuum cleaner 2 towards a suitable receptacle...into which the dirt is to be emptied,” and “releas[ing]” “[t]he **catch 42**” (which, when

⁴ Petitioners reserve all rights to raise claim construction arguments and other arguments in litigation.

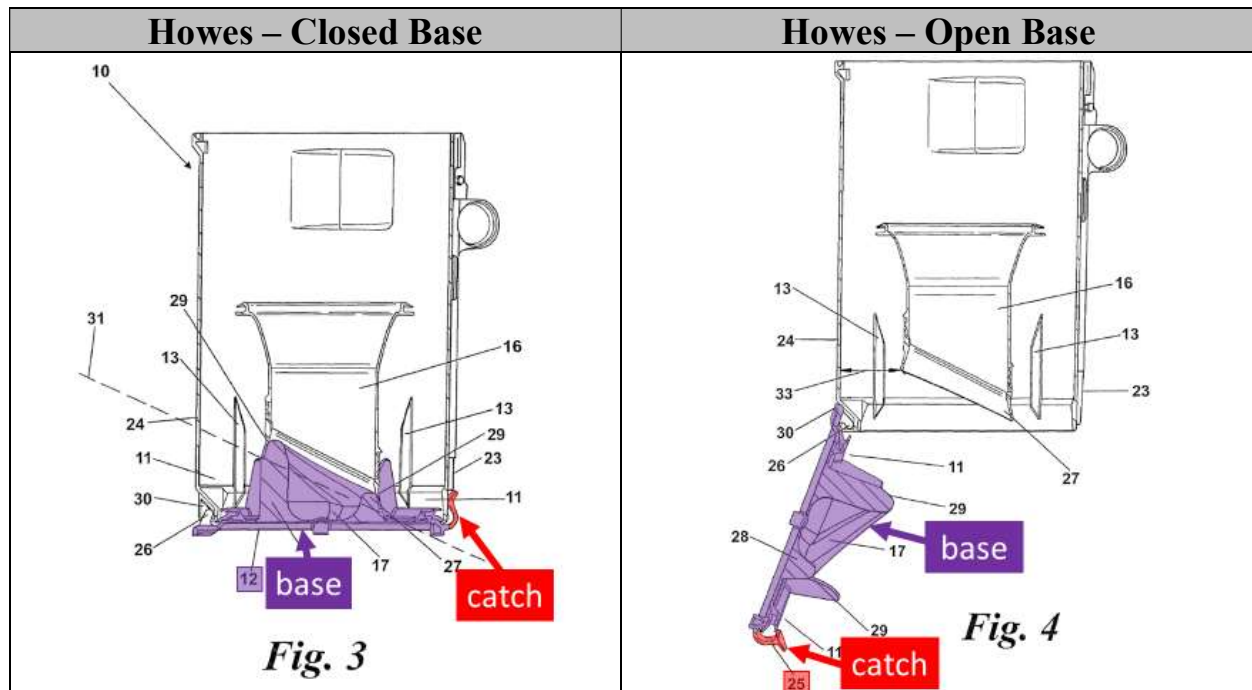
engaged, holds a pivotable “**end wall 26**” closed), allowing “**end wall 26** [to be] pivoted from its closed position into its open position”:



Ex1005, Abstract, ¶¶37, 48, Figs. 1, 8; Ex1002 ¶78.

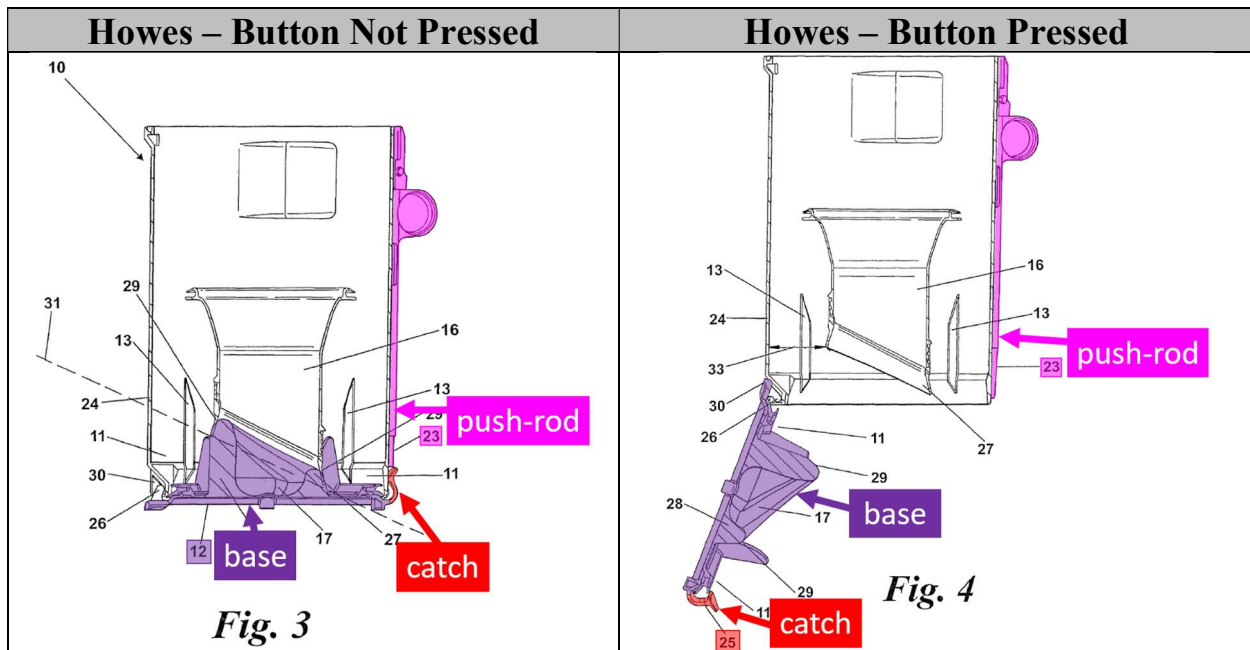
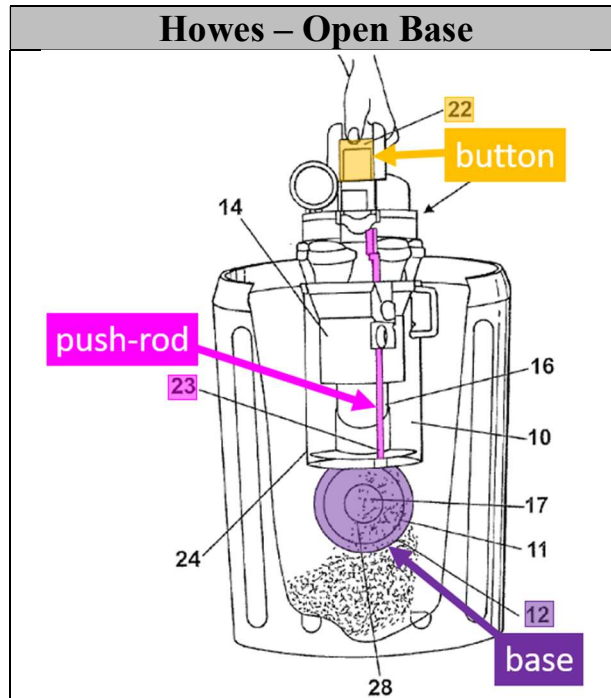
Dimbylow teaches two benefits to this dust-emptying design. First, it is “very intuitive and ergonomic”: “[s]ince the cyclonic separating unit 8 is pointed away from the user, there is no need for the user to adopt a different grip or posture from that which is adopted during normal cleaning.” Ex1005 ¶48. Second, because “dirt exits the dirt collector 38/fine dust collector 51 from the end of the cyclonic separating unit 8 which is furthest from the handle 6..., there is less risk that dirt will spill...onto a user during emptying.” *Id.* However, Dimbylow does not specify the method by which “[t]he **catch 42** is...released by the user.” *Id.*; *see also id.* ¶37 (describing the “user-operable **catch 42**”).

Howes, a 2011 Dyson patent, teaches “a separating unit” for a “bagless vacuum cleaner” that “separate[s] dirt and dust by way of cyclonic, centrifugal or inertial separation” and has a “**base**” that “is movable between a closed position and an open position”:



Ex1006, Abstract, 2:36-39, Figs. 3-4; Ex1002 ¶¶80-81. “[C]atch 25” holds “**base 12**” in the “closed position.” Ex1006, 4:6-10, Figs. 3-4.

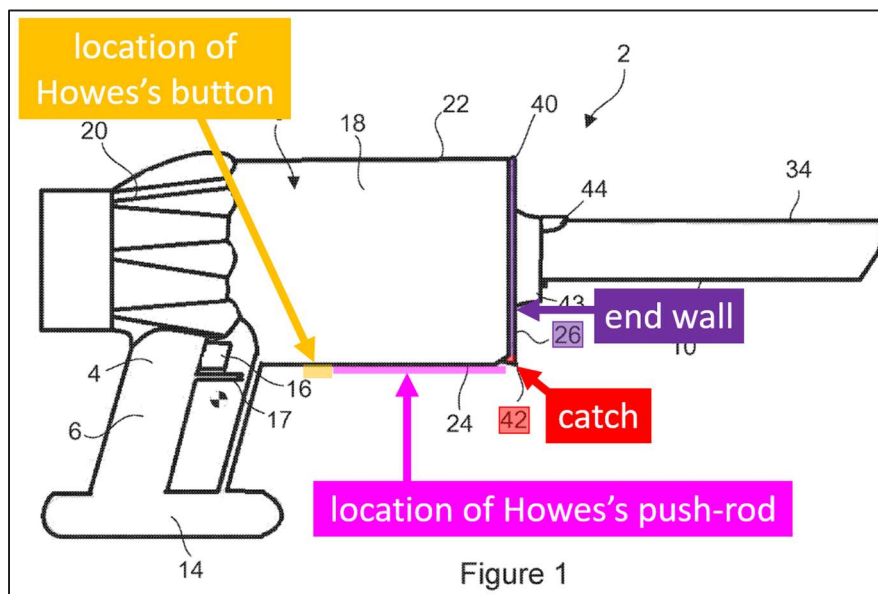
Howes teaches a convenient and hygienic method of releasing the catch to open the base to empty the separating unit: “to empty the separator unit 3, the user presses the button 22” that is “linked to” a “push-rod 23.” Ex1006, 4:2-4, Fig. 2b. “When the user depresses the **button 22**, the **push-rod 23** is urged against a **catch 25** on the **base 12**,” and “[t]he force exerted by the **push-rod 23** overcomes any resistance of the **base 12** to move into the open position”:



Ex1006, 4:4-10, Figs. 2b-4; Ex1002 ¶82.

b. Motivation to Combine

A POSA would have been motivated to implement Howes's base "actuator mechanism" teachings, including "**button 22**" and "**push-rod 23**," as the method by which Dimbylow's "**catch 42** is...released by the user" to achieve Dimbylow's stated goal of "intuitive and ergonomic" dust emptying that reduces the "risk that dirt will spill...onto a user during emptying." Ex1006, 4:1-10; Ex1005 ¶48; Ex1002 ¶¶83-90. Specifically, a POSA would have been motivated to incorporate a button and a push-rod as Howes teaches on Dimbylow's "outer wall 24," adjacent Dimbylow's "**catch 42**," such that, as Howes teaches, "[w]hen the user depresses the **button 22**, the **push-rod 23** is urged against a **catch 25** [Dimbylow's **catch 42**] on the **base 12** [Dimbylow's **end wall 26**]," and "[t]he force exerted by the **push-rod 23** overcomes any resistance of the **base 12** [Dimbylow's **end wall 26**] to move into the open position":



Ex1005, Fig. 1(modified); Ex1006, 4:1-10; Ex1002 ¶83.

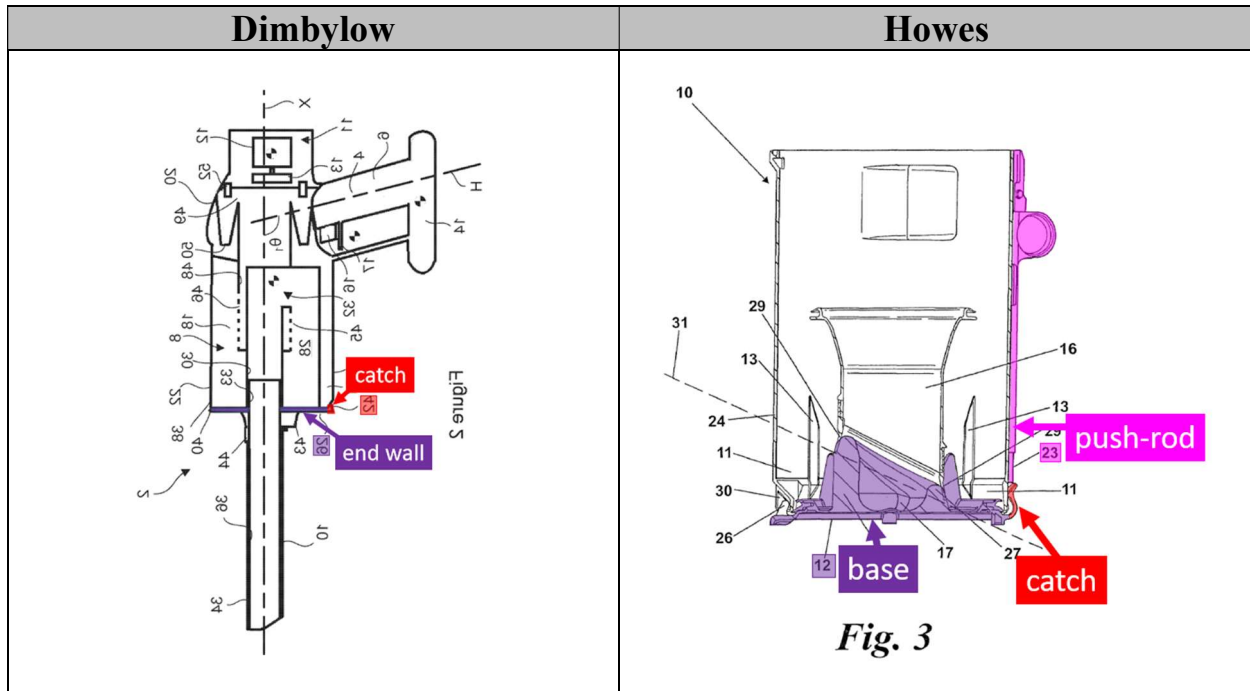
Because Dimbylow does not teach how a user releases its “catch,” a POSA would have been motivated to look for ways to do this. Ex1002 ¶84. A POSA would have been particularly motivated to look at similar references (including cyclonic vacuum-cleaner references having the same assignee, Dyson) that teach mechanisms to release a similar component (door catch) on a similar device (dirt collection chamber) to accomplish a similar goal (hygienic and convenient bin emptying). Ex1002 ¶84. Howes is such a reference.

A POSA would have understood Howes’s “actuator mechanism” teachings further Dimbylow’s stated purpose of providing “intuitive and ergonomic” dust emptying, Ex1005 ¶48, because simply pushing a button located near the handle with one hand while continuing to hold the cleaner’s handle with the other hand is a very intuitive and ergonomic method of emptying the collected dust. Ex1002 ¶85. Moreover, a POSA would have understood a user could operate Howes’s “actuator mechanism” with Dimbylow’s cleaner while still meeting Dimbylow’s beneficial teaching of “no[t] need[ing] ... the user to adopt a different grip or posture from that which is adopted during normal cleaning.” Ex1005 ¶48; Ex1002 ¶85. Further, simply pushing a button located near the handle is more “intuitive and ergonomic” for a user than having to manually release Dimbylow’s “catch 42,” which Dimbylow

teaches is located at a position “which is furthest from the handle 6.” Ex1005 ¶48; Ex1002 ¶85.

A POSA would have understood Howes’s “actuator mechanism” teachings also further Dimbylow’s stated purpose of providing a dirt-emptying process that reduces the “risk that dirt will spill...onto a user during emptying” because the user would not need to place his/her hand in front of or even near the dirt collection chamber’s openable door, which, when opened, releases the dirt. Ex1005 ¶48; Ex1002 ¶86. Instead, a user simply pushes a button located closer to the handle. Ex1002 ¶86. A POSA would have understood this had benefits over manually releasing Dimbylow’s “catch 42,” including because a user need not place his/her hand near the area where dust is emptied, which further reduces the risk of dirt spilling onto a user during emptying. Ex1002 ¶86.

A POSA reading Dimbylow would have been motivated to look to Howes to implement Dimbylow’s catch-release functionality. Ex1002 ¶87. For example, Dimbylow and Howes are analogous art. Ex1002 ¶87. Both are Dyson patents related to bagless, cyclonic vacuum cleaners having separation units with pivotable doors held in place by a releasable, user-operable catch. Ex1005, Abstract, ¶¶37, 48, Figs. 1, 8; Ex1006, Abstract, 2:36-39, 4:1-10, Figs. 2b-4.



Ex1005, Fig. 2; Ex1006, Fig. 3; Ex1002 ¶87.

This combination would have involved a simple substitution of known elements (Howes's button linked to a push-rod) to obtain the predictable result of opening a pivotable door by releasing a catch. Ex1002 ¶88.

This combination would have involved applying a known technique (Howes's button-actuated push-rod) to a known device ready for improvement (Dimbylow's manually operated catch) to yield predictable results (using the push-rod to exert a force against the catch sufficient to release the catch and overcome any resistance of the openable door). Ex1006, 4:1-10; Ex1002 ¶89.

This combination would have been at least obvious to try as a POSA would have understood there are a finite number of ways to release Dimbylow's user-

operable catch, including manually releasing the catch and using an actuated push-rod to release the catch. Ex1002 ¶90.

c. Reasonable Expectation of Success

A POSA would have reasonably expected success implementing Howes’s “actuator mechanism” teachings as the method for releasing Dimbylow’s “user-operable catch 42,” for the reasons stated above. Ex1006, 4:1-10; Ex1005 ¶37; Ex1002 ¶91. Further, as explained above, Dimbylow and Howes are very similar: both are Dyson patents related to cyclonic vacuum cleaners having separation units with pivotable doors held in place by a releasable, user-operable catch, which would have further given a POSA a reasonable expectation of success. Ex1005, Abstract, ¶¶37, 48, Figs. 1, 8; Ex1006, Abstract, 2:36-39, 4:1-10, Figs. 2b-4. Further, implementing Howes’s “actuator mechanism” teachings would have only involved incorporating a few straightforward, well-known parts: a button linked to a push-rod. Ex1002 ¶91.

2. [1]/[10]

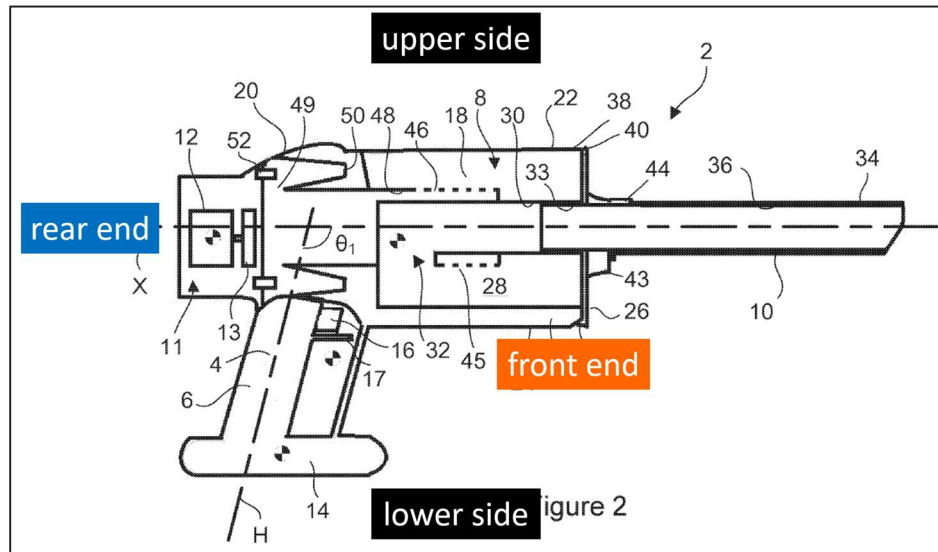
a. [1pre]/[10pre]⁵

To the extent the preambles are limiting, Dimbylow teaches them. Ex1002 ¶¶92-94. Dimbylow teaches a “handheld vacuum cleaner...for cleaning confined

⁵ See LIST OF CHALLENGED CLAIMS.

spaces” and other “hard-to-reach surfaces.” Ex1005 ¶¶8, 43, Figs. 1, 6. This is a hand vacuum cleaner (“handvac”). Ex1002 ¶93.

Dimbylow’s handvac has a “**front**” **end** opposite a “**rear**” **end**, and an **upper** **side** opposite a **lower side**:



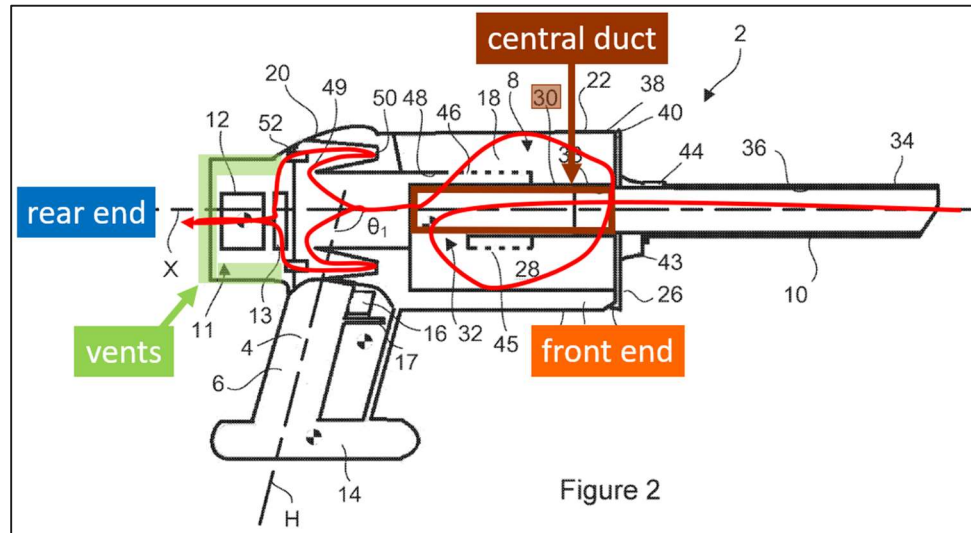
Ex1005 ¶¶41-42, Fig. 2; *see also id.*, Fig. 3; Ex1002 ¶94.

b. [1a]/[10a]

Dimbylow teaches these limitations. Ex1002 ¶¶95-97.

Dimbylow teaches an air flow passage extending from a dirty air inlet provided at the front end to a clear air outlet provided at the rear end. Ex1002 ¶¶96-97. In Dimbylow, “[d]irty **air** is drawn by the suction generator 11 through the inlet duct 30, 36” (which includes the “**central duct 30**” at the “**front**” **end**), “into the [primary] cyclonic separation chamber 28,” then through the “secondary cyclones 20,” whereafter the “cleaned air exits...through the suction generator 11,”

“comprising a motor 12,” and “out of **vents** (not shown) at the **rear [end]** of the main body”:



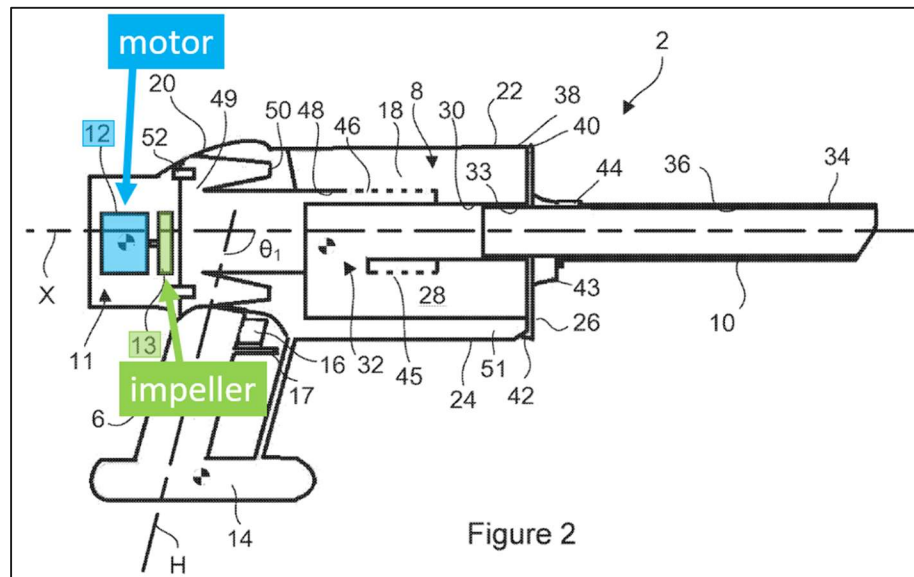
Ex1005 ¶¶31, 35, 42, Fig. 2; Ex1002 ¶96. The upstream portion of Dimbylow’s “central duct 30” is a dirty air inlet; Dimbylow’s “vents” are unobstructed, clear air outlets exhausting air that a POSA would understand is both clean⁶ and “clear”; and an air flow path extends between them. Ex1002 ¶97.

c. [1b]/[10b]/[10d]

Dimbylow teaches these limitations. Ex1002¶¶98-104.

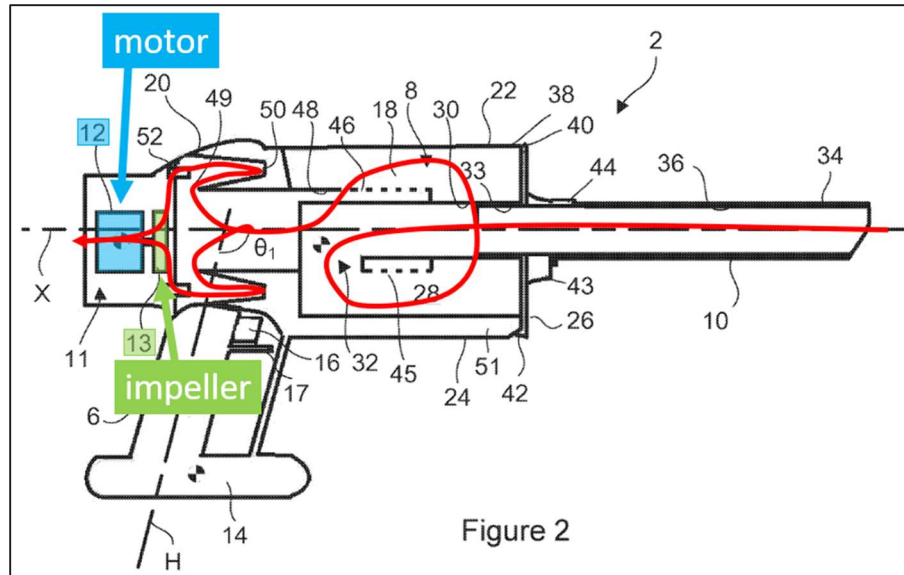
⁶ The specification describes a “clean air outlet” while the claims recite a “clear air outlet.” Ex1001, 16:51-56, claim 1.

Dimbylow's cleaner has a body comprising a suction motor. Ex1002 ¶¶100-101. Dimbylow's handvac has a “main body...compris[ing] a suction generator 11 comprising a motor 12 and impeller 13”:



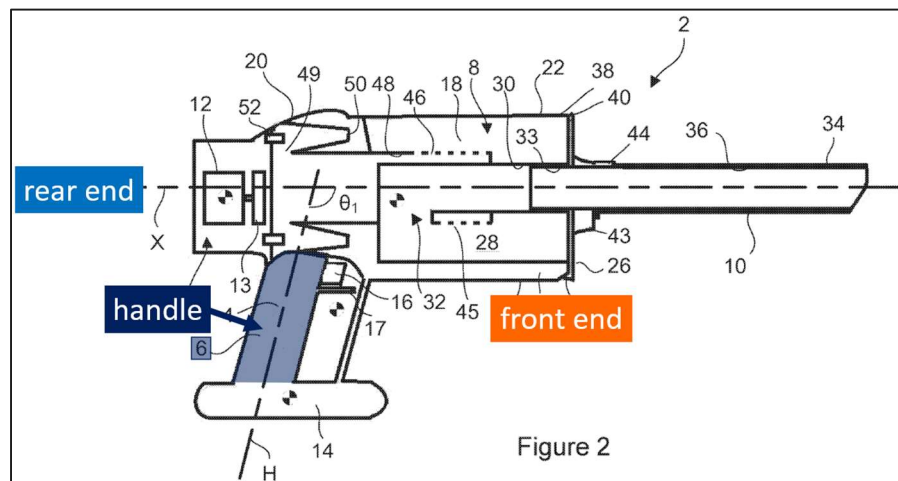
Ex1005 ¶31, Fig. 2; Ex1002 ¶100. Dimbylow's “motor 12,” individually or together with “impeller 13,” is a suction motor. Ex1002 ¶101.

Dimbylow's suction motor is positioned in the air flow passage. Ex1002 ¶102. In Dimbylow, “cleaned **air** exits...through the suction generator 11” “comprising a motor 12 and impeller 13” “and out of vents (not shown) at the rear of the main body”:



Ex1005, ¶¶31, 42, Fig. 2; Ex1002 ¶102; Ground 1, [1a]/[10a].

Dimbylow's vacuum cleaner body comprises a front end, a rear end, and a handle. Ex1002 ¶103. Dimbylow's "main body" has a "**front**" end opposite a "**rear**" end, and "an elongate **handle 6**":



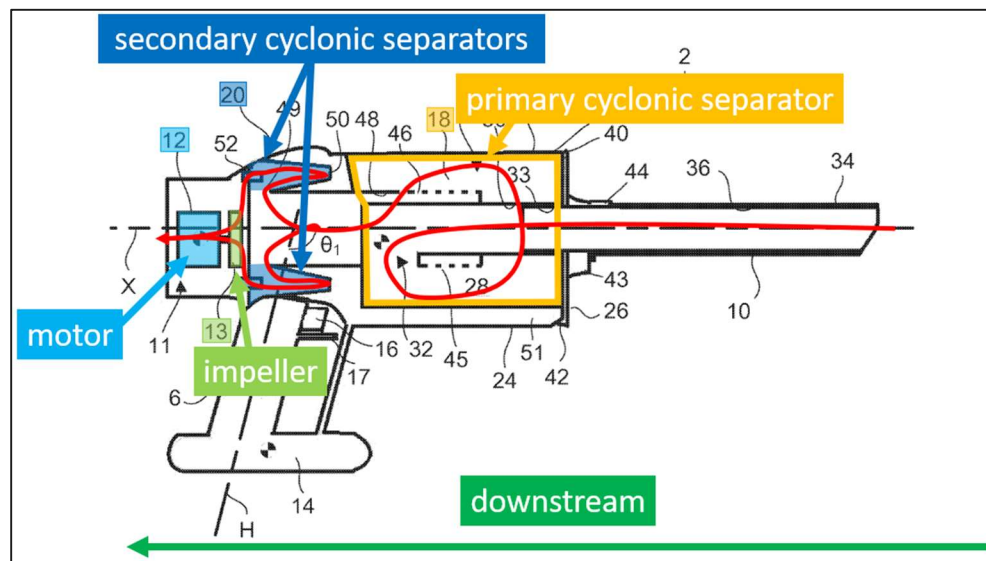
Ex1005 ¶¶30, 41-42, Fig. 2; Ex1002 ¶103.

Regarding [10d], Dimbylow teaches a pistol-grip handle. Ex1002 ¶104. Dimbylow’s “**handle 6** is in a pistol grip configuration.” Ex1005 ¶31, Fig. 2; Ex1002 ¶104.

d. [1c]/[10c]

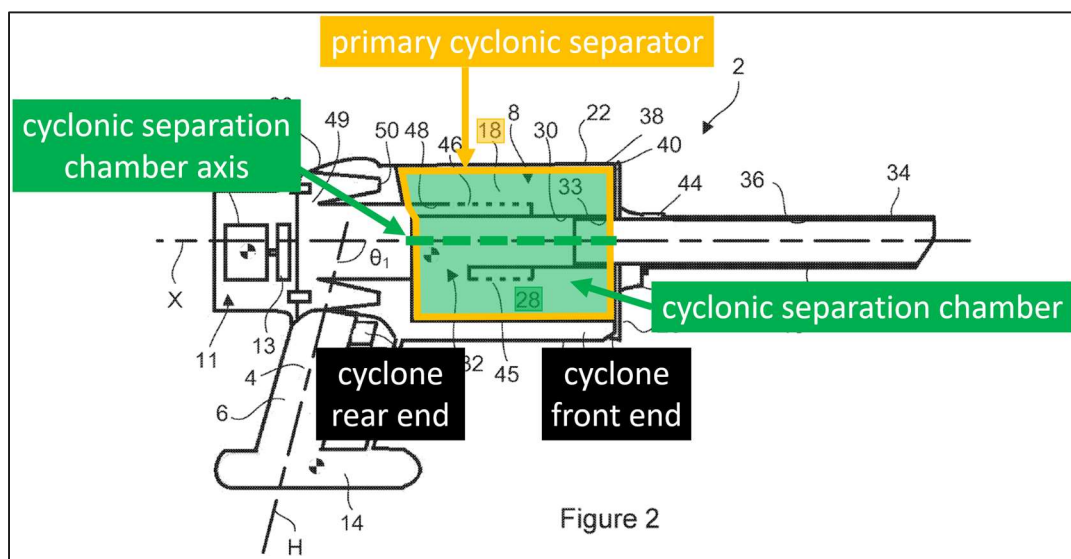
Dimbylow teaches these limitations. Ex1002 ¶¶105-114.

Dimbylow teaches a cyclone unit positioned in the air flow passage upstream from the suction motor. Ex1002 ¶¶106-108. Dimbylow’s “cyclonic separating unit 8 comprises a **primary cyclonic separator 18** and a plurality of **secondary cyclonic separators 20** positioned **downstream** of the **primary cyclonic separator**”:



Ex1005 ¶32, Fig. 2; Ex1002 ¶106. Dimbylow’s “primary cyclonic separator 18” is a cyclone unit positioned in the air flow passage. Ex1002 ¶107; Ground 1, [1a]/[10a]. Dimbylow’s “**primary cyclonic separator 18**” is positioned upstream from “**motor 12**” and “**impeller 13**.” Ex1005, Fig. 2; Ex1002 ¶108.

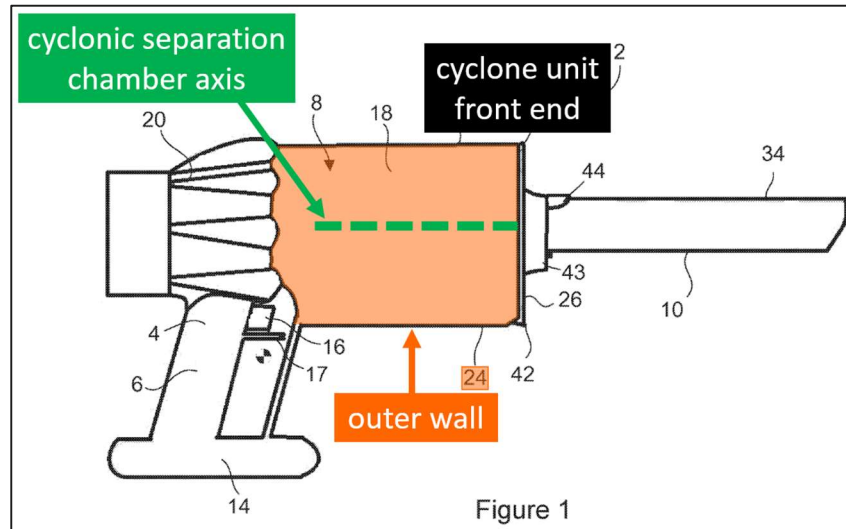
Dimbylow teaches the cyclone unit comprising a cyclone having a front end, a rear end, and a cyclone axis of rotation extending between the front and rear ends of the cyclone. Ex1002 ¶¶109-110. Dimbylow's “**primary cyclonic separator 18**” has a “**cyclonic separation chamber 28**,” which, when Dimbylow's cleaner is activated, a POSA would have understood comprises a cyclone, with a **front end** and a **rear end**:



Ex1005 ¶33; Fig. 2; Ex1002 ¶109. Further, Dimbylow teaches an “**axis of the cyclonic separation chamber 28**,” which a POSA would have understood is a cyclone axis of rotation that extends between the front and rear ends of the cyclone, as shown above. Ex1005 ¶33; Ex1002 ¶110.

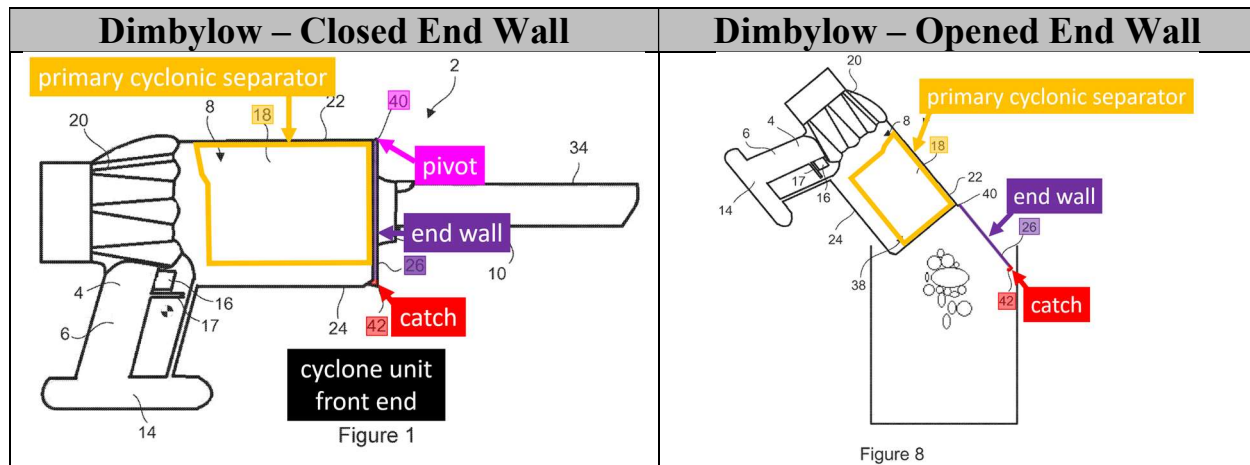
Dimbylow teaches the cyclone unit further comprising an axially extending cyclone unit wall which extends to a front end of the cyclone unit. Ex1002 ¶¶111-12. Dimbylow's “primary cyclonic separator 18 comprises a separator body 22 in

the form of a bin having a cylindrical **outer wall 24**” that extends to an “end,” i.e.,
a **cyclone unit front end**:



Ex1005 ¶33, 37, Fig. 1; Ex1002 ¶111. A POSA would have understood Dimbylow’s
“**outer wall 24**” is an axially extending cyclone unit wall because it extends along
the same direction as the “**axis of the cyclonic separation chamber 28**.” Ex1005
¶33; Ex1002 ¶112.

Dimbylow teaches the front end of the cyclone unit comprising a front door
that is moveable between a closed position and an open position. Ex1002 ¶¶113-14.
The front “end” of Dimbylow’s “**primary cyclonic separator 18**” comprises an
“**end wall 26** [that] is connected to the cylindrical outer wall 24 by a **pivot 40** and is
held in a closed position by a user-operable **catch 42**”:

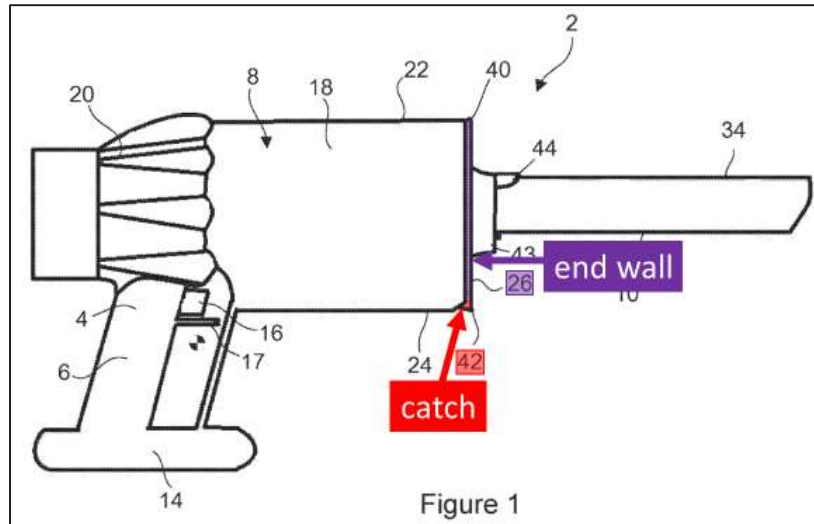


Ex1005 ¶¶36-37, Figs. 1, 8; Ex1002 ¶113. To open “**end wall 26**,” the “user points the vacuum cleaner 2 towards a suitable receptacle,” “release[s]” “**catch 42**,” and the “**end wall 26** [is] pivoted from its closed position into its open position.” Ex1005 ¶48. Dimbylow’s “end wall 26” is a front door at the front end of the cyclone unit. Ex1002 ¶114.

e. [1d]/[10e]

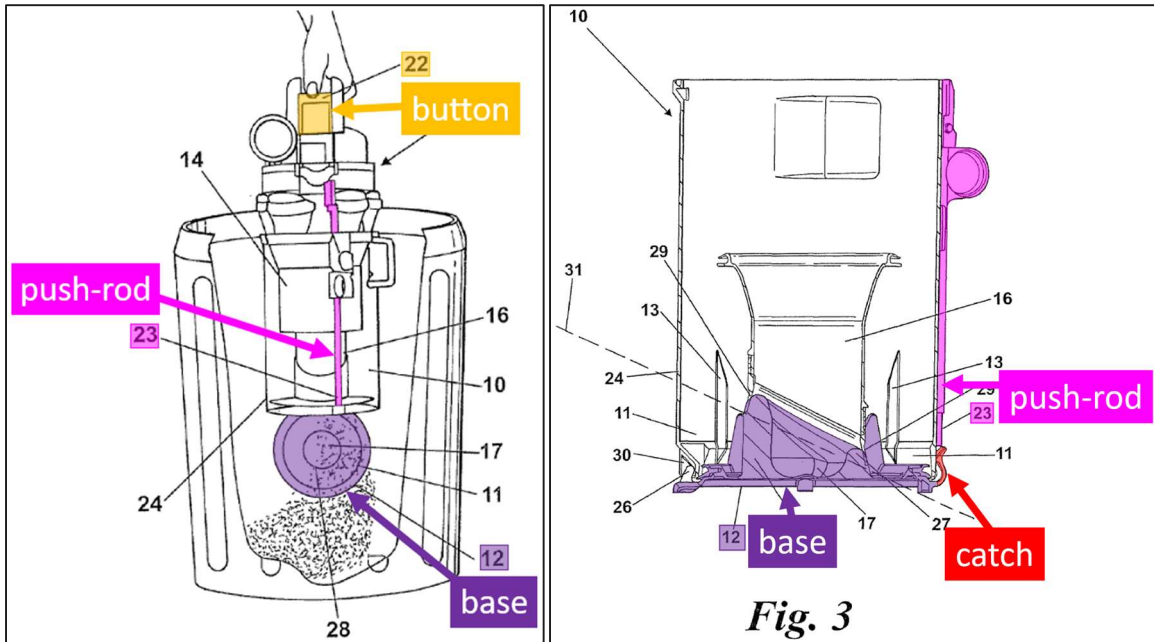
Dimbylow combined with Howes renders these limitations obvious. Ex1002 ¶¶115-126.

Dimbylow teaches a lock securing the front door in the closed position. Ex1002 ¶¶117-18. Dimbylow’s “**end wall 26** is connected to the cylindrical outer wall 24 by a pivot 40 and is held in a closed position by a user-operable **catch 42**”:



Ex1005 ¶37, Fig. 1; Ex1002 ¶117. Dimbylow’s “user-operable catch 42” is a lock because, when engaged, it secures the front door in a closed position. Ex1002 ¶118.

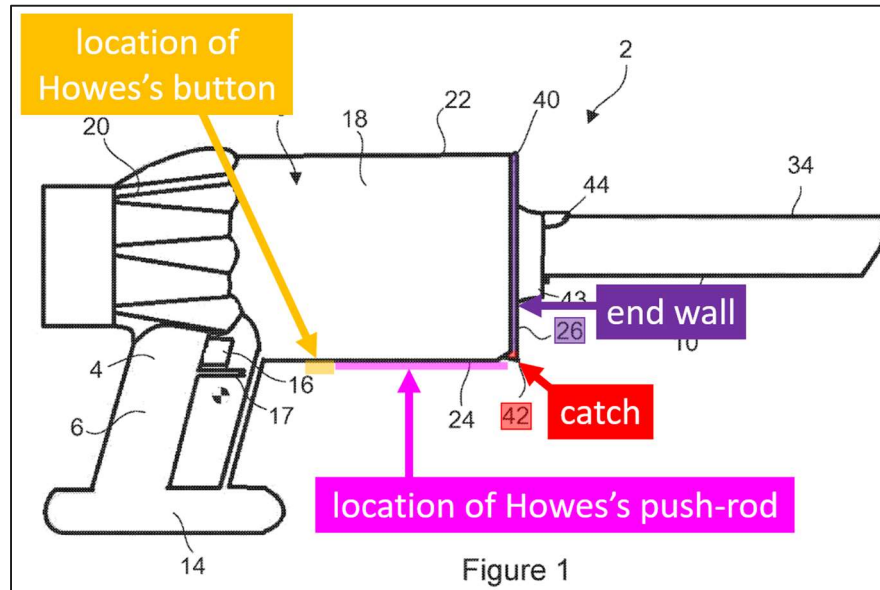
Howes teaches a lock securing the openable door in the closed position, the lock comprising an actuator. Ex1002 ¶¶119-120. Howes teaches “[a]n actuator mechanism in the form of a **push-button 22**” “linked to on[e] end of a **push-rod 23**,” and the “other end of the push-rod 23 is adjacent the **base 12**,” which is pivotable and, when closed, is held in place by a “**catch 25**”:



Ex1006, 4:1-10, Figs. 2b-3; Ex1002 ¶119. A POSA would have understood Howes’s base 12 actuator mechanism, including “push button 22,” “push-rod 23,” and “catch 25,” together are a lock securing the openable door in the closed position. Ex1002 ¶120. Further, a POSA would have understood Howes’s “actuator mechanism” comprises an actuator (“button 22”) because pushing (actuating) the button (actuator) releases the door: “to empty the separator unit 3, the user presses the button 22,” which causes “base 12 to move into the open position.” Ex1006, 4:2-10; Ex1002 ¶120.

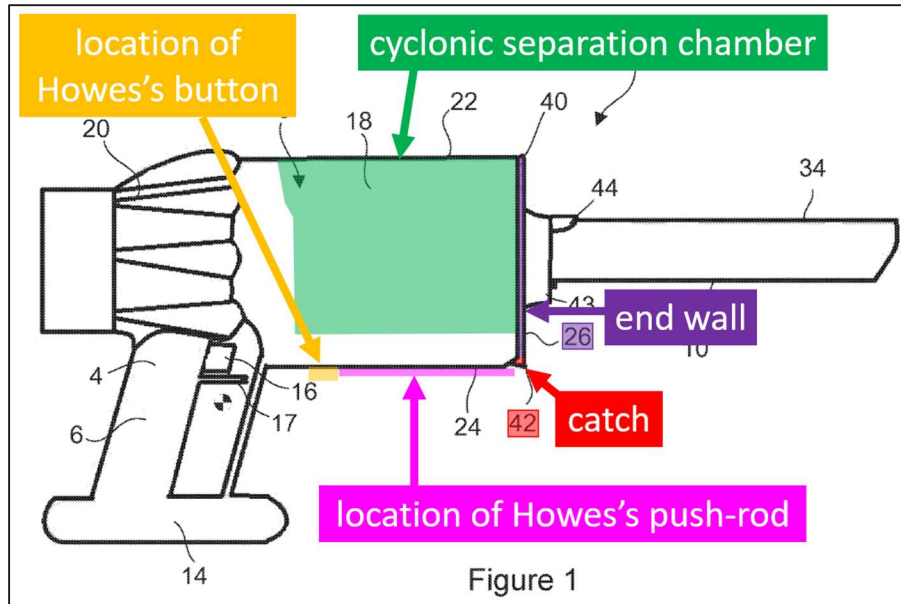
A POSA would have been motivated to combine Dimbylow and Howes to include an “actuator mechanism,” as Howes teaches, to Dimbylow’s hand vacuum and would have reasonably expected success. Ground 1, §1. A POSA would have

been motivated to implement Howes's actuator mechanism on Dimbylow's hand vacuum as shown:



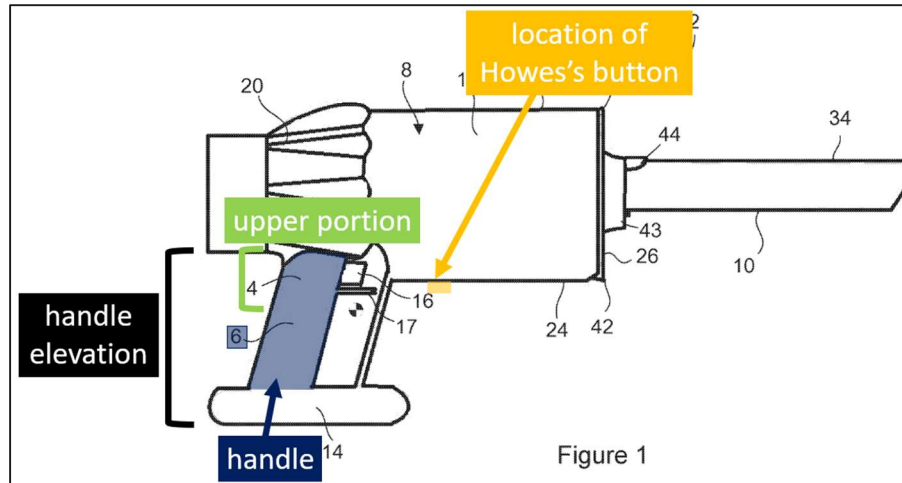
Ex1005, Fig. 1(modified); Ex1006, 4:1-10; Ex1002 ¶121. Thus, the combination of Dimbylow and Howes renders obvious a lock securing the front door in the closed position, the lock comprising an actuator. Ex1002 ¶122.

Regarding [1d], the combination of Dimbylow and Howes renders obvious the actuator is spaced towards the rear end of the cyclone. Ex1002 ¶123-24. In their combined teachings, Howes's "actuator mechanism" (including "**button 22**" and "**push-rod 23**") releases Dimbylow's "**end wall 26**" (by releasing Dimbylow's "**catch 42**"):



Ex1005, Fig. 1(modified); Ex1006, 4:1-10; Ex1002 ¶123. A POSA reading Dimbylow and Howes would have found it obvious to locate Howes’s actuator in the convenient location identified above—spaced towards the rear end of the cyclone (i.e., the end closer to the handvac rear end)—and would have reasonably expected success doing so, including because Howes’s cyclone, when oriented as shown in Dimbylow, likewise has its actuator at the rear of the cyclone. Ground 1, §1; Ex1002 ¶124.

Regarding [10e], the combination of Dimbylow and Howes renders obvious locating the actuator at an elevation of an upper end of the pistol-grip handle and forward of the pistol-grip handle. Ex1002 ¶¶125-26. A POSA reading Dimbylow and Howes would have found it obvious to conveniently locate the “**button 22**” (actuator) at an **elevation** of an “**upper portion**” (upper end) of Dimbylow’s “**handle 6**,” and forward of “**handle 6**”:



Ex1005 ¶31, Fig. 1(modified); Ex1006, 4:1-10; Ex1002 ¶125. A POSA would have understood, in the combined teachings of Dimbylow and Howes, the actuator is forward of Dimbylow's "handle 6." Ex1002 ¶126; Ex1005 ¶31 ("A trigger guard 17 extends forwardly from the handle below the trigger 16.").

3. [2]

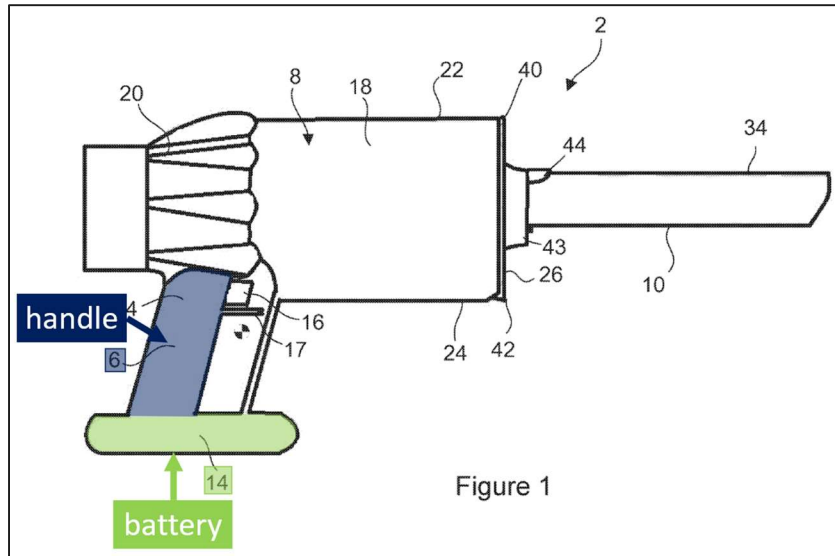
Dimbylow combined with Howes renders claim 1 and the remaining limitations of this claim obvious for the same reasons discussed for [1d]/[10d]/[10e].

Ground 1, [1d]/[10d]/[10e]; Ex1002 ¶¶127-28.

4. [3]/[13]

Dimbylow combined with Howes renders claims 2/10 and the remaining limitations of these claims obvious. Ex1002 ¶¶129-136.

Dimbylow teaches a hand vacuum cleaner comprising a battery pack. Ex1002 ¶¶131-32. Dimbylow’s “**battery 14** [is] located directly below the **handle 6**”:

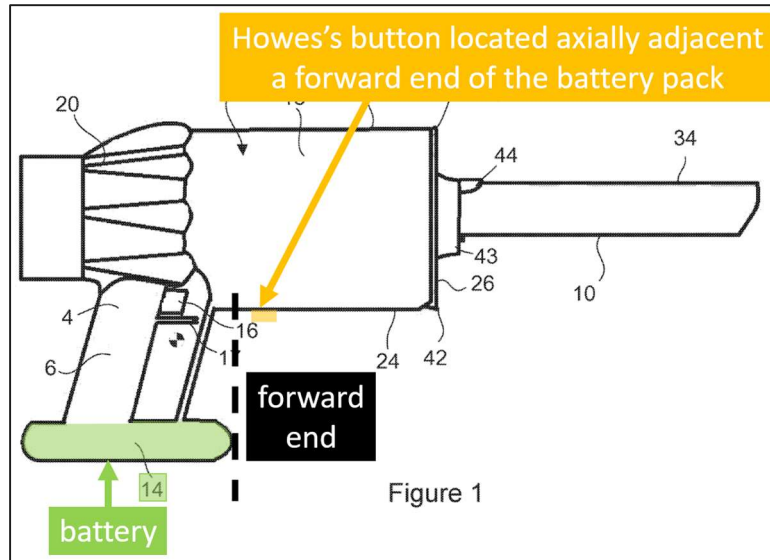


Ex1005 ¶31, Fig. 1; Ex1002 ¶131. A POSA would have understood Dimbylow’s “**battery 14**” is a battery pack. Ex1002 ¶132.

To the extent PO argues Dimbylow’s “**battery 14**” is not a battery pack, a POSA would have been motivated by Dimbylow’s disclosures to modify Dimbylow to include a battery pack. Ex1002 ¶¶133-34. The ’984Patent explains the “battery pack” can “include[] one...battery cell[],” such as Dimbylow’s “battery 14.” Ex1001, 6:35-41. While a POSA would have understood Dimbylow’s “battery 14” is a battery pack (not an air-exposed battery), a POSA also would have found encasing Dimbylow’s “battery 14” in a pack to be obvious to try, easy to implement, and would have yielded the predictable result of protecting the user from the battery in case of an accident while still meeting Dyson’s other “battery 14” objectives, including “form[ing] a base of the vacuum cleaner.” Ex1005 ¶40; Ex1002 ¶133. A POSA would have reasonably expected success based on Dimbylow’s teachings of

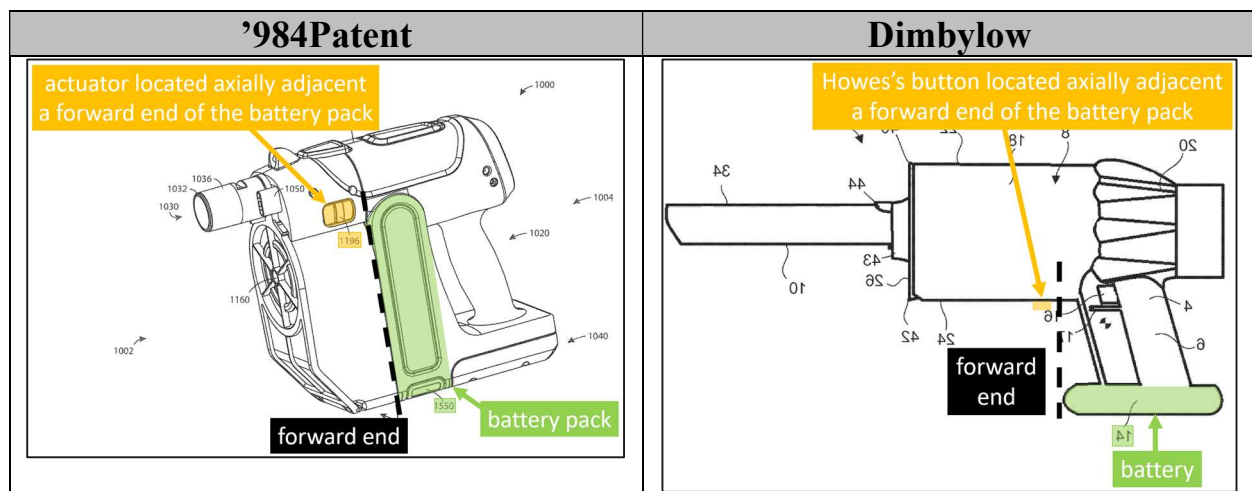
a “battery 14” and because batteries and battery packs perform the same function (powering the cleaner) in the same way (providing electricity). Ex1002 ¶133. A POSA would also have reasonably expected success because battery packs were well-known in the art for powering cordless vacuum cleaners. *E.g.*, Ex1017, 1:19-22 (Dyson publication teaching “a removable battery pack [10]...that is receivable in a dock opening in the end of [the] handle [8]” “so that the battery pack 10 may be docked onto the vacuum cleaner 2”); *see also id.*, 7:13-14, Fig. 2; Ex1002 ¶134.

The Dimbylow-Howes combination renders obvious wherein the actuator is axially located adjacent a forward end of the battery pack. Ex1002 ¶¶135-36. A POSA would have understood the right-most end of Dimbylow’s battery pack in the figure below (the end closest to the front end of Dimbylow’s cleaner) is a forward end. Ex1002 ¶135; Ex1005 ¶31 (“A trigger guard 17 extends forwardly from the handle below the trigger 16.”). A POSA reading Dimbylow and Howes would have found it obvious to locate the “**button 22**” (actuator) axially adjacent to that **forward end** of Dimbylow’s “**battery 14**” (battery pack):



Ex1005 ¶31, Fig. 1(modified); Ex1006, 4:1-10; Ex1002 ¶135; Ground 1, §1.

Further, this is at least as much disclosure of these limitations as the '984Patent:

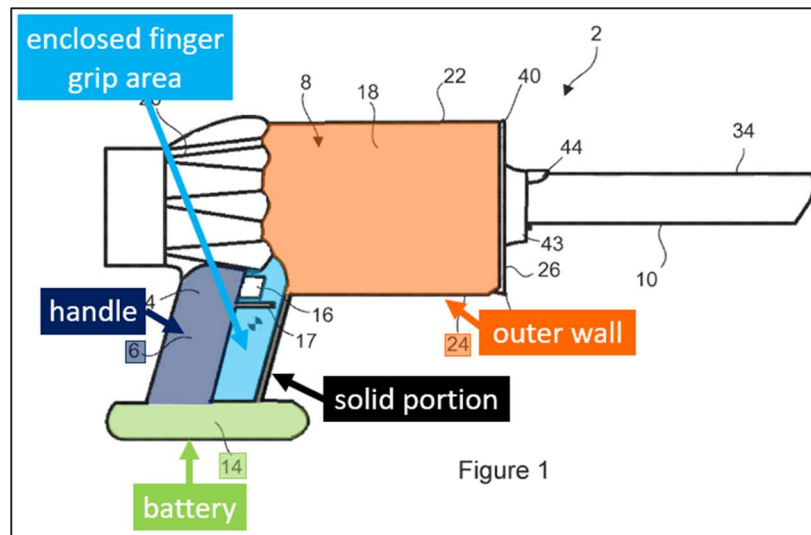


Ex1001, Fig. 46; Ex1005, Fig. 1(modified); Ex1002 ¶136.

5. [4]/[14]

Dimbylow combined with Howes renders claims 3/13 obvious and Dimbylow teaches the remaining limitations of these claims. Ex1002 ¶¶137-140.

Dimbylow teaches the hand vacuum cleaner further comprising an enclosed finger grip area. Ex1002 ¶139. Dimbylow's handvac comprises an **enclosed finger grip area**, as Dimbylow illustrates an open area bordered on all sides by “**outer wall 24**,” “**handle 6**,” “**battery 14**,” and a **solid portion** extending from “**outer wall 24**” to “**battery 14**”:



Ex1005, Fig. 1; Ex1002 ¶139. When the user grabs Dimbylow’s “**handle 6**,” their fingers wrap into Dimbylow’s **enclosed finger grip area**. Ex1002 ¶140.

6. [5]/[15]

Dimbylow combined with Howes renders claims 4/14 obvious and Dimbylow teaches the remaining limitations of these claims. Ex1002 ¶¶141-44.

Dimbylow teaches an enclosed finger grip area, where the bottom boundary of the enclosed finger grip area is illustrated as “**battery 14**.” Ground 1, [4]/[14].

Dimbylow teaches its “**battery**” is mounted “directly below the **handle 6**.” Ex1005 ¶31, Fig. 1; Ex1002 ¶144. A POSA would have understood Dimbylow’s

“**battery 14**” includes a **battery pack mount** (including the solid portion identified in claims 4/14) holding the battery in place, and the **battery pack mount** forms part of the **enclosed finger grip area**:

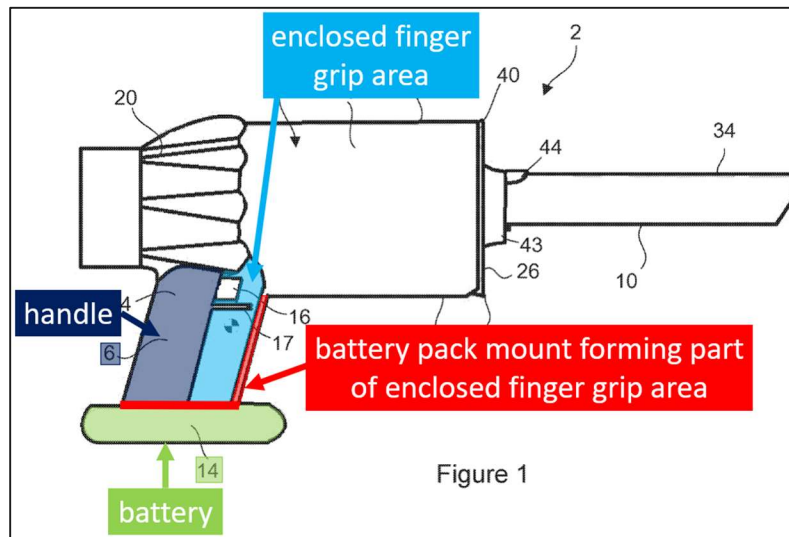


Figure 1

Ex1005 ¶31, Fig. 1; Ex1002 ¶144; Ground 1, [3]/[13], [4]/[14].

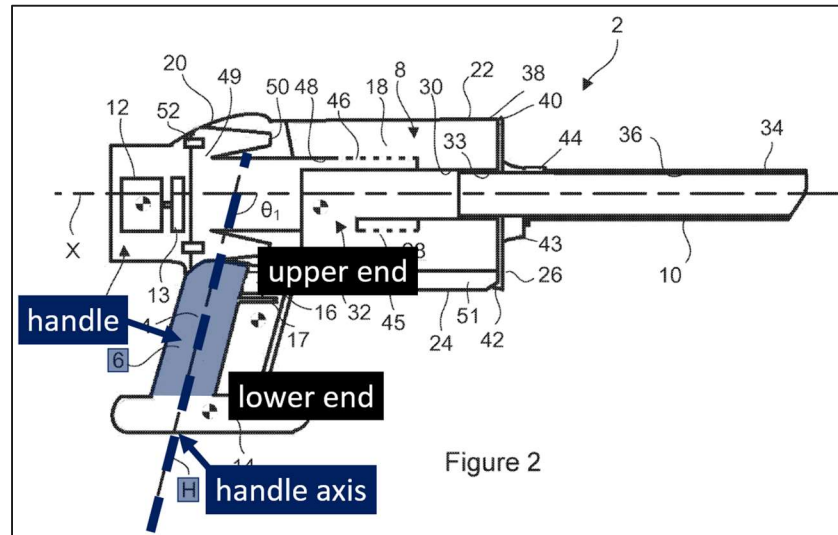
7. [6]/[11]

Dimbylow combined with Howes renders claims 2/10 obvious and Dimbylow teaches and renders obvious the remaining limitations of these claims. Ex1002 ¶¶145-156.

As explained for [1b]/[10b]/[10d], Dimbylow teaches a pistol-grip handle and a suction motor. Ground 1, [1b]/[10b]/[10d].

Dimbylow further teaches a pistol-grip axis extends through the pistol-grip handle from a lower end of the pistol-grip handle to an/the upper end of the pistol-

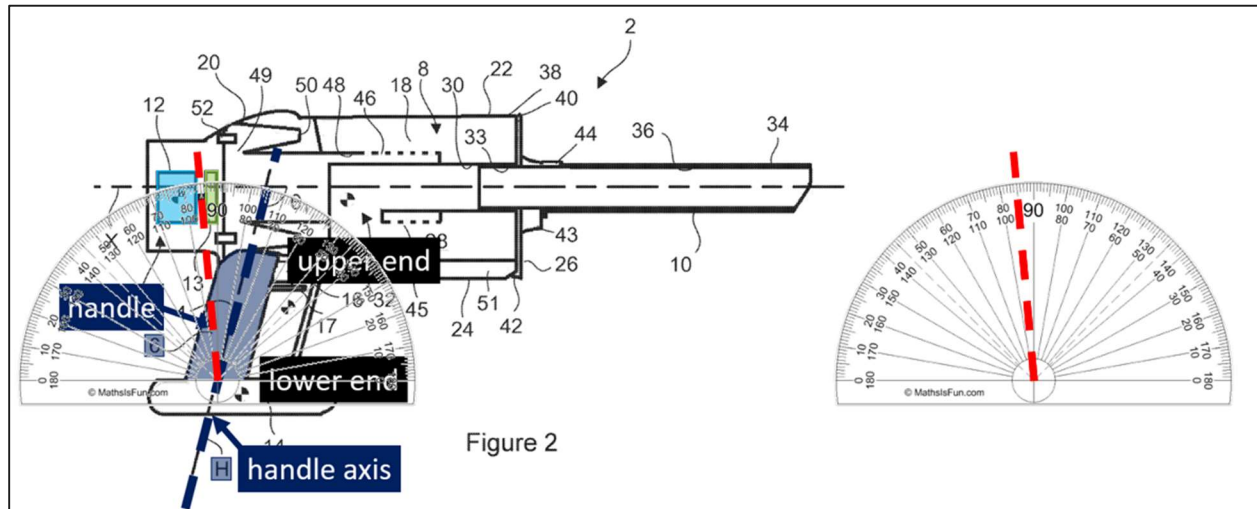
grip handle. Ex1002 ¶148. Dimbylow’s “**handle axis H** extend[s] through the **handle 6**” from a **lower end** to an/the **upper end**:



Ex1005 ¶31, Fig. 2; Ex1002 ¶148.

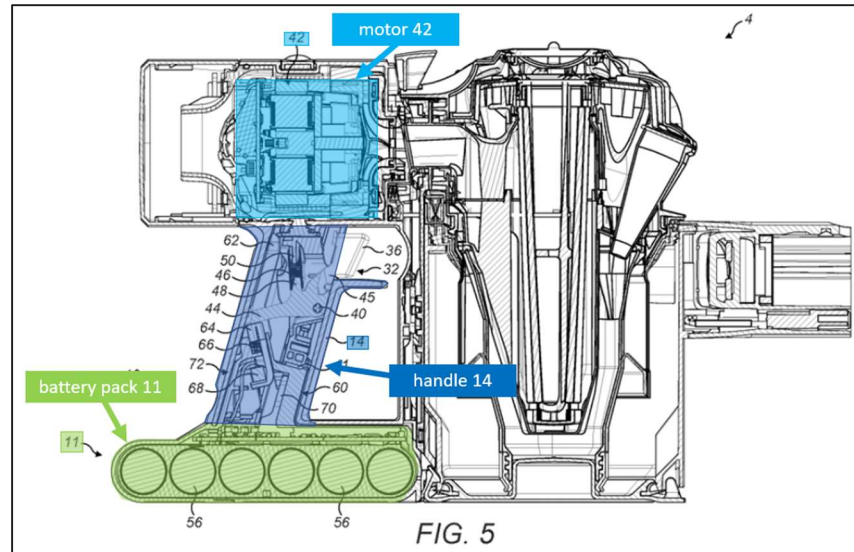
Dimbylow teaches the pistol-grip axis intersects the suction motor. Ex1002 ¶149. Dimbylow teaches the “suction generator 11 compris[es] a motor 12 and impeller 13...located **above** and towards the rear of the handle 6.” Ex1005 ¶31. “The handle 6 is arranged at an angle θ_1 with respect to the longitudinal axis X of the cyclonic separating unit 8 such that the handle 6 is in a pistol grip configuration.” *Id.* Dimbylow discloses that “[t]he cyclonic separating unit may be inclined with respect to the handle to form an angle of not less than 85 degrees and not greater than 140 degrees between the handle and the longitudinal axis of the cyclonic separating unit.” *Id.* ¶13. This range includes angles, including **an 85-degree angle**,

depicted below, resulting in Dimbylow's "**handle axis H**" intersecting Dimbylow's "**motor 12** and **impeller 13**...located above...the handle":

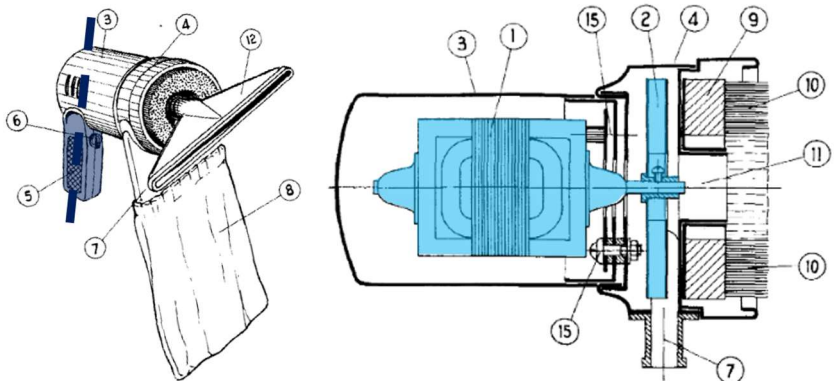
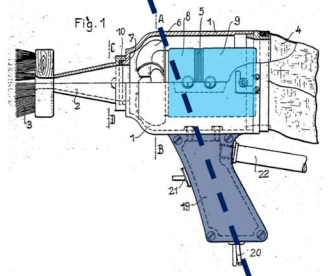
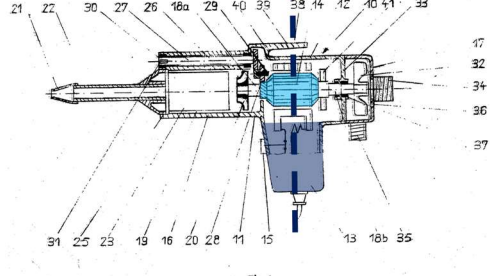
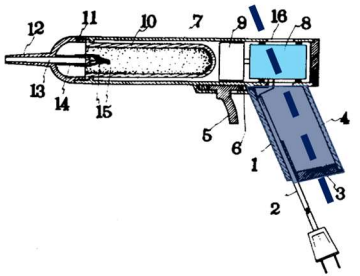
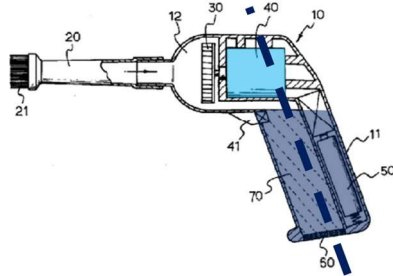
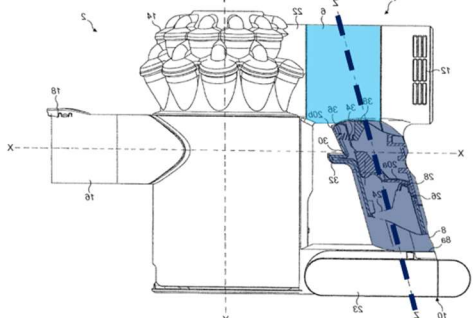


Ex1005 ¶31, Fig. 2; Ex1002 ¶149.

Alternatively, to the extent PO argues Dimbylow's hand vacuum does not disclose a pistol-grip axis intersecting the suction motor, a POSA would have been motivated by Dimbylow's disclosures to modify Dimbylow such that the pistol-grip axis intersects the suction motor. Ex1002 ¶¶150-156. A POSA would have understood locating heavy components, such as the battery and suction motor, at opposite ends of the handle can advantageously improve weight balance and useability, as was known in the art, including as taught by another Dyson patent, US10743733, filed six months before the '984Patent's earliest-claimed priority date, which teaches that "[t]he battery pack 11 and the motor and fan [42]...being positioned on the opposite ends of the handle 14 provides...particularly ergonomic weight balance":



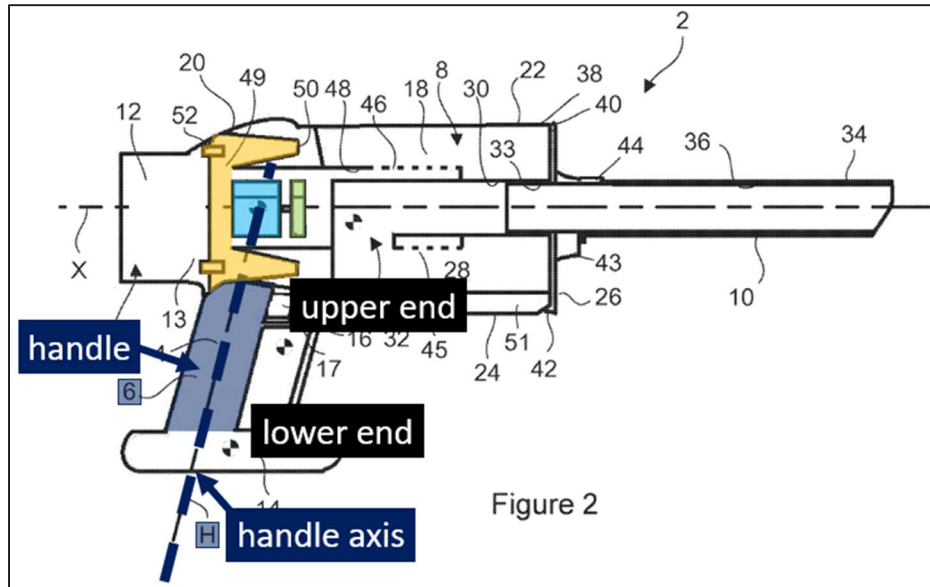
Ex1027, 8:28-32, 10:59-62, Fig. 5; Ex1002 ¶150. Thus, a POSA would have been motivated to achieve this improved weight balance by placing Dimbylow's handle directly underneath the suction motor. Ex1002 ¶151. Indeed, handvacs having **pistol-grip handles** positioned directly underneath the **suction motor** with **axes** that intersect the **suction motor** have existed for nearly 70 years:

Ex1025, page 3 (1954)	
	
Ex1029, Fig. 1 (1955)	Ex1033, Fig. 1 (1971)
	
Ex1022, Fig. 1 (1973)	Ex1031, Fig. 2 (1998)
	
Ex1017, Fig. 2 (2013)	
	

A POSA would have reasonably expected success modifying Dimbylow as described because it would have involved a straightforward relocation of

Figure 2

Further, Dimbylow depicts and teaches the “**secondary cyclonic separators** **20** are arranged in a circular array,” creating a central space into which a POSA would have understood Dimbylow’s **motor 12** and **impeller 13** could be located:



Ex1005, ¶32, Fig. 2(modified); Ex1002 ¶154. A POSA would have been motivated to modify Dimbylow as depicted above to make Dimbylow more compact and therefore more versatile, usable, and easier to store, and would have reasonably expected success doing so because it would involve a straightforward relocation of Dimbylow’s existing components. Ex1002 ¶155.

Thus, positioning Dimbylow’s pistol-grip such that the axis intersects the suction motor would have been obvious to try, particularly given Dimbylow’s teaching that different handle angles could be used; easy to implement, using nearly 70-year-old teachings; and would have yielded the predictable result of a “wieldable handheld vacuum” that “can be manipulated easily in order to clean hard-to-reach surfaces,” which is one of Dimbylow’s stated objectives. Ex1005 ¶¶8, 13, 43; Ex1002 ¶156. A POSA would have reasonably expected success based on Dimbylow’s teachings of arranging the suction motor above the pistol-grip handle

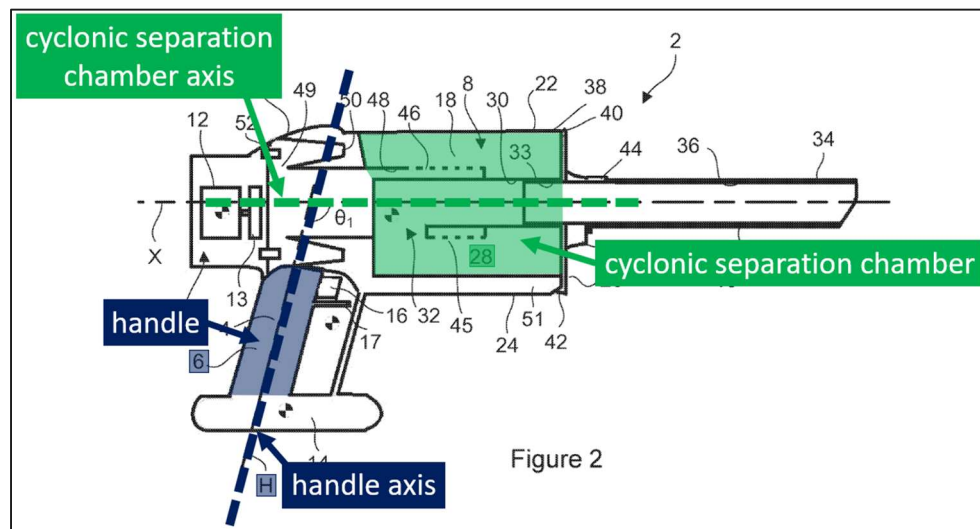
to increase maneuverability and balance, and the prior art's teachings of positioning the pistol-grip handle below the suction motor. Ex1002 ¶156; Ex1005 ¶¶31, 40.

8. [7]/[12]

Dimbylow combined with Howes renders claims 6/11 obvious and Dimbylow teaches the remaining limitations of these claims. Ex1002 ¶¶157-161.

Dimbylow teaches a pistol-grip handle with a pistol-grip axis, and a cyclone axis of rotation. Ground 1, [1c]/[10c], [6]/[11].

Dimbylow teaches the pistol-grip axis and the cyclone axis of rotation intersect within the hand vacuum cleaner. Ex1002 ¶160. Dimbylow illustrates its “**handle axis H**” and “**axis of the cyclonic separation chamber 28**” intersect within Dimbylow’s handvac:



Ex1005 ¶¶31, 33, Fig. 2; Ex1002 ¶160. Further, Dimbylow discloses “[t]he cyclonic separating unit may be inclined with respect to the handle to form an angle of not less than 85 degrees and not greater than 140 degrees between the handle and the

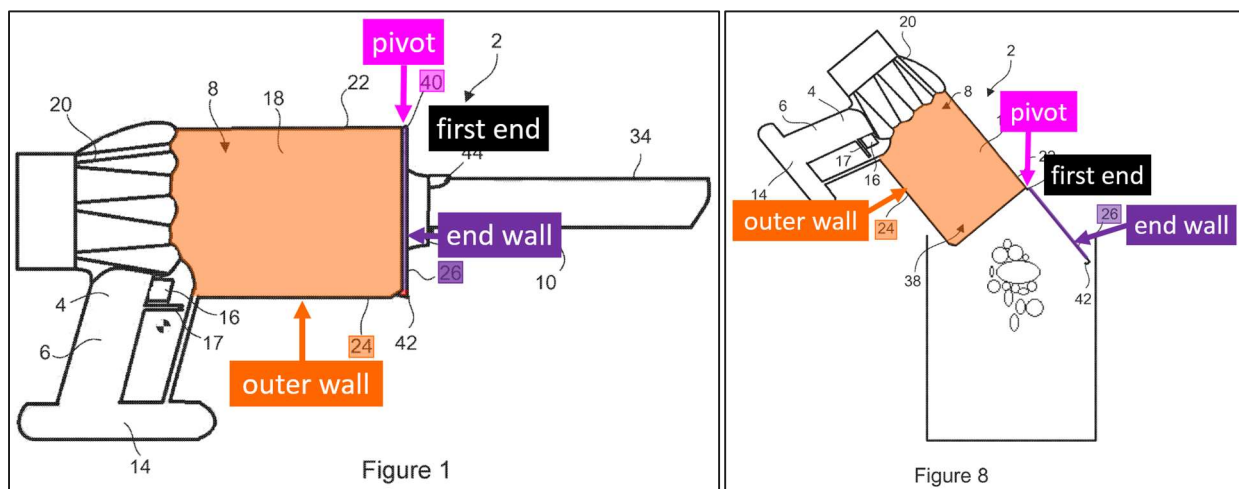
longitudinal axis of the cyclonic separating unit.” Ex1005 ¶13. A POSA would have understood those configuration angles result in the pistol-grip axis and the cyclone axis of rotation intersecting within the hand vacuum cleaner, including when modified as described in claims 6/11. Ground 1, [6]/[11]; Ex1002 ¶161.

9. [8]/[17]

Dimbylow combined with Howes renders claims 1/10 obvious and Dimbylow teaches the remaining limitations of these claims. Ex1002 ¶¶162-68.

As explained for [1c]/[10c], Dimbylow teaches a front door and a cyclone unit wall with a front end. Ground 1, [1c]/[10c].

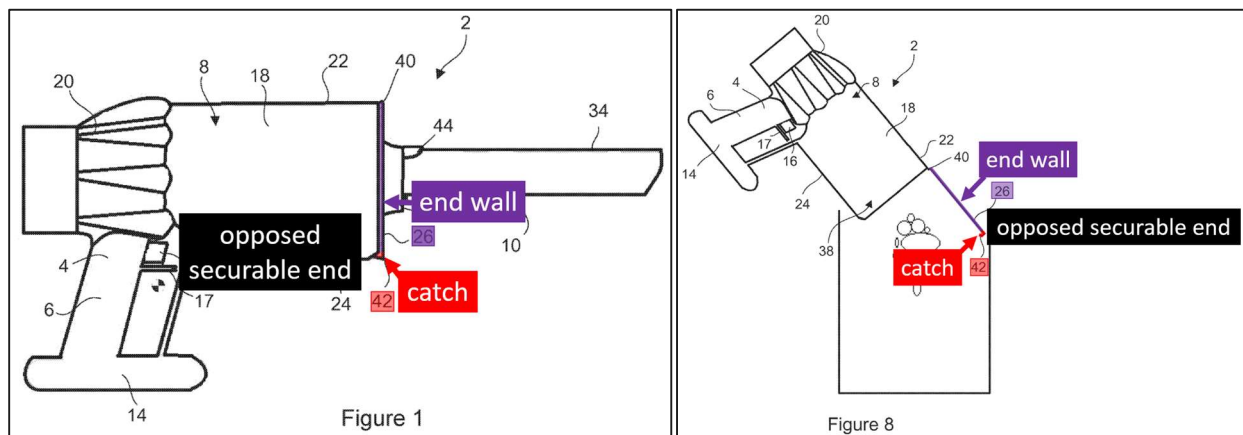
Dimbylow’s front door has a door first end which is rotatably mounted to a front end of the cyclone unit wall. Ex1002 ¶165. The **first end** of Dimbylow’s “**end wall 26** is connected to the cylindrical **outer wall 24** by a **pivot 40**”:



Ex1005 ¶37, Figs. 1, 8; Ex1002 ¶165; *see also* Ex1005 ¶37 (“The end wall 26 can be moved from the closed position...to an open position...by releasing the catch 42 and pivoting the end wall 26 away from the end of the cylindrical outer wall 24.”).

As explained for [1d]/[10e], Dimbylow teaches a door lock, and the combination of Dimbylow and Howes teaches a door lock. Ground 1, [1d]/[10e].

Dimbylow teaches an opposed securable end and the lock further comprises a latch located at an elevation of the opposed securable end. Ex1002 ¶¶167-68. The **opposed securable end** of Dimbylow’s “**end wall 26**...is held in a closed position by a user-operable **catch 42**,” which a POSA would have understood is located at an elevation of the **opposed securable end**:



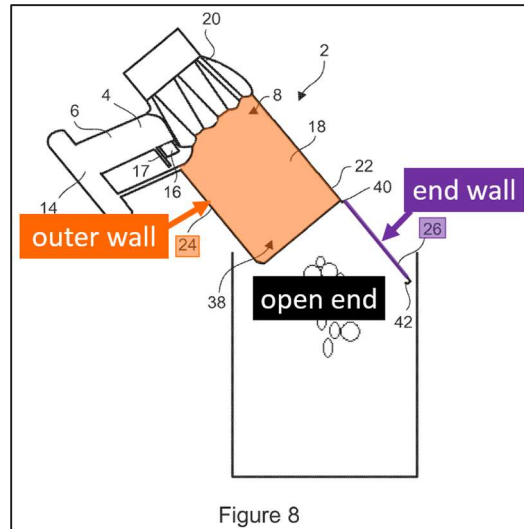
Ex1005 ¶37, Figs. 1, 8; Ex1002 ¶167. Dimbylow’s “catch 42” is a latch, including because it secures Dimbylow’s “end wall” in place when engaged. Ex1002 ¶168.

10. [9]/[18]

Dimbylow combined with Howes renders claims 1/10 obvious and Dimbylow teaches the remaining limitations of these claims. Ex1002 ¶¶169-172.

As explained for [1c]/[10c], Dimbylow teaches the cyclone unit wall terminates at an open end, and the open end is closed by a front door. Ground 1, [1c]/[10c].

Dimbylow further teaches wherein all of the open end is opened when the front door is in the open position. Ex1002 ¶172. When Dimbylow’s “**end wall 26** [is] pivoted from its closed position into its open position,” all of “**outer wall 24[’s]**” **open “end”** is opened:



Ex1005 ¶¶33, 48, Fig. 8; Ex1002 ¶172.

11. [16]

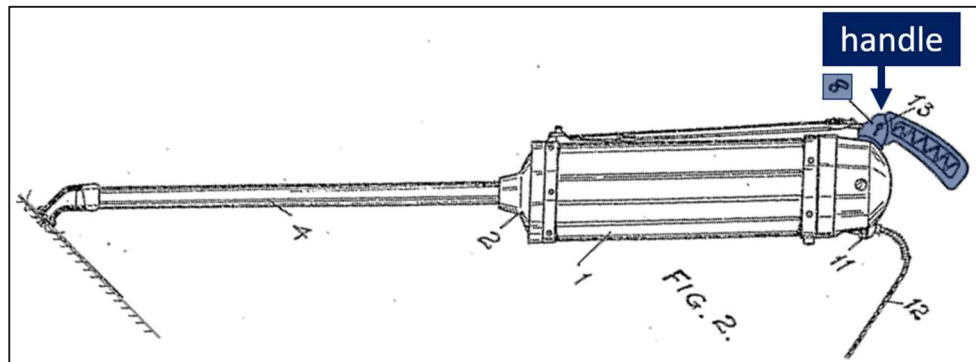
Dimbylow combined with Howes renders claim 14 and the remaining limitations of this claim obvious for the same reasons discussed for [1d]. Ground 1, [1d], [14]; Ex1002 ¶¶173-74.

B. Ground 2: IPVG in Combination with Nakai Renders Obvious Claims 1-18

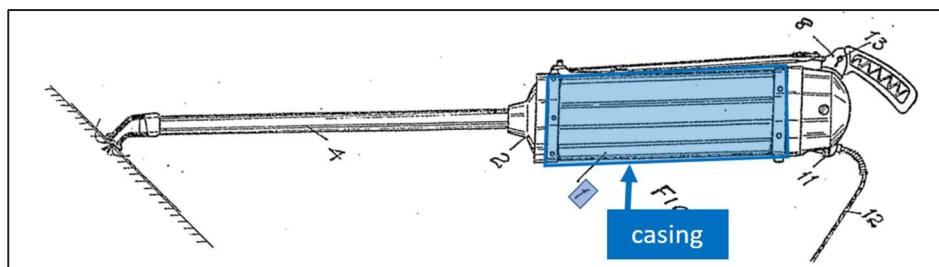
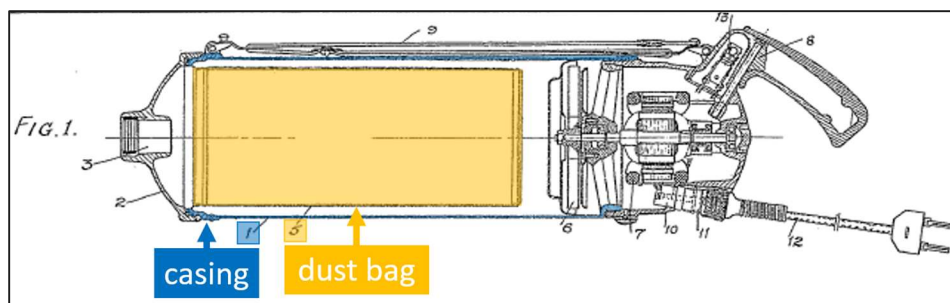
1. A POSA Would Have Combined IPVG and Nakai

a. Scope and Content of the Prior Art

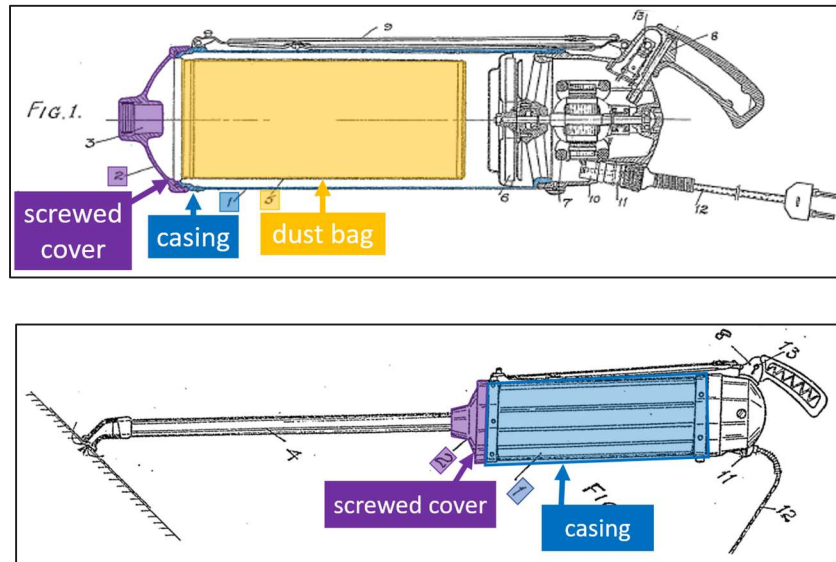
IPVG teaches a “portable dust suction apparatus” with “a **handle [8]**”:



Ex1007, 1:10-33, Fig. 2; Ex1002 ¶175. A POSA would have understood a “portable dust suction apparatus” having a handle and a configuration as illustrated is a hand vacuum. Ex1002 ¶176. IPVG’s vacuum uses “**dust bag or like member [5]**,” stored in “**casing 1**,” to filter dust:

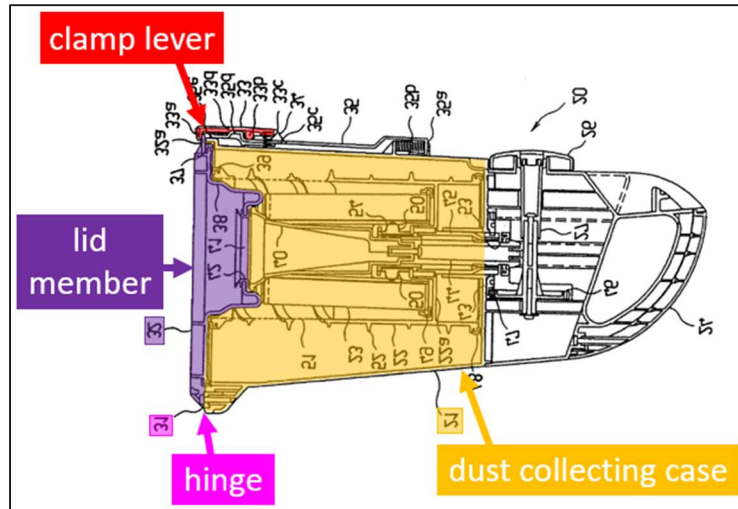


Ex1007, 1:51-57, 2:9-20, Figs. 1-2; Ex1002 ¶177. IPVG’s vacuum is emptied by removing “**screwed cover 2**” (which “close[s]” “**casing 1**...at the front end”) and removing “**dust bag 5**”:

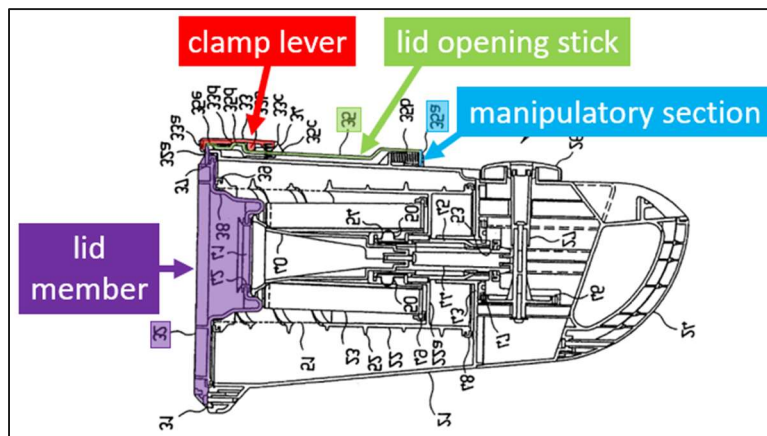


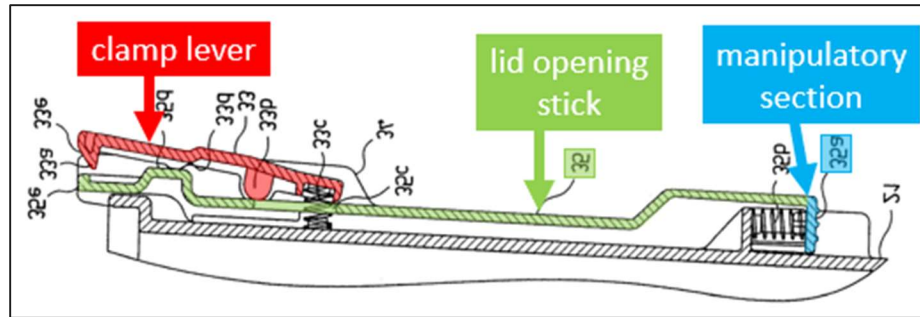
Ex1007, 1:51-57, Figs. 1-2; Ex1002 ¶178.

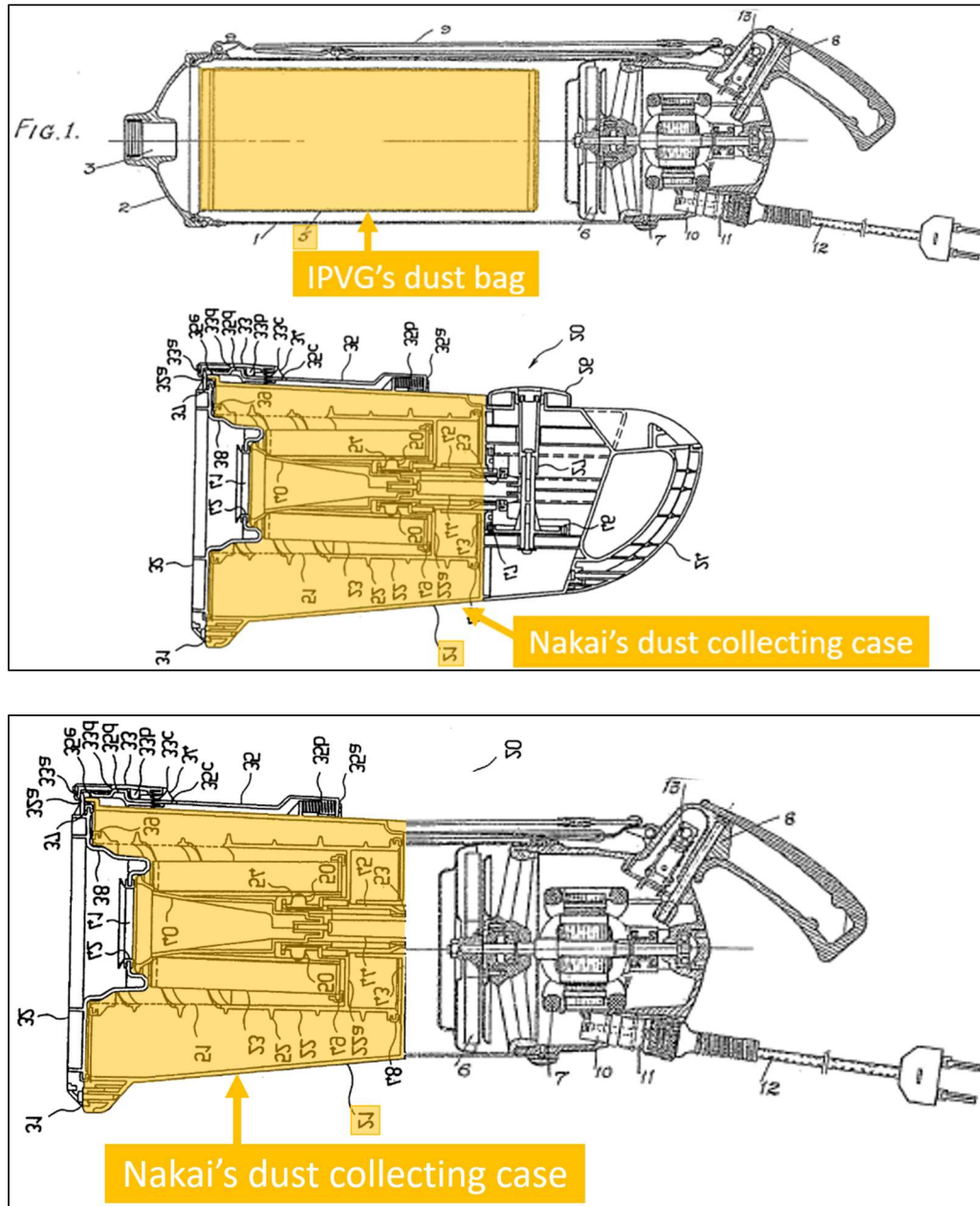
Nakai teaches a cyclonic “vacuum cleaner” with a “**dust collecting case 21**,” wherein “dust sucked together with the air from the upper suction port is forcibly whirled downward, causing the dust to be accumulated and compacted on the bottom of the **lid member 32**”:



Ex1008, Abstract, 6:24-29, Fig. 3; Ex1002 ¶179. As shown above, “**lid member 32**” is “rotatably mounted on the bottom of the **dust collecting case 21**...via a **hinge 31**,” and is “locked by hooking up the clamp hook 33a formed on the lower end of the **clamp lever 33**.” Ex1008, 4:27-34, Fig. 3; Ex1002 ¶180. To open “**lid member 32**,” the “**manipulative section 35a** of the **lid opening stick 35** is forced down,” “thereby rotating the **clamp lever 33** away from the...**lid member 32**”:

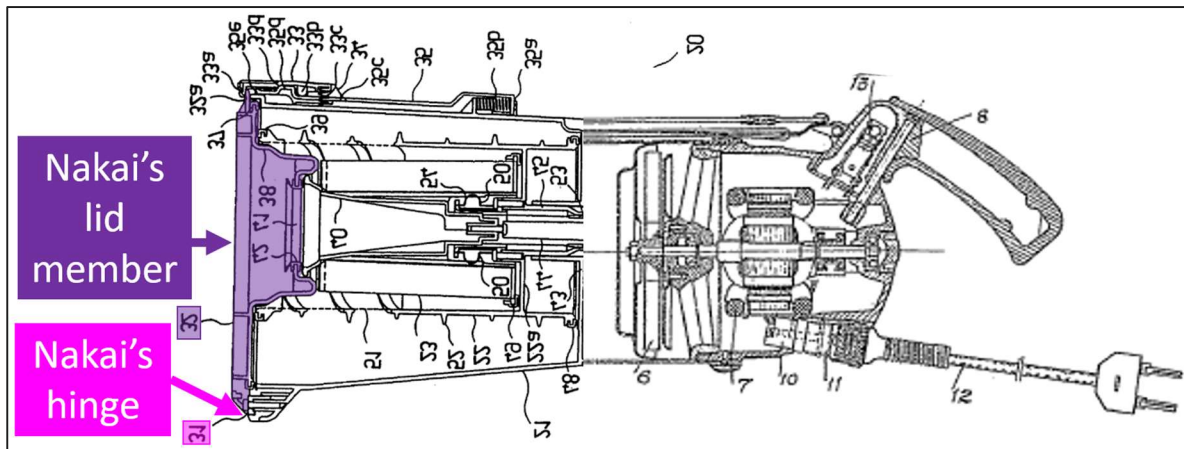
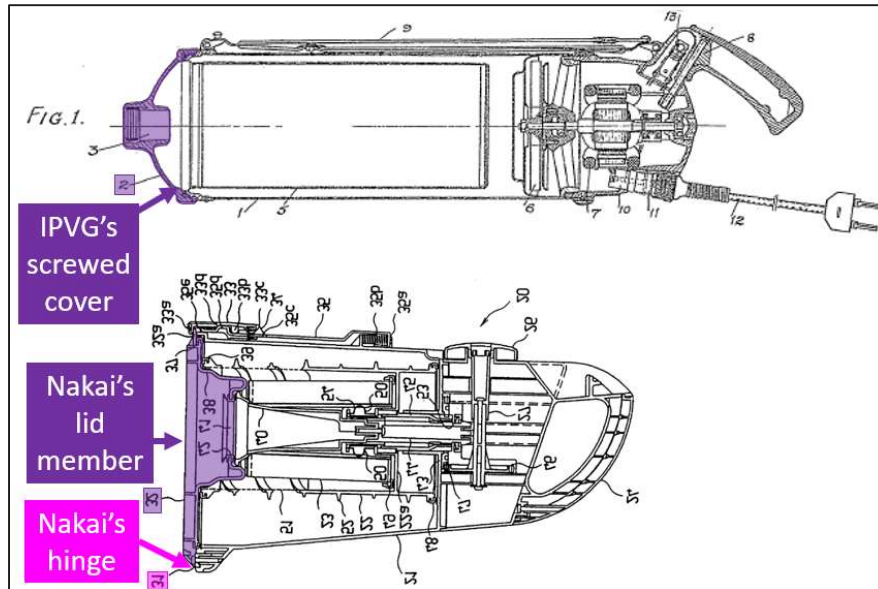




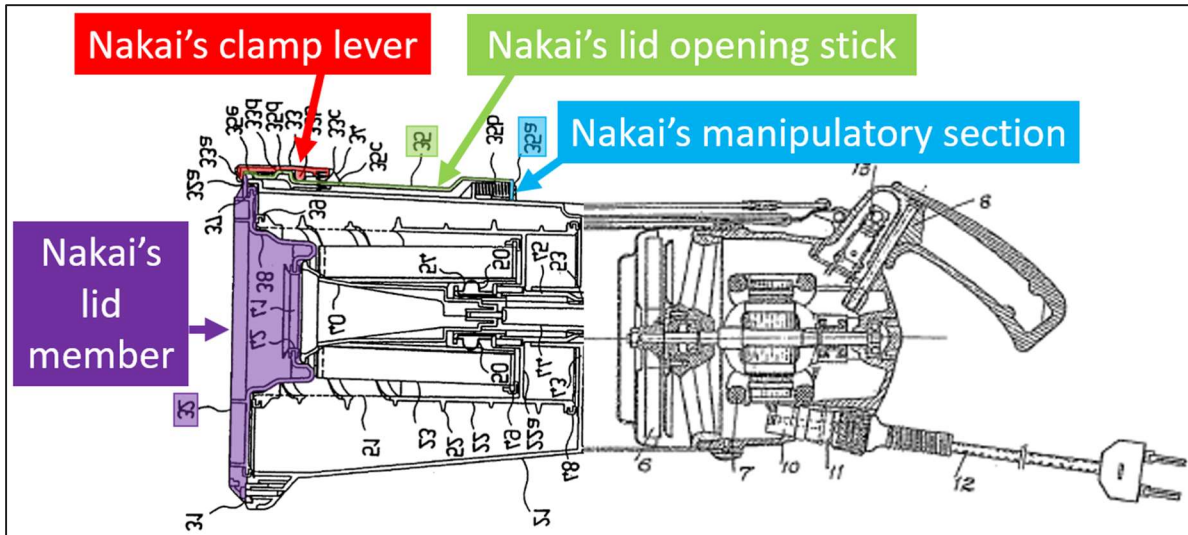


Ex1007, Fig. 1(modified); Ex1008, 4:22-26, Fig. 3(modified); Ex1002 ¶183.

A POSA would have been motivated to modify IPVG's screwed-open door ("screwed cover 2") to use a pivot-open door, such as Nakai's "lid member 32" with "hinge 31":



Ex1007, Fig. 1(modified); Ex1008, Fig. 3(modified); Ex1002 ¶184. When making this modification, a POSA would have also been motivated to modify IPVG to include Nakai's "lid opening mechanism," including "[manipulatory section 35a](#)" "[lid opening stick 35](#)," and "[clamp lever 33](#)":



Ex1007, Fig. 1(modified); Ex1008, 7:11-24, Fig. 3(modified); Ex1002 ¶185.

A POSA would have been motivated to combine IPVG and Nakai as described for multiple reasons. Ex1002 ¶¶186-190. **First**, IPVG and Nakai are analogous art. Ex1002 ¶186. Like IPVG, which teaches a vacuum cleaner with an air-filtration unit (“dust bag or like member [5]”) contained within a cylindrical chamber (“casing 1”) sealed at one end by an openable door (“casing 1 [is] closed at the front end by a screwed cover 2”), Ex1007, 1:10-12, 1:51-57, 2:9-20, Nakai teaches a vacuum cleaner with an air-filtration unit (“dust collecting case 21,” which uses “a whirlpool motion” to separate dust from air) sealed at one end by an openable door (“lid member 32”), Ex1008, 4:22-26, 6:24-29; 7:11-24; Ex1002 ¶186.

Second, Nakai and IPVG each provide motivations for this combination. IPVG teaches its air-filtration unit is “a dust bag or like member through which the suction air stream passes.” Ex1007, 1:22-33, claim 1. A POSA would have looked

for “like members” for filtering air, including a cyclonic air-filtration unit. Ex1002 ¶187. A POSA would have understood cyclonic filtration had benefits over dust-bag filtration, including: (1) no bag needs to be replaced, reducing recurring costs; (2) unlike cyclonic cleaners, dust-bag cleaners lose suction as they fill; and (3) cyclonic cleaners give the user a visual indication of how full the container is and when to empty. Ex1002 ¶187. These benefits were well-known in the art at the time the ’984Patent’s priority application was filed. Ex1002 ¶187. For example, in 1955, a French patent (“Martelliere”) taught, “[b]y application of the ‘Whirlwind’ principle,” i.e., cyclonic filtration, “the materials are deposited in the bottom of the container, after having separated from the air, before it passes through the filter screen,” which “prevent[s] clogging” and creates “stable suction,” and by using a transparent cyclonic chamber, “the user is able, when stopped, to see where the filling of the container is” and “can therefore better judge when it must be emptied.” Ex1012, 1.⁷ And a 2002 PCT Publication explained, “so-called bagless vacuum cleaners,” or “cyclonic” cleaners, “are becoming increasingly popular” because they “avoid[ed] the use of a filter bag as the primary form of separation” and thus “maintain a consistently high level of suction, even as the collecting chamber fills

⁷ Citations are by page, as the English translation does not include column or line numbers.

with dirt.” Ex1013, 1:5-10. Nakai itself teaches “conventional cyclone type separators” are known in the art, and its cyclonic air filtration system (“**dust collecting case 21**”) offers a further improvement to those conventional cyclone type separators because its whirlpool motion is so strong that its “dust” “compression rate is larger several fold,” which enables the “dust collecting unit” to “collec[t] a large amount of dust per unit volume.” Ex1008, 6:24-35. Nakai further notes its cyclonic air filtration “provides an economic advantage” in that “it can be used semipermanently without any replacement of disposable paper bag,” and “the usability of the dust collection unit is greatly improved to that of a disposable type unit.” Ex1008, 7:53-59.

Third, a POSA would have known Nakai’s hinged “lid member 32” and “lid opening mechanism” had benefits over IPVG’s “screwed cover 2,” including ease of opening for cleaner emptying, and would have been motivated to incorporate Nakai’s hinged-door and door-opening mechanism into IPVG. Ex1002 ¶188. Unlike IPVG’s emptying process, which involves a user unscrewing “screwed cover 2,” removing “dust bag 5,” and carrying the dirty dust bag to the trashcan, a POSA would have understood a cleaner having Nakai’s “lid member 32” may be emptied by simply “push[ing]” “manipulatory section 35a” “down.” Ex1008, 7:6-24. By contrast to IPVG’s “screwed cover 2,” a POSA would have understood Nakai’s “lid member 32” can empty dirt more quickly and “easily,” “thereby permitting the user

to avoid laborious and unsanitary operations of opening the lid member 32.”
Ex1008, 7:25-32; Ex1002 ¶188.

Fourth, this combination would have involved a simple substitution of known elements for others to obtain predictable results. Ex1002 ¶189. IPVG teaches a cleaner having a dust-separation unit (using a bag) with a door covering one end that opens with a screw. Ex1007, Fig. 1. Nakai teaches a dust-separation unit (using cyclonic action) with a door covering one end that opens with a hinge. Ex1008, Figs. 3, 8. A POSA would have understood the simple substitution of these styles of dust-separation units and openable doors would achieve the predictable results of filtering air and permitting one end of the dust-separation unit to be opened for emptying. Ex1002 ¶189. Further, as depicted above, IPVG and Nakai are directed to vacuums having a similar orientation of separation unit relative to the openable door. Ex1007, Fig. 1; Ex1008, Figs. 3, 8; Ex1002 ¶189.

Fifth, it would have been at least obvious to try this combination. Ex1002 ¶190. A POSA would have understood there are a finite number of identified dust separation solutions, including dust bags (as IPVG teaches) and cyclonic dust collecting cases (as Nakai teaches). Ex1002 ¶190. And, a POSA would have understood there are a finite number of identified openable-door solutions, including screwed-open doors (as IPVG teaches) and actuated, hinged-open doors (as Nakai

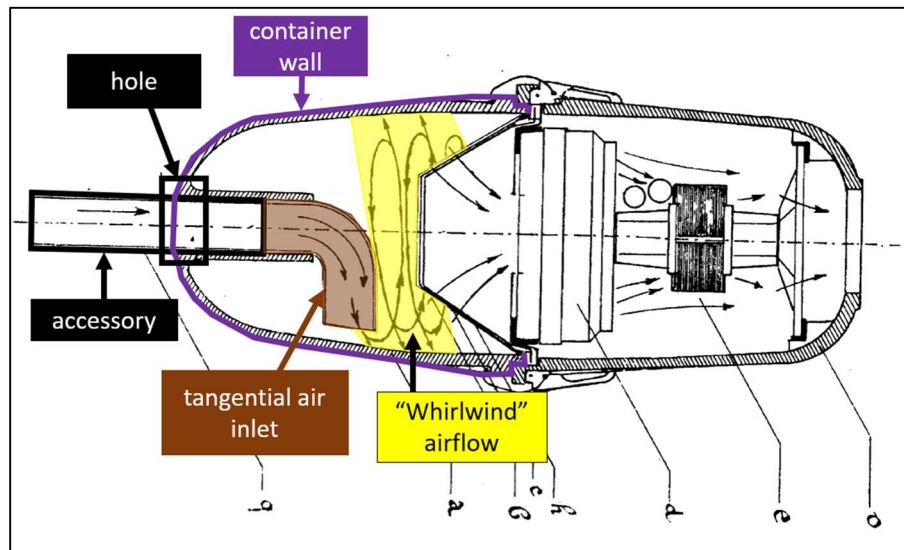
teaches), and it would have been obvious to try to achieve the known benefits described above. Ex1002 ¶190.

c. Reasonable Expectation of Success

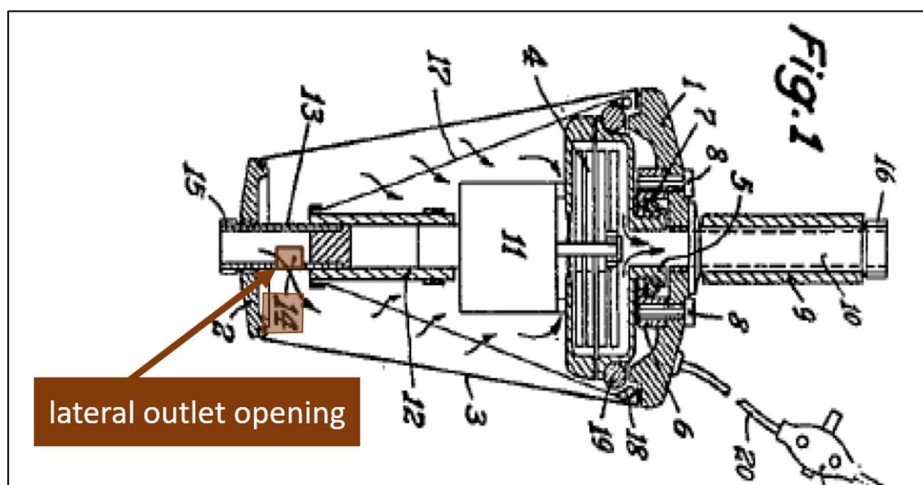
A POSA would have reasonably expected success combining IPVG's and Nakai's teachings as described. Ex1002 ¶¶191-98. A POSA would have understood these two types of dust-separation units could be used interchangeably, and these two openable doors and their locking and opening mechanisms could also be used interchangeably. Ex1002 ¶191. A POSA would have further expected success for the reasons stated above, including because such modification involves a straightforward substitution of known elements performing similar functions in similar ways, and because of the express motivations found in Nakai and IPVG to perform such substitutions. Ex1002 ¶191.

Further, a POSA would have reasonably expected success incorporating Nakai's cyclonic dust collecting case teachings into IPVG because it was well-known that front-located air inlets (such as IPVG's) create cyclonic separation by using a tangential opening. As Nakai explains, "[b]ecause the suction port of the dust collecting case 21 is offset from the center of the dust collecting case 21," i.e., tangential, "dust-containing air sucked from the suction port is set in a whirlpool motion inside the dust collecting case 21." Ex1008, 4:22-26; Ex1002 ¶192. Front-located tangential air inlets have been used for cyclonic cleaners since well before

the '984Patent. For example, Martelliere taught “**tangential[]**” **air inlet** and removable **accessory** attached thereto through a **hole** in the “detachable” front “**wall of the...container**” creating cyclonic airflow (“the ‘Whirlwind’ principle”):

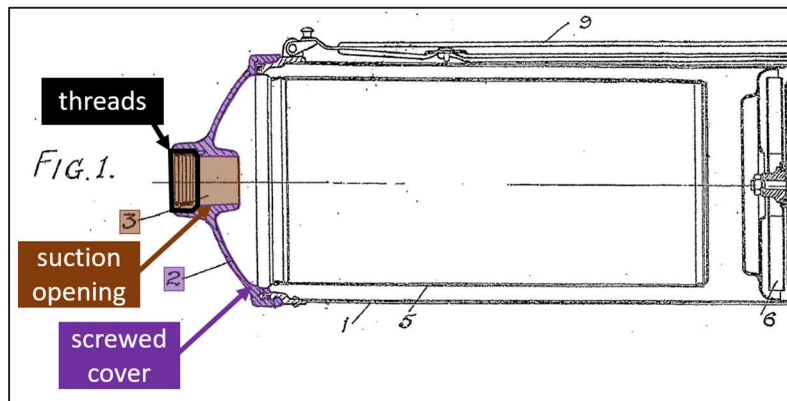


Ex1012, 1, Fig. 1; Ex1002 ¶192. Similarly, a 1938 Swiss patent disclosed a cleaner with a front-mounted accessory and air inlet, which contained “**lateral outlet opening 14**” that a POSA would have understood created cyclonic airflow:

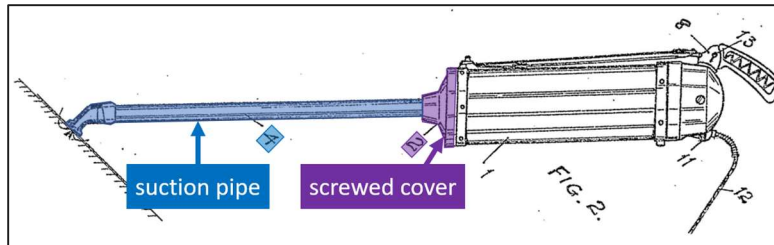


Ex1015, Fig. 1⁸; Ex1002 ¶193. A POSA would have understood the same configuration would create cyclonic airflow in the combined teachings of IPVG and Nakai by simply incorporating a tangential cyclone air inlet, such as Nakai’s “suction port [30]” (Ex1008, 4:20-26), and such a pipe would connect IPVG’s air inlet with Nakai’s tangential “suction port [30].” Ex1002 ¶194.

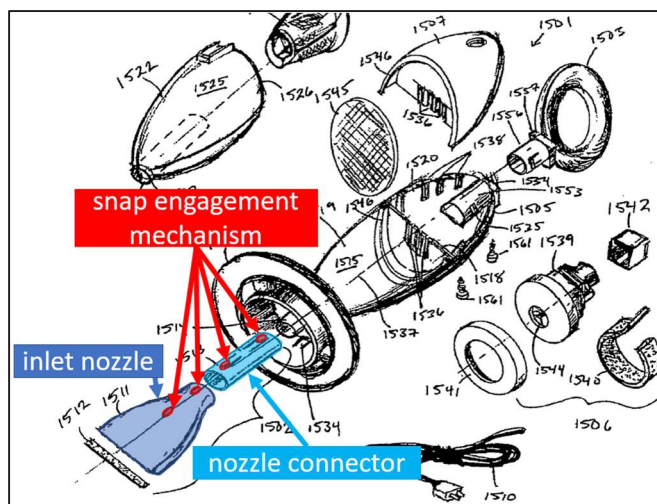
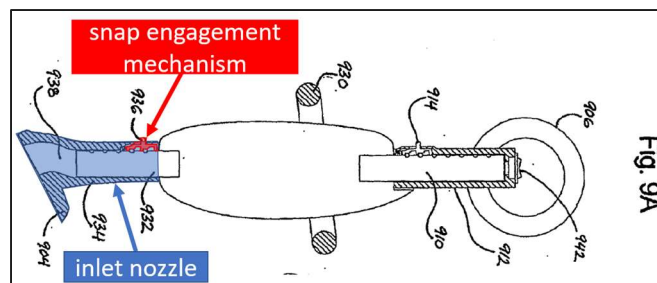
Finally, a POSA would have reasonably expected success incorporating Nakai’s hinged lid and lid opening mechanism into IPVG’s vacuum cleaner. Ex1002 ¶195. IPVG teaches a **threaded “suction opening 3”** to which “a **suction pipe 4**” with corresponding mating threads can be attached for use and detached to allow “**screwed cover 2**” to be removed for emptying the cleaner:



⁸ Citations are by page, as the English translation does not include column or line numbers.

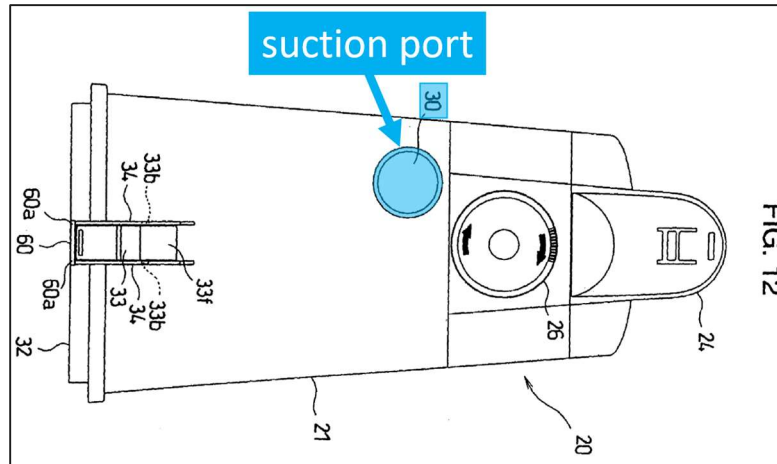


Ex1007, 1:51-57, Figs. 1-2; Ex1002 ¶195. Nakai teaches its “whirlpool motion” “dust collecting case 21” can be used with any type of “electric vacuum cleaner,” including hand vacuums, for which front-mounted accessories were common. Ex1008, 4:16-26; Ex1002 ¶196. For example, a 2007 PCT Publication teaches a cyclonic hand vacuum with removable accessories such as an “inlet nozzle” and/or “nozzle connector,” that are removably “attached to the housing...by snap engagement” for easy attachment and removal:



Ex1016, 27:12, 34:28-30, 35:8-11, Figs. 9A, 15; *see also id.*, 10:28-11:2, 37:16-18, 38:25-39:1; Ex1002 ¶196. A POSA would have understood front-mounted accessories could be detachable, as IPVG teaches, to allow Nakai's door to pivot open. Ex1002 ¶197.

A POSA would have further understood IPVG’s “suction pipe 4” could alternatively attach to a cyclone air inlet positioned on the outside of the dirt separation unit, such as Nakai’s “suction port 30”:



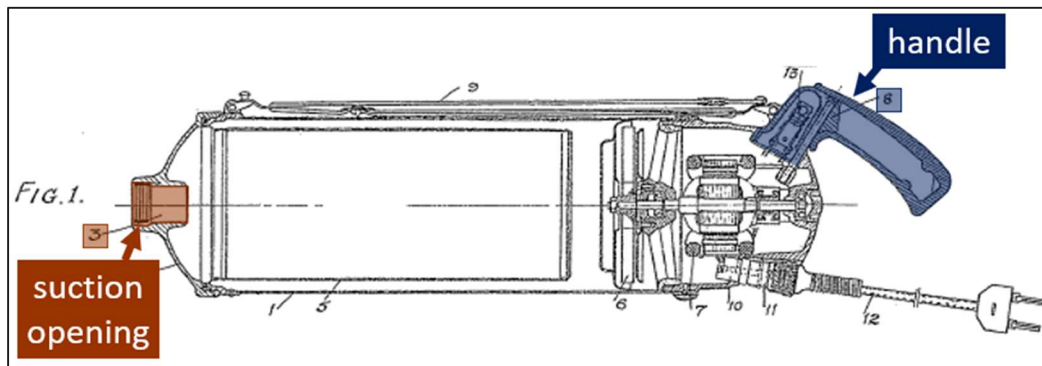
Ex1008, Fig. 12; Ex1002 ¶198.

2. $[1]/[10]$

a. [1pre]/[10pre]

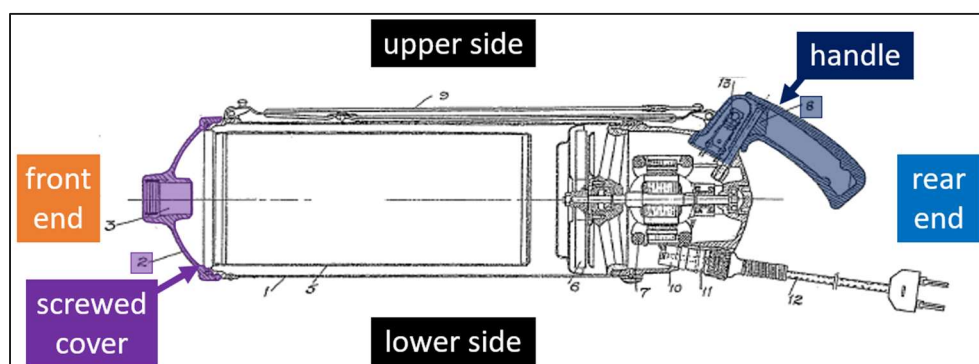
To the extent the preambles are limiting, IPVG teaches them. Ex1002 ¶¶199-202.

IPVG teaches a hand vacuum cleaner. Ex1002 ¶¶200-201. IPVG teaches a “portable dust suction apparatus” that “may be readily lifted” by a “**handle [8]**” that the operator holds with a single hand “during manipulation of the apparatus”:



Ex1007, 1:10-33, claims 1-2, Fig. 1; Ex1002 ¶200. Further, IPVG’s “**handle [8]**” and “**suction opening 3**” (dirty air inlet) are rigidly coupled and maintain a constant orientation relative to each other “during manipulation of the apparatus.” Ex1007, 1:13-21, 51-62, Fig. 1; Ex1002 ¶201. This is a hand vacuum cleaner. Ex1002 ¶201.

IPVG’s handvac has a “casing 1 closed at the **front end** by a **screwed cover 2**,” a “**handle 8**” located at the “**rear end**,” and an **upper side** opposite a **lower side**:

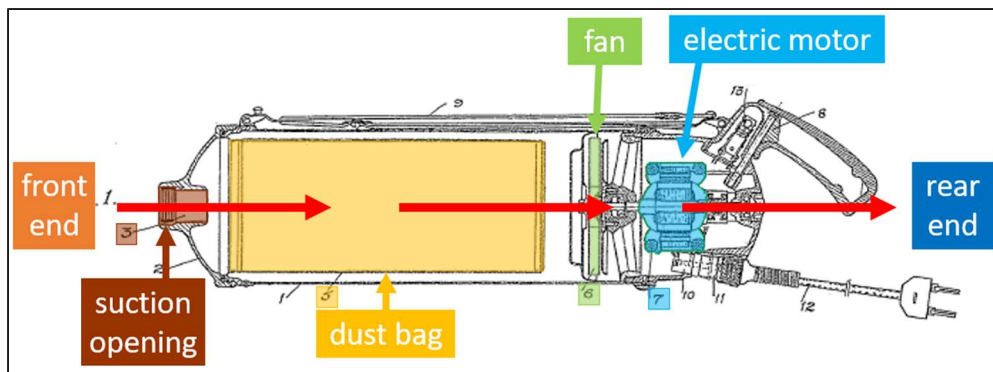


Ex1007, 1:10-12, 1:51-57, 1:92-2:2, Fig. 1; Ex1002 ¶202.

b. [1a]/[10a]

IPVG, and the combination of IPVG and Nakai, teaches these limitations. Ex1002 ¶¶203-208.

IPVG teaches an air flow passage extending from a dirty air inlet provided at the front end, to a clear air outlet provided at the rear end. Ex1002 ¶¶204-205. In IPVG, **air flows** in “**suction opening 3**,” located at the “**front end**,” through “**dust bag 5**, and a **fan 6** driven by an **electric motor 7**,” and out “the exhaust or blowing end of the casing,” which is at the “**rear**” end:



Ex1007, 1:51-62, 1:92-2:2, Fig. 1; Ex1002 ¶204; Ground 2, [1pre]/[10pre]. IPVG’s “suction opening 3” is a dirty air inlet, IPVG’s “exhaust or blowing end of the casing” is an unobstructed, clear air outlet exhausting clean and clear air, and an air flow passage extends between them. Ex1002 ¶205. Further, IPVG’s “handle” is mounted to the “exhaust or blowing end of the casing,” i.e., the rear end, and IPVG’s “fan” and “motor” are between the “exhaust or blowing end” and the “suction opening.” Ex1007, 1:51-62.

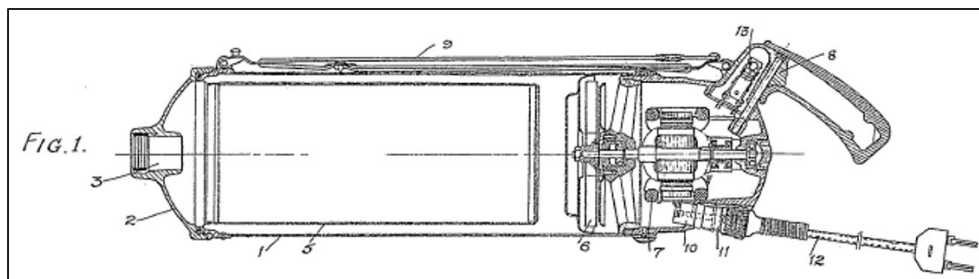
Likewise, Nakai teaches an air flow passage extending from a dirty air inlet to a clear air outlet. Ex1002 ¶¶206-207. Nakai’s cleaner has a “suction port” and undergoes cyclonic separation that cleans the air such that “only clean filtered air is passed down to the electric fan and exhausted from the outlet 58” “formed in the lower front end of the main body 1.” Ex1008, 6:9-15, 36-40, Fig. 1, claim 10.

A POSA would have been motivated to combine the teachings of IPVG and Nakai and would have reasonably expected success. Ground 2 §1. The combined teachings likewise meet these limitations because the air flows from a dirty air inlet located at the front end, such as IPVG’s “suction opening 3” (when modified to create cyclonic airflow), to a clear air outlet at the rear end, such as IPVG’s “exhaust.” Ex1002 ¶¶208.

c. [1b]/[10b]/[10d]

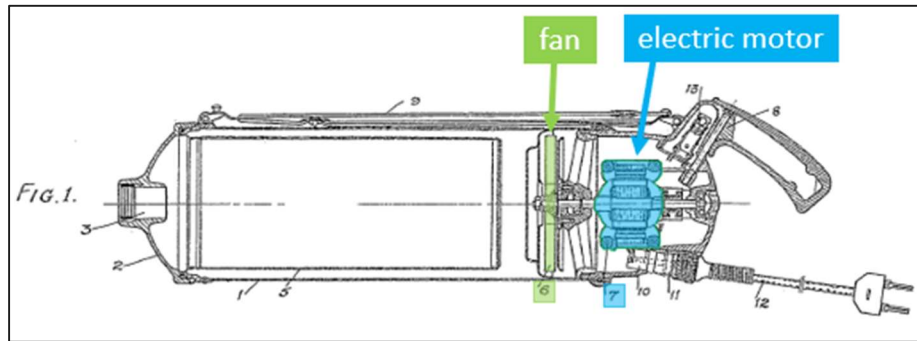
IPVG, and the combination of IPVG and Nakai, teaches these limitations. Ex1002 ¶¶209-221.

IPVG’s vacuum cleaner has a vacuum cleaner body:



Ex1007, Fig. 1; Ex1002 ¶211.

IPVG's vacuum cleaner body comprises a suction motor. Ex1002 ¶¶212-13. IPVG's “fan 6” and “electric motor 7” are positioned in IPVG's vacuum cleaner body:



Ex1007, 1:51-62, Fig. 1; Ex1002 ¶212. A POSA would have understood IPVG's “electric motor,” individually or together with its “fan,” is a suction motor. Ex1002 ¶213.

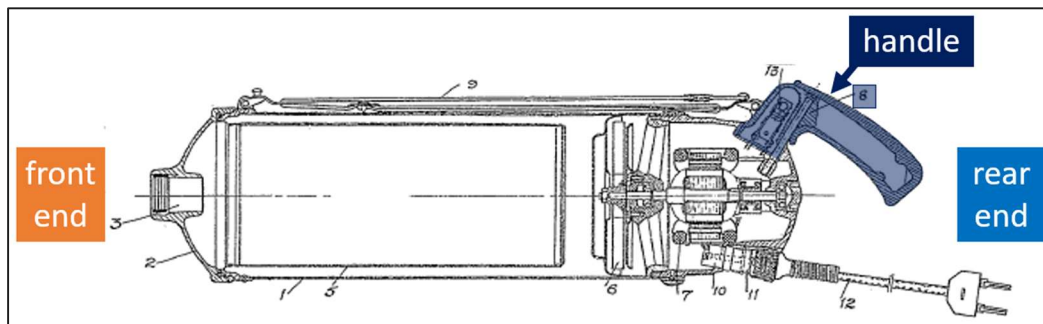
Likewise, Nakai teaches a vacuum cleaner body comprising a suction motor. Ex1002 ¶214. Nakai's “electric fan” is positioned in “main body 1.” Ex1008, 6:9-15, Fig. 1.

As explained for [1a]/[10a], IPVG's and Nakai's suction motors are positioned in the air flow passage. Ground 2, [1a]/[10a].

A POSA would have been motivated to combine the teachings of IPVG and Nakai and would have reasonably expected success, Ground 2, §1, and would have been motivated to use a suction motor positioned in the air flow passage for improved motor efficiency and reliability (by cooling the motor using the airflow) and for improved suction. Ex1002 ¶216. The combined teachings likewise meet

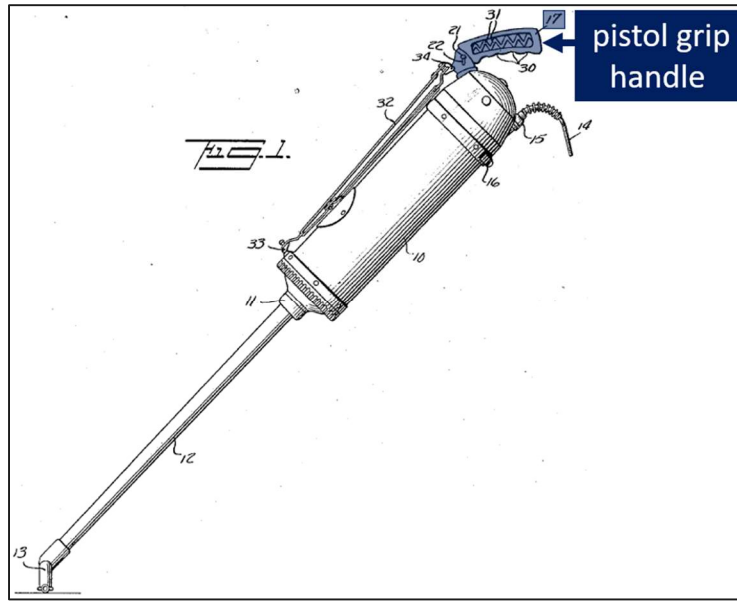
these limitations because the air flows from a dirty air inlet, such as IPVG’s “suction opening 3” (when modified to create cyclonic airflow), through a suction motor, to a clear air outlet, such as IPVG’s “exhaust.” Ex1002 ¶216.

IPVG’s cleaner body has a “**front end**,” and a “**handle 8**” located at the “**rear**” **end**:



Ex1007, 1:51-62, 1:92-2:2, Fig. 1; Ex1002 ¶217.

Regarding [10d], IPVG teaches a pistol-grip handle. Ex1002 ¶¶218-221. A POSA would understand IPVG’s “handle 8” is a pistol-grip handle. Ex1007, 1:57-62; Ex1002 ¶218. For example, in 1933, U.S. Patent No. 1,908,834 to Engberg et al. (“Engberg”) disclosed a vacuum nearly identical to IPVG with a “[**h**]andle 17 hav[ing] the general form of a pistol grip”:



Ex1019, 1:53-54, Fig. 1; Ex1002 ¶218. Likewise, various types of **pistol-grip vacuum handles** exist in the art:

Ex1020, 2:28-32("pistol grip 11"), Fig. 1 (1937)	Ex1023 ¶6("4 is a gun-type handle"), Fig. 1 (1993)
Fig. 1 of Ex1020 is a perspective view of a vacuum cleaner. It features a long, slender tube (12) extending from a motor unit (10) at the top. The motor unit has a cylindrical body with a handle (11) and a trigger switch (13) at the bottom. A flexible hose (14) is connected to the motor unit. A blue callout box with an arrow points to the handle (11) and is labeled "pistol grip handle".	Fig. 1 of Ex1023 is a perspective view of a vacuum cleaner. It features a long, slender tube (5) extending from a motor unit (1) at the bottom. The motor unit has a cylindrical body with a handle (4) and a trigger switch (3) at the top. A flexible hose (6) is connected to the motor unit. A blue callout box with an arrow points to the handle (4) and is labeled "gun-type handle".

Further, pistols with handles like IPVG's have existed for centuries:



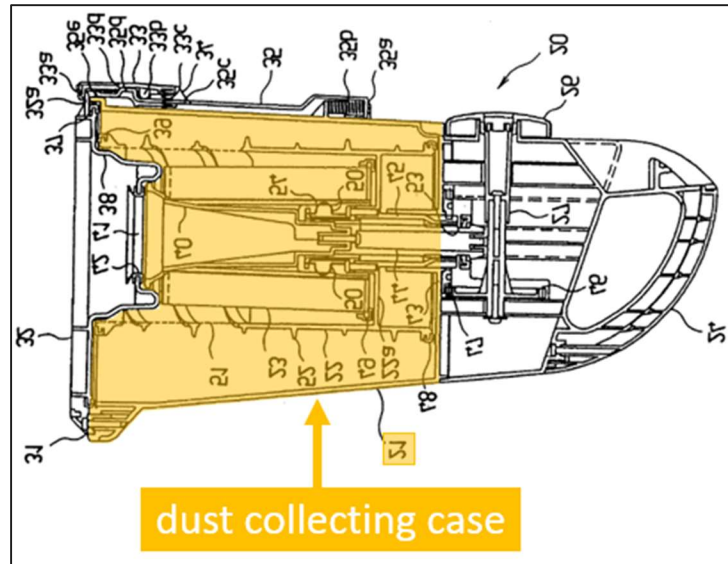
Thus, a POSA would have understood IPVG’s “handle 8” is a pistol-grip handle. Ex1002 ¶221.

d. [1c]/[10c]

IPVG combined with Nakai teaches these limitations. Ex1002 ¶¶222-235.

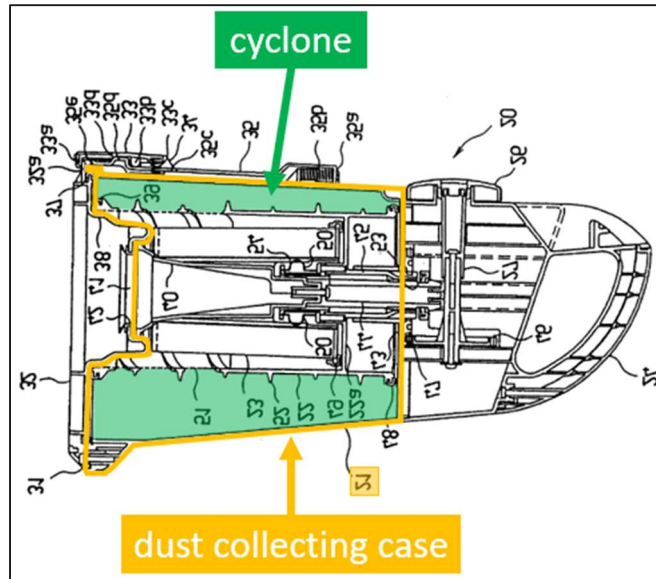
IPVG teaches a “dust bag 5” “through which the suction air stream passes,” which is an air-filtration unit positioned in the airflow passage upstream from the suction motor. Ex1007, 1:51-57, claim 1; Ex1002 ¶223; Ground 2, [1b]/[10b].

Nakai teaches a cyclone unit positioned in the air flow passage upstream from the suction motor. Ex1002 ¶¶224-26. Nakai’s “**dust collecting case 21**,” which uses “a whirlpool motion” (cyclonic separation) to separate dust from air, is located upstream of Nakai’s “electric fan”:



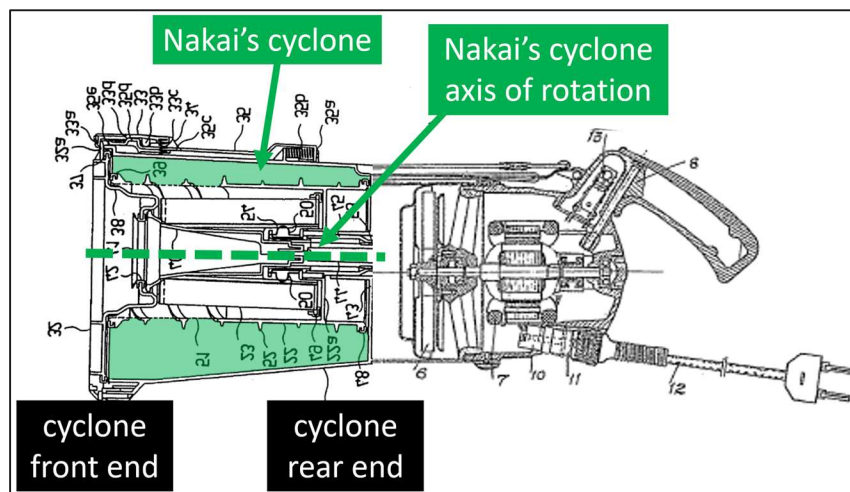
Ex1008, 4:22-26, Fig. 3; Ex1002 ¶224; Ground 2, [1b]/[10b]/[10d]. “[D]ust sucked together with the air from the upper suction port is forcibly whirled downward, causing the dust to be accumulated and compacted on the bottom...of the **dust collecting case 21**.” Ex1008, 6:24-29. A POSA would understand Nakai’s “dust collecting case 21” is a cyclone unit. Ex1002 ¶¶225-26; Ex1008, 4:16-26, 5:52-57, 6:16-23, 31-32, claim 9.

Nakai’s “**dust collecting case 21**” comprises a **cyclone** separating dust from air by “whirl[ing]”:



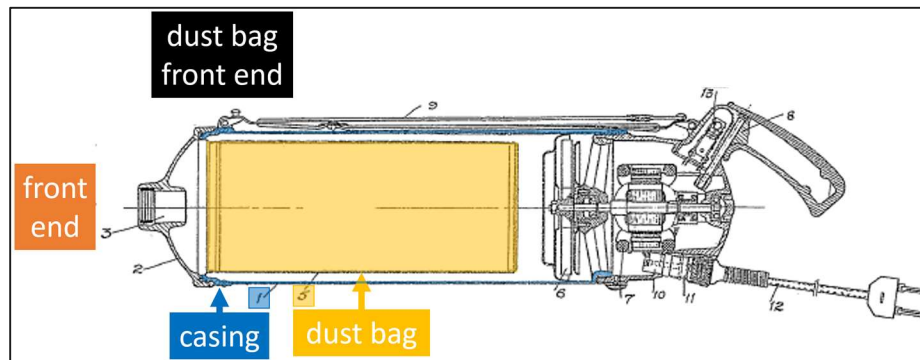
Ex1008, 6:16-35, Fig. 3; Ex1002 ¶227.

A POSA would have been motivated to combine IPVG and Nakai and would have reasonably expected success. Ground 2, §1. When Nakai’s “dust collecting case 21” (cyclone unit) comprising a **cyclone** is incorporated into IPVG’s cleaner, Nakai’s **cyclone** has its **front end** at IPVG’s “front end,” its **rear end** at the opposite end, and a **cyclone axis of rotation** extends between the front and rear ends:



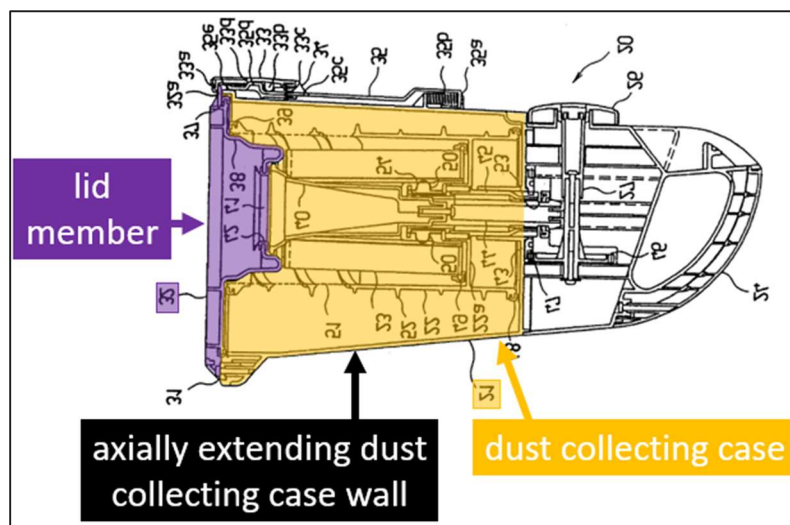
Ex1007, Fig. 1 (modified); Ex1008, Fig. 3 (modified); Ex1002 ¶228.

IPVG’s “**dust bag 5**” has an axially extending wall (“**casing 1**”) that extends to the **front end** of “**dust bag 5**,” which is located at the “**front end**” of IPVG’s cleaner:



Ex1007, Fig. 1; Ex1002 ¶229.

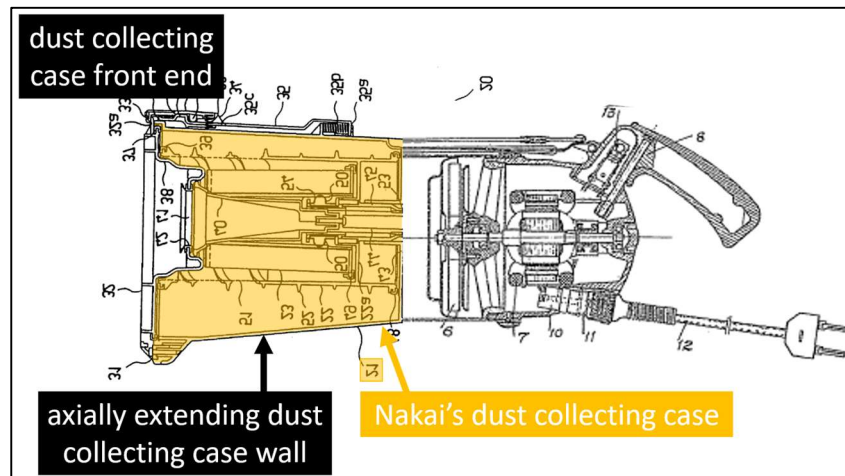
Further, Nakai’s “**dust collecting case 21**” (cyclone unit) also has an **axially extending wall** which extends to “**dust collecting case 21[s]**” “**lid member 32**”:



Ex1008, Fig. 3; Ex1002 ¶230.

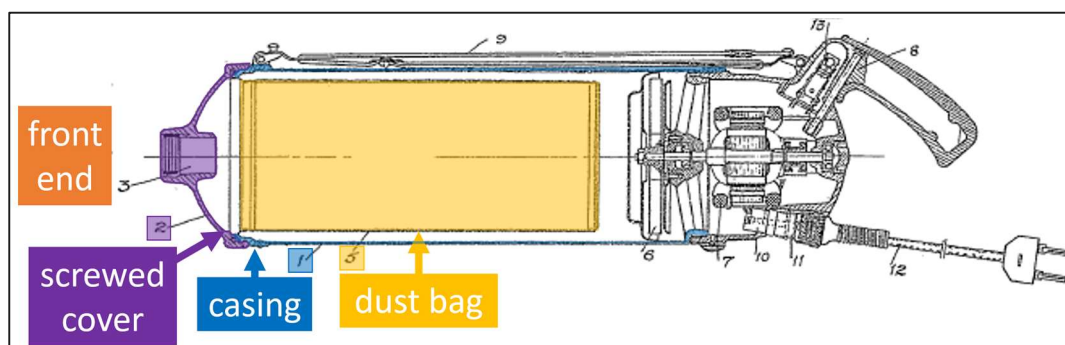
A POSA would have been motivated to combine IPVG and Nakai and would have reasonably expected success. Ground 2, §1. When Nakai’s “**dust collecting**

case 21” is incorporated into IPVG’s cleaner, Nakai’s “**dust collecting case 21**” comprises an **axially extending dust collecting case wall** which extends to the **front end** of the “**dust collecting case 21**,” which is at the “front end” of IPVG’s cleaner:



Ex1007, Fig. 1 (modified); Ex1008, Fig. 3 (modified); Ex1002 ¶231.

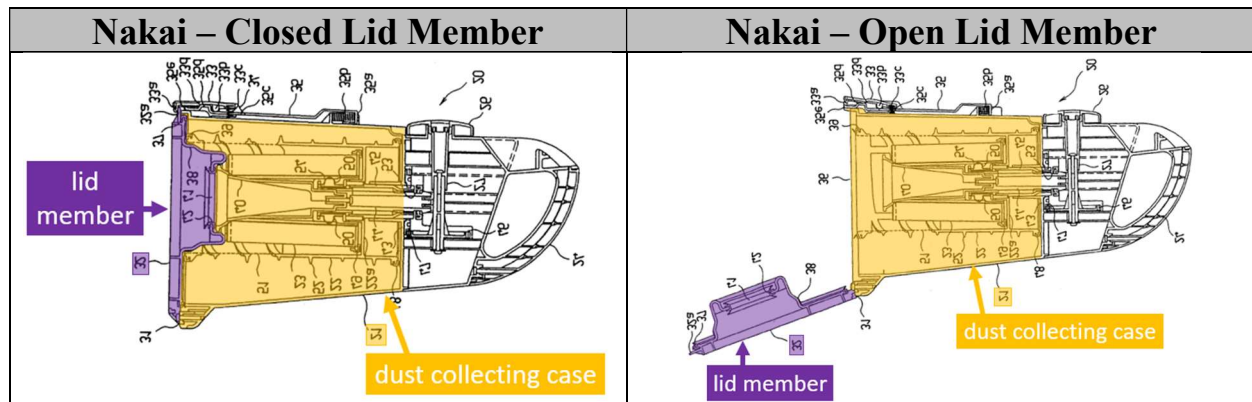
IPVG teaches the front end of the air filtration unit comprises a front door that is moveable between a closed position and an open position. Ex1002 ¶232. A POSA would have understood IPVG’s “**screwed cover 2**” is a front door at the front end of IPVG’s “**dust bag 5**” because it “close[s]” “**casing 1**...at the **front end**” and it is opened by removing the “screw[s]” to empty IPVG’s “**dust bag 5**”:



Ex1007, 1:51-62, Fig. 1; Ex1002 ¶¶232.

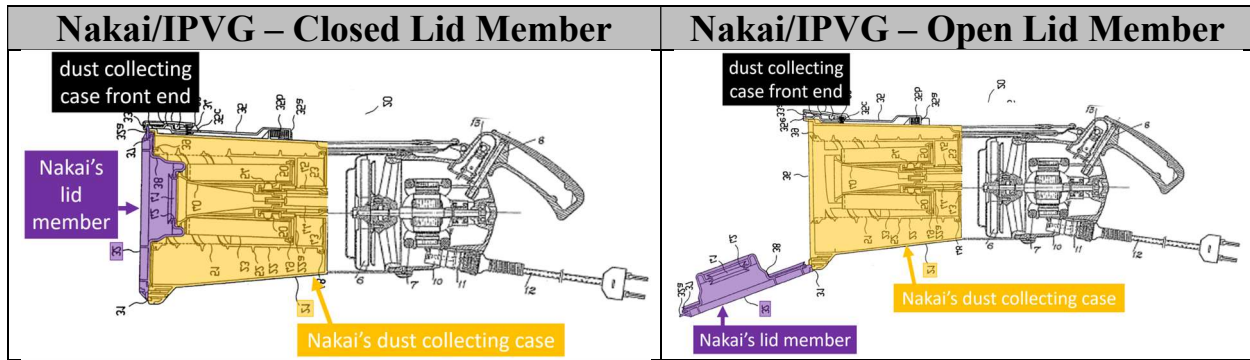
Likewise, Nakai teaches the end of the cyclone unit comprising a door that is moveable between a closed position and an open position. Ex1002 ¶¶233-34.

Nakai’s “**dust collecting case 21**” comprises “**lid member 32**” “that can be opened” and “closed”:



Ex1008, Abstract, Figs. 3, 8, 4:27-34, 7:11-24; Ex1002 ¶¶233-34.

A POSA would have been motivated to combine IPVG and Nakai and would have reasonably expected success. Ground 2, §1. When Nakai’s openable door is incorporated into IPVG’s cleaner, Nakai’s “**dust collecting case 21[’s]**” **front end** (cyclone unit front end) comprises “**lid member 32**” (front door) “that can be opened” and “closed”:



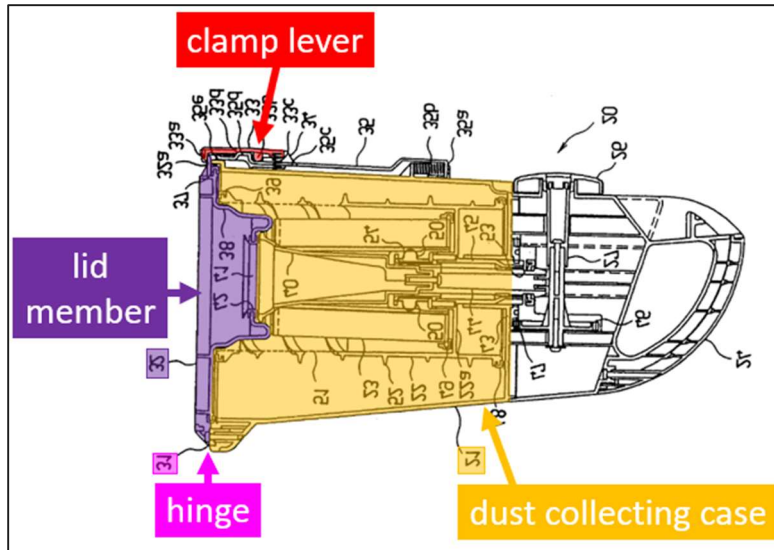
Ex1007, Fig. 1(modified); Ex1008, Abstract, Figs. 3(modified), 8(modified); Ex1002 ¶235.

e. [1d]/[10e]

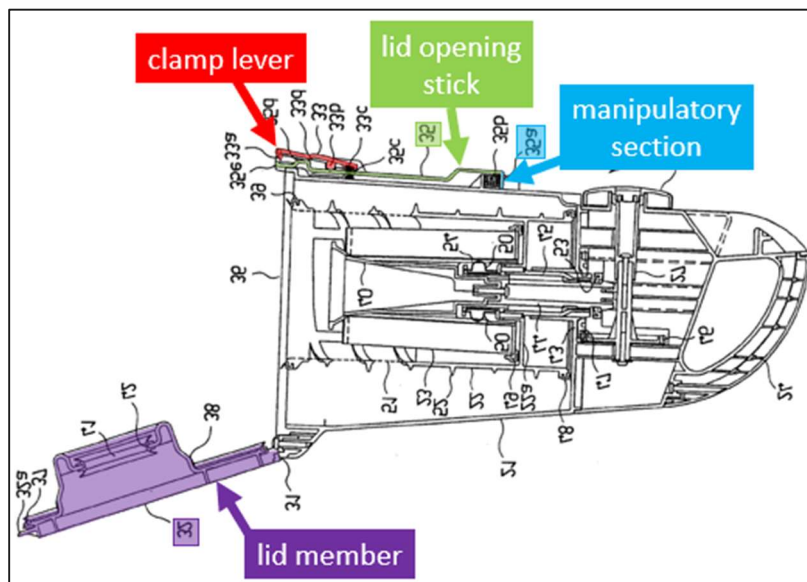
IPVG combined with Nakai renders these limitations obvious. Ex1002 ¶¶236-244.

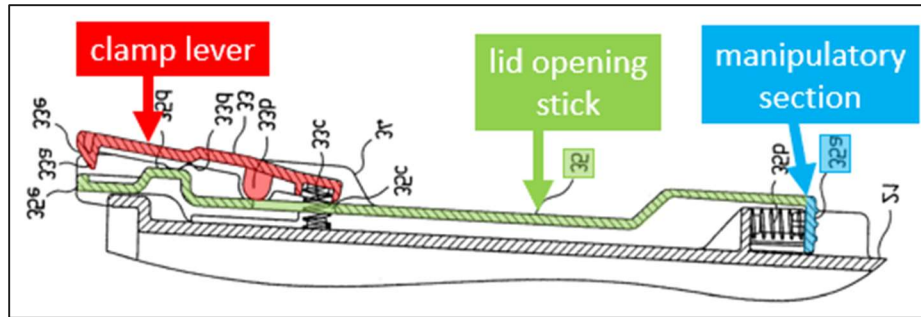
IPVG teaches a lock securing the front door in the closed position. Ex1002 ¶238. As explained for [1c]/[10c], IPVG’s “screw[ed] cover 2” is held in the closed position by “screw[s].” Ground 2, [1c]/[10c]. A POSA would understand IPVG’s “screw[s]” comprise a door lock, because inserting the screws locks the “screw[ed] cover 2” shut. Ex1002 ¶238.

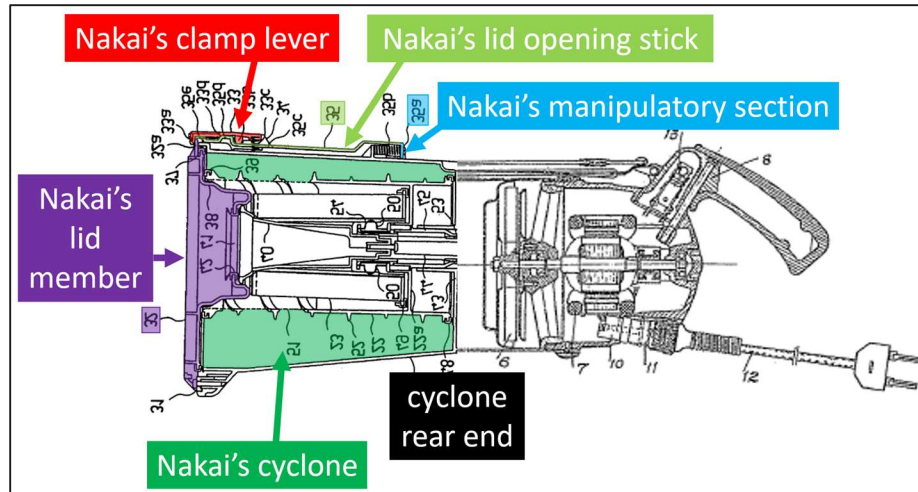
Likewise, Nakai teaches a lock securing the door in the closed position, the lock comprising an actuator. Ex1002 ¶¶239-242. Nakai’s “lid member 32” is “rotatably mounted on the bottom of the dust collecting case 21...via a hinge 31,” and is “locked by hooking up the clamp hook 33a formed on the lower end of the clamp lever 33”:



Ex1008, 4:27-34, Fig. 3; Ex1002 ¶239. To open “lid member 32,” the “manipulatory section 35a of the lid opening stick 35 is forced down,” “thereby rotating the clamp lever 33 away from the...lid member 32”:

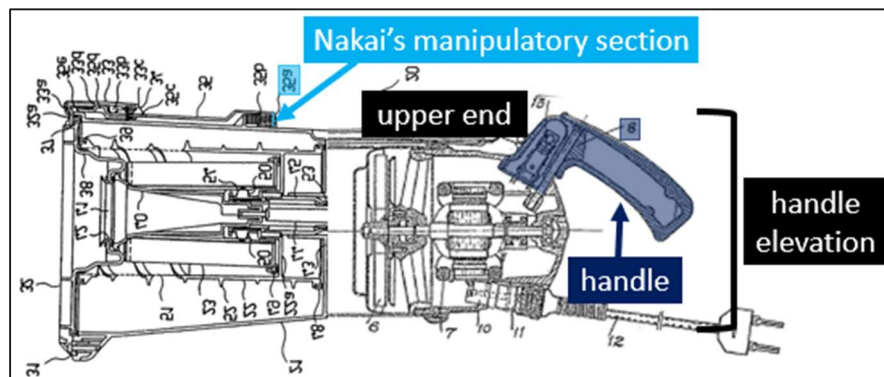






Ex1007, Fig. 1(modified); Ex1008, Fig. 3(modified); Ex1002 ¶243.

Regarding [10d], when Nakai's door and door locking mechanism are incorporated into IPVG's cleaner, Nakai's "**manipulatory section 35a**" is also located at an **elevation** of an **upper end** of IPVG's "**handle 8**" (pistol-grip handle) and forward of "**handle 8**":



Ex1007, Fig. 1(modified); Ex1008, Fig. 3(modified); Ex1002 ¶244.

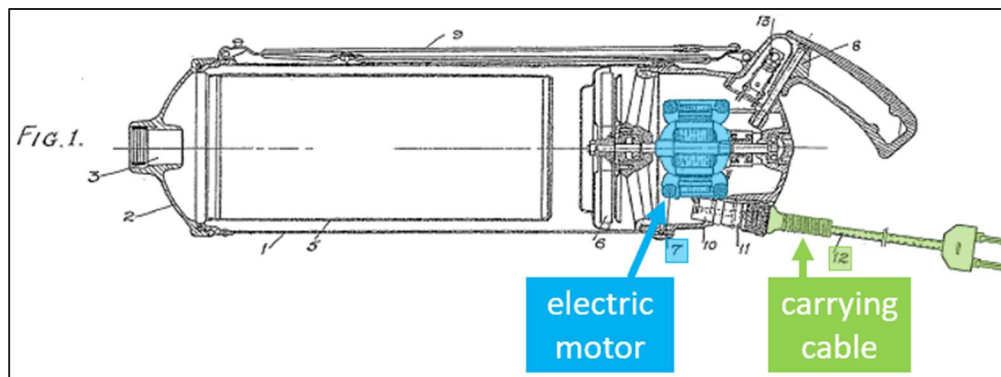
3. [2]

IPVG combined with Nakai renders claim 1 and the remaining limitations of this claim obvious for the same reasons discussed for [1d]/[10d]/[10e]. Ground 2, [1d]/[10d]/[10e]; Ex1002 ¶¶245-46.

4. [3]/[13]

IPVG combined with Nakai renders claims 2/10 and the remaining limitations of these claims obvious. Ex1002 ¶¶247-254.

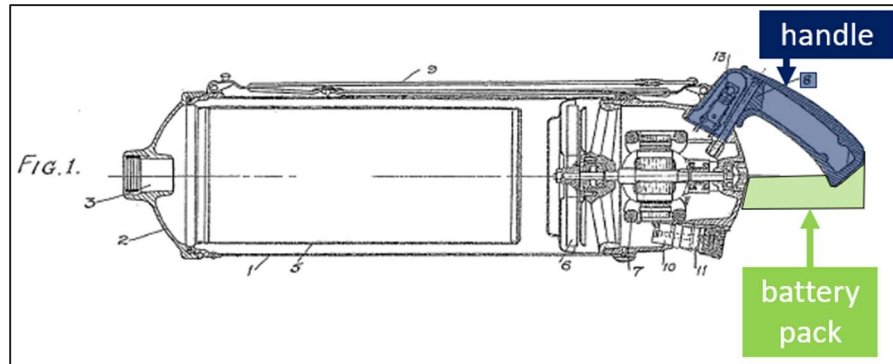
IPVG renders obvious a battery pack. Ex1002 ¶¶249-251. IPVG teaches “a **current carrying cable 12**” that plugs into a wall to provide power to “**electric motor 7**”:



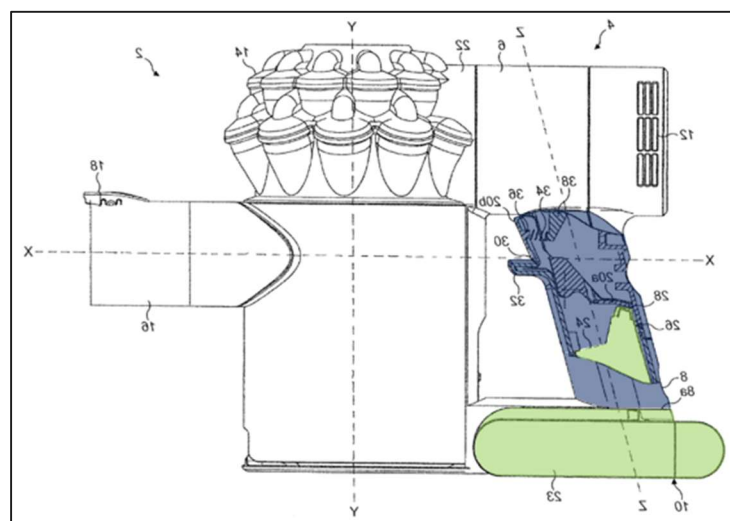
Ex1007, 1:51-57, 1:63-67, Fig. 1; Ex1002 ¶249.

A POSA would have been motivated to modify IPVG to power “electric motor 7” with a battery pack rather than “carrying cable 12.” Ex1002 ¶250-51. IPVG teaches a “portable dust suction apparatus” that “may be readily lifted during operation.” Ex1007, 1:10-12, 1:22-33. A POSA would have therefore looked for

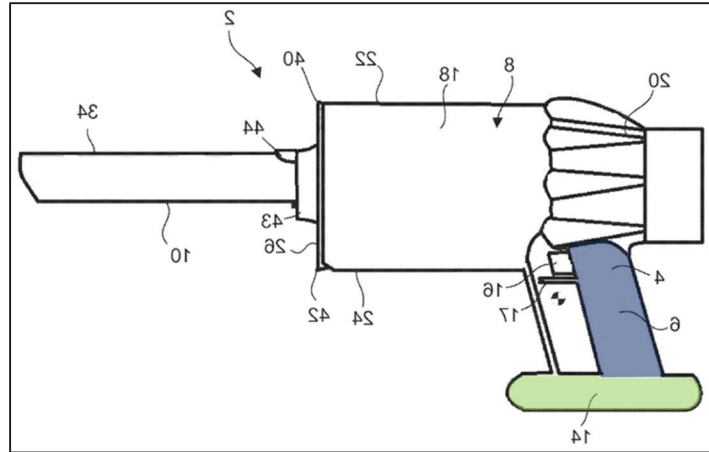
alternative ways to power IPVG's electric motor to increase “portab[ility]” and maneuverability, including using a battery pack, as was commonly known in the art. Ex1002 ¶250; Ex1017, 1:6-7, 1:15-16 (“[I]n order to provide portability, it is common for handheld vacuum cleaners and stick-vacs to be cordless whereby power is supplied to such devices by way of a battery pack.”). Further, a POSA would have been motivated to implement the **battery pack** at the base of IPVG's pistol-grip “**handle 8**,” as was commonly known in the art:



Ex1007, Fig. 1(modified); Ex1002 ¶250.



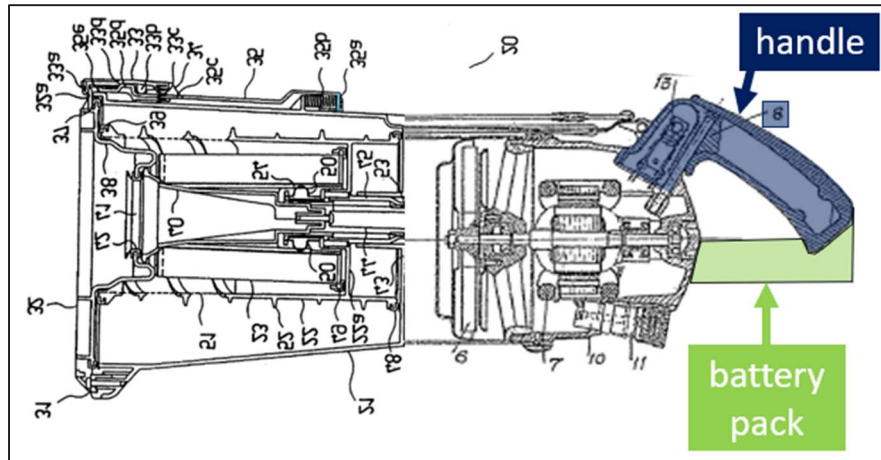
Ex1017, 5:18, Fig. 2; Ex1002 ¶250.



Ex1005, ¶31, Fig. 1; Ex1002 ¶250.

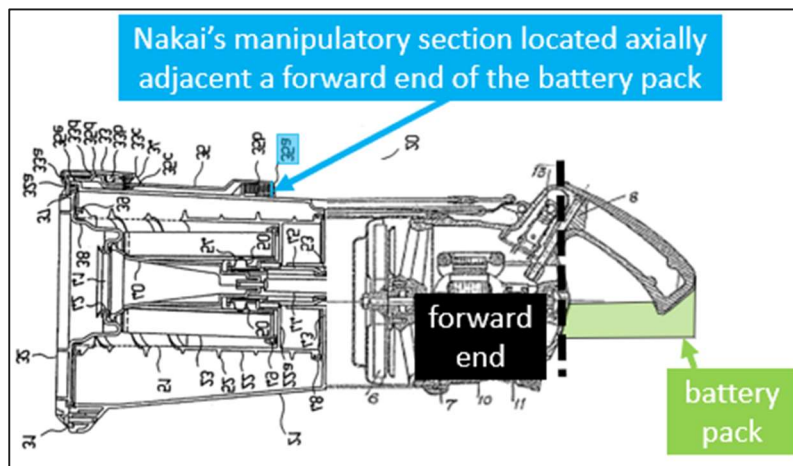
Implementing a battery back into IPVG, as shown above, would have been obvious to try, easy to implement using known techniques, and would have yielded the predictable result of increased vacuum “portab[ility],” which is one of IPVG’s objectives. Ex1007, 1:10-12, 1:22-33, claim 1; Ex1002 ¶251. A POSA would have further understood this was one of a finite number of identified locations for the battery pack, and it would have been the most convenient location because it would place the center of gravity below IPVG’s pistol-grip handle, thereby reducing strain on the user’s wrist. Ex1002 ¶251.

A POSA would have been motivated to combine IPVG and Nakai and would have reasonably expected success. Ground 2, §1. The combined teachings likewise meet these limitations:

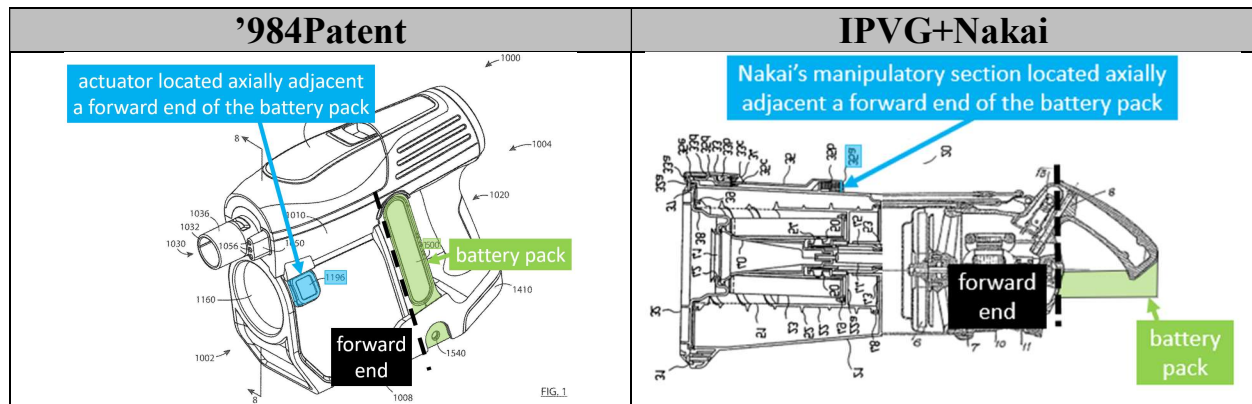


Ex1007, Fig. 1(modified); Ex1008, Fig. 3(modified); Ex1002 ¶252.

Further, when Nakai’s door and door locking mechanism are incorporated into IPVG’s cleaner, Nakai’s “**manipulatory section 35a**” (actuator) is axially located adjacent a **forward end** of the **battery pack**:



Ex1007, Fig. 1(modified); Ex1008, Fig. 3(modified); Ex1002 ¶253. A POSA would have understood the left-most end of IPVG’s battery pack is the forward end. Ex1002 ¶254. Further, this is at least as much disclosure of these limitations as the ’984Patent:

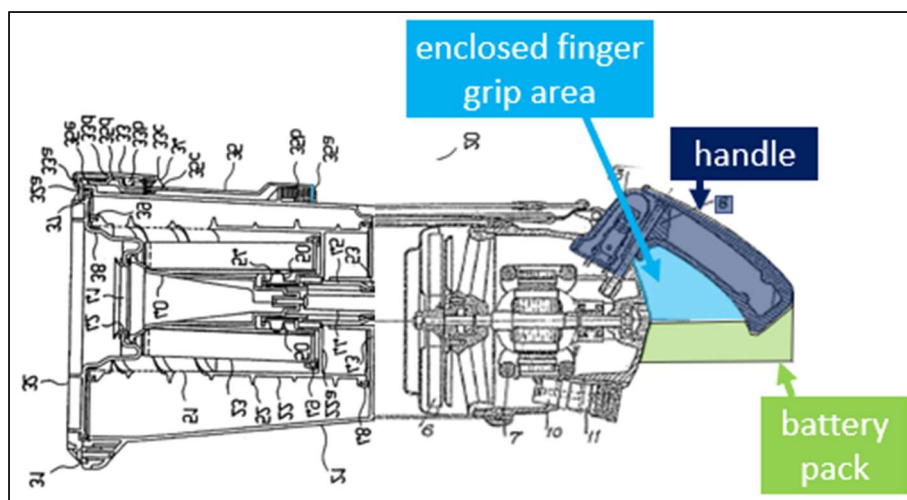


Ex1001, Fig. 1; Ex1007, Fig. 1(modified); Ex1008, Fig. 3(modified); Ex1002 ¶254.

5. [4]/[14]

IPVG combined with Nakai renders claims 3/13 and the remaining limitations of these claims obvious. Ex1002 ¶¶255-58.

IPVG renders obvious a battery pack. Ground 2, [3]/[13]. When the **battery pack** is mounted to IPVG's "**handle 8**" and the "exhaust or blowing end of the casing," the handvac comprises an **enclosed finger grip area**:



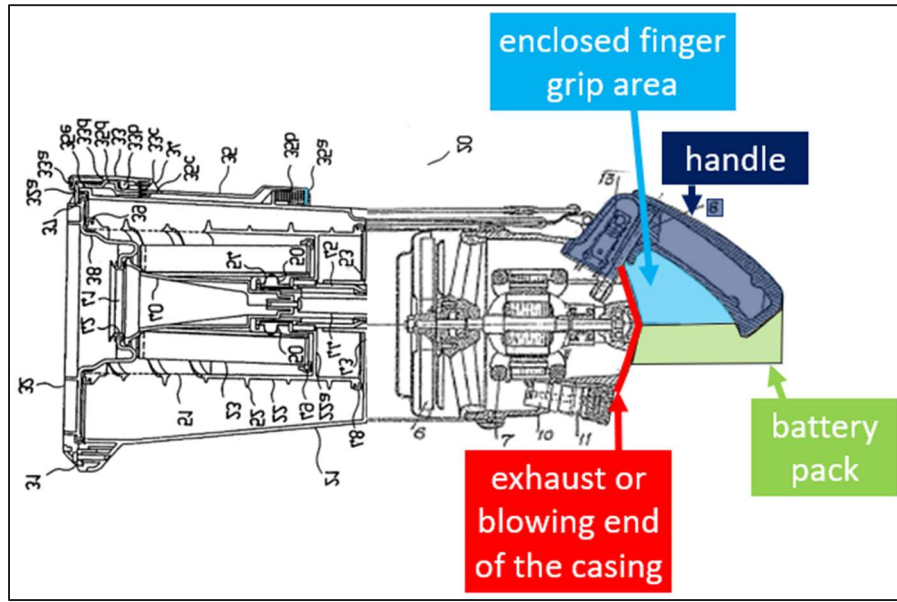
Ex1007, 1:51-62, Fig. 1(modified); Ex1008, Fig. 3(modified); Ex1002 ¶257. When the user grabs IPVG’s “**handle 8**,” their fingers wrap into IPVG’s **enclosed finger grip area**. Ex1002 ¶258.

6. [5]/[15]

IPVG combined with Nakai renders claims 4/14 and the remaining limitations of these claims obvious. Ex1002 ¶¶259-263.

IPVG renders obvious a battery pack and an enclosed finger grip area. Ground 2, [3]/[13], [4]/[14].

IPVG renders obvious a battery pack mount forms part of the enclosed finger grip area. Ex1002 ¶262. A POSA would have understood when a **battery pack** is implemented into IPVG’s handvac, it is mounted to IPVG’s “**handle 8**” and the “**exhaust or blowing end of the casing**.” Ex1007, 1:51-62; Ex1002 ¶262. As such, a POSA would have understood both IPVG’s “**handle 8**” and “**exhaust or blowing end of the casing**” are part of a battery pack mount, and both form part of the **enclosed finger grip area**:



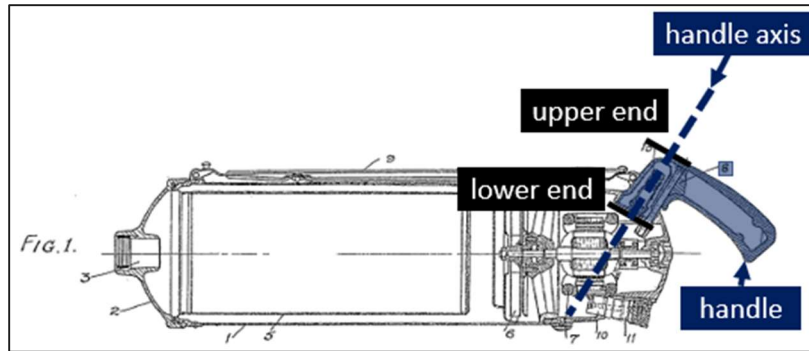
Ex1007, Fig. 1(modified); Ex1008, Fig. 3(modified); Ex1002 ¶262.

A POSA would have been motivated to combine IPVG and Nakai and would have reasonably expected success. Ground 2, §1. As shown above, the combined teachings meet these claims. Ex1002 ¶263.

7. [6]/[11]

IPVG combined with Nakai renders claims 2/10 obvious and IPVG teaches the remaining limitations of these claims. Ex1002 ¶¶264-69.

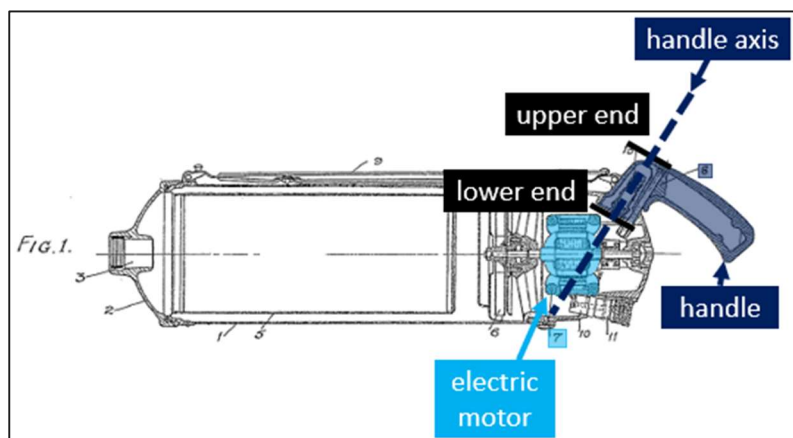
IPVG teaches a pistol-grip axis extends through the pistol-grip handle from a lower end of the pistol-grip handle to an/the upper end of the pistol-grip handle. Ex1002 ¶¶266-67. IPVG’s pistol-grip “**handle 8**” has a **handle axis** that extends from a **lower end** to an/the **upper end**:



Ex1007, Fig. 1; Ex1002 ¶266. A POSA would have understood IPVG’s handle has an upper and lower end as depicted above. Ex1002 ¶267.

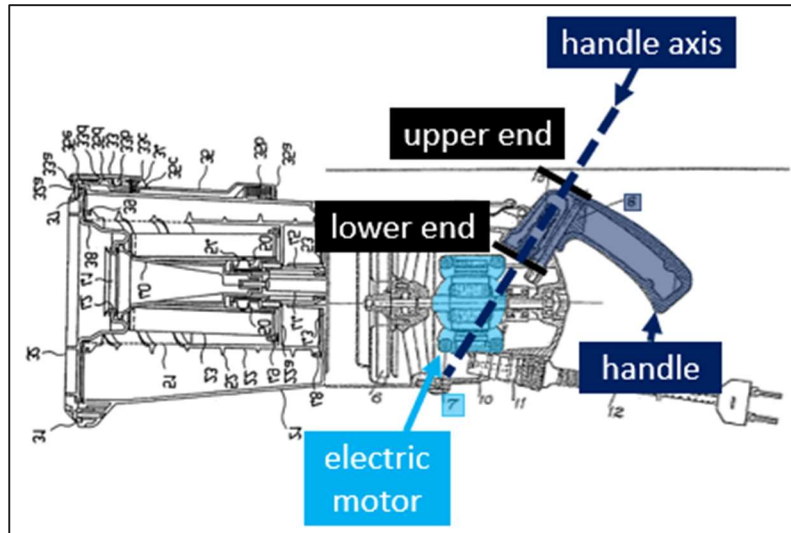
IPVG teaches the pistol-grip axis intersects the suction motor. Ex1002 ¶268.

IPVG’s **handle axis** intersects “**electric motor 7**”:



Ex1007, Fig. 1; Ex1002 ¶268.

A POSA would have been motivated to combine IPVG and Nakai and would have reasonably expected success. Ground 2, §1. The combined teachings likewise meet these claims:



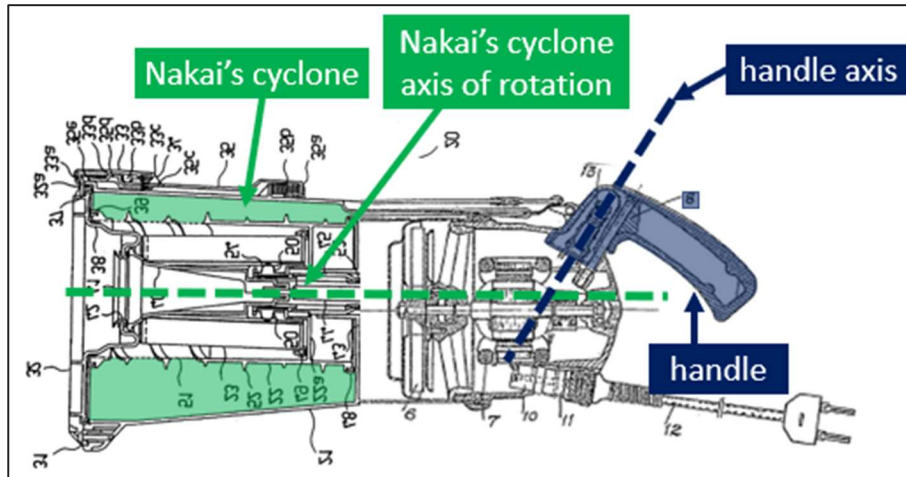
Ex1007, Fig. 1(modified); Ex1008, Fig. 3(modified); Ex1002 ¶269.

8. [7]/[12]

IPVG combined with Nakai renders claims 6/11 and the remaining limitations of these claims obvious. Ex1002 ¶¶270-73.

IPVG teaches a pistol-grip axis, and Nakai teaches a cyclone axis of rotation. Ground 2, [1c]/[10c], [6]/[11].

A POSA would have been motivated to combine IPVG and Nakai and would have reasonably expected success. Ground 2, §1. When Nakai's cyclonic separation teachings are incorporated into IPVG's cleaner, the **handle axis** and the **cyclone axis of rotation** intersect within the handvac:

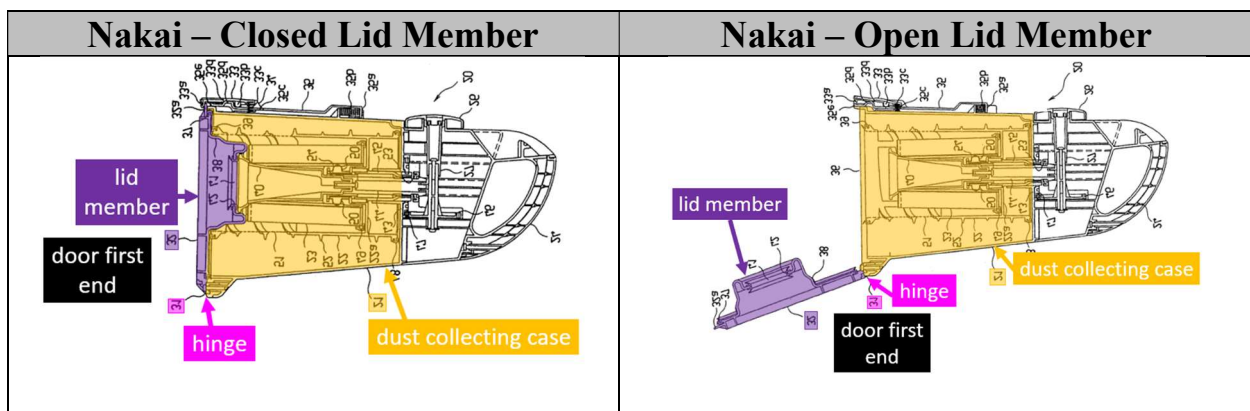


Ex1007, Fig. 1(modified); Ex1008, Fig. 3(modified); Ex1002 ¶273.

9. [8]/[17]

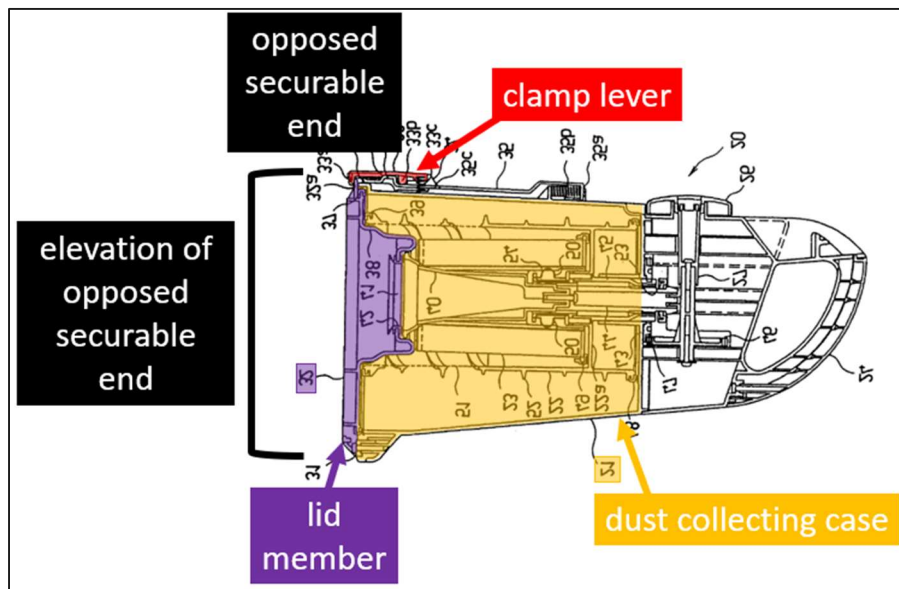
IPVG combined with Nakai renders claims 1/10 and the remaining limitations of these claims obvious. Ex1002 ¶¶274-281.

Nakai teaches the door has a door first end which is rotatably mounted to an end of the cyclone unit wall. Ex1002 ¶¶276-77. Nakai's “**lid member 32**” (door) has a “**lid member 32**” first end which is “[r]otatably mounted on the bottom of the **dust collecting case 21**” (cyclone unit) wall “via a **hinge 31**”:



Ex1008, 4:27-34, Figs. 3, 8; Ex1002 ¶276. A POSA would have understood the first end of Nakai's "lid member 32" is rotatably mounted to the wall of "dust collecting case 21." Ex1002 ¶277.

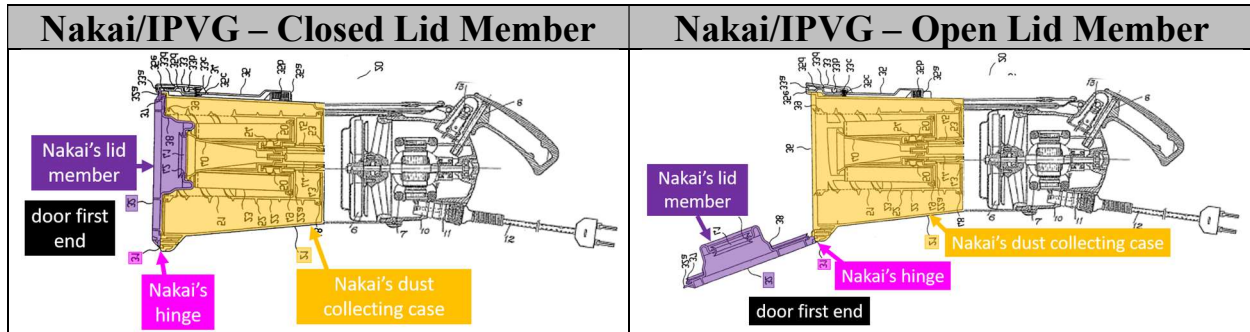
Further, Nakai teaches a door opposed securable end and the lock further comprises a latch that is located at an elevation of the opposed securable end. Ex1002 ¶¶278-79. Nakai's "**lid member 32**" has an **opposed securable end** and the "lid opening mechanism" (lock) further comprises a "**clamp lever 33**" (latch) that is located at an **elevation of the opposed securable end**:



Ex1008, 7:11-24, Fig. 3; Ex1002 ¶278. Nakai's "**clamp lever 33**" is a latch located at an **elevation of the opposed securable end** of the front door. Ex1002 ¶279.

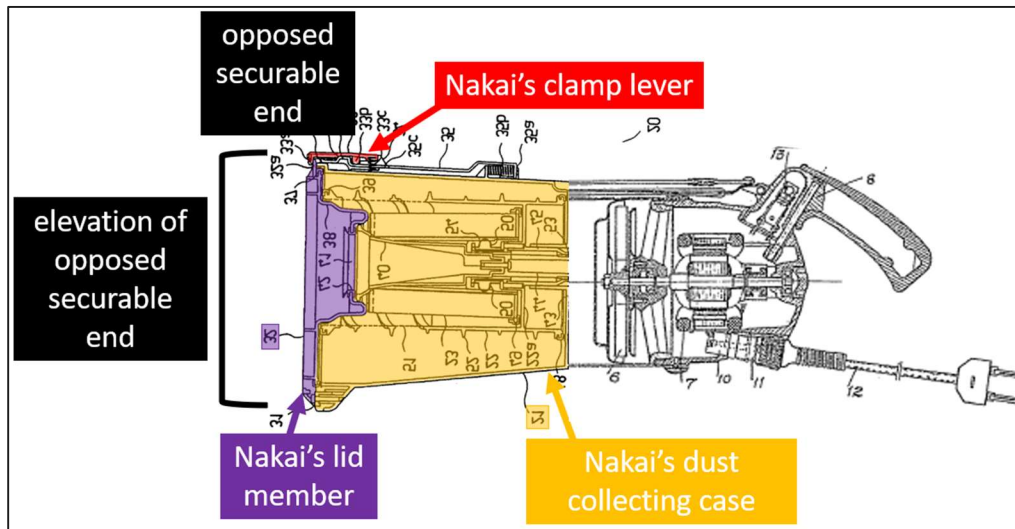
A POSA would have been motivated to combine IPVG and Nakai and would have reasonably expected success. Ground 2, §1. When Nakai's "**lid member 32**" (including "**hinge 31**") and "lid opening mechanism" (including "clamp lever 33")

teachings are incorporated into IPVG’s cleaner, the “**lid member 32**” has a **door first end** which is rotatably mounted to a front end of Nakai’s “**dust collecting case 21**” wall:



Ex1007, Fig. 1(modified); Ex1008, Figs. 3(modified), 8(modified); Ex1002 ¶280.

Likewise, “**lid member 32**” has an **opposed securable end** and the “lid opening mechanism” further comprises a “**clamp lever 33**” that is located at an **elevation of the opposed securable end**:



Ex1007, Fig. 1(modified); Ex1008, Fig. 3(modified); Ex1002 ¶281.

10. [9]/[18]

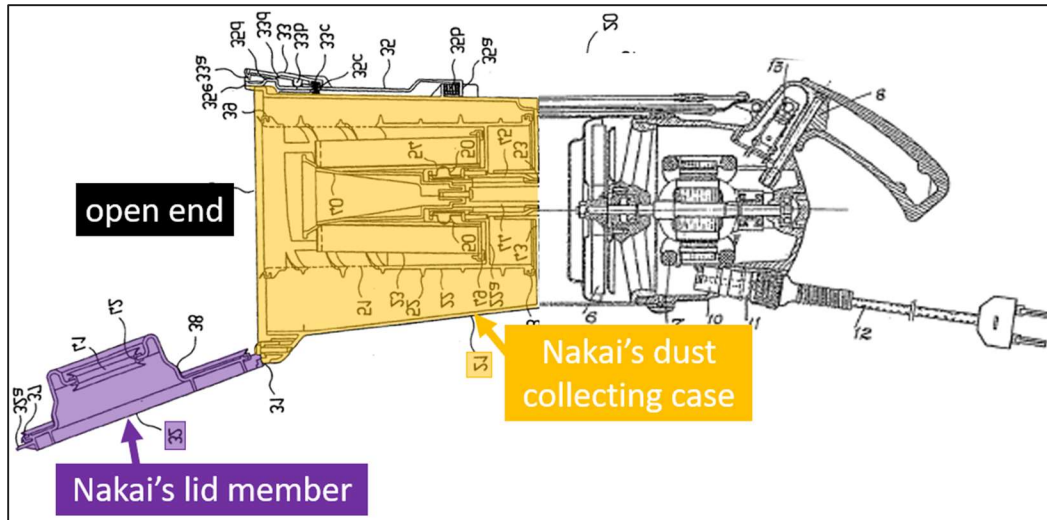
IPVG combined with Nakai renders claims 1/10 and the remaining limitations of these claims obvious. Ex1002 ¶¶282-87.

As explained for [1c]/[10c], IPVG combined with Nakai renders obvious the cyclone unit wall terminates at an open end, the open end is closed by the front door. Ground 2, [1c]/[10c].

Further, IPVG teaches wherein all of the open end is opened when the front door is in the open position. Ex1002 ¶285. IPVG’s “screwed cover 2” “close[s]...the front end” of IPVG’s “chamber 1,” and when it is opened (by removing the “screw[s]” to empty IPVG’s “dust bag 5”) all of the open end is opened. Ex1007, 1:51-62, Fig. 1; Ex1002 ¶285.

Nakai also teaches wherein all of the open end is opened when the front door is in the open position. Ex1002 ¶286. When Nakai’s “lid member 32” is “opened to discharge the accumulated dust,” all of the open end is “opened.” Ex1008, Abstract; Fig. 8; Ex1002 ¶286.

A POSA would have been motivated to combine IPVG and Nakai and would have reasonably expected success. When Nakai’s “**lid member 32**” and “**dust collecting case 21**” teachings are incorporated into IPVG’s cleaner, all of the **open end** is “opened” when “**lid member 32**” is in the open position:



Ex1007, Fig. 1(modified); Ex1008, Fig. 8(modified); Ex1002 ¶287.

11. [16]

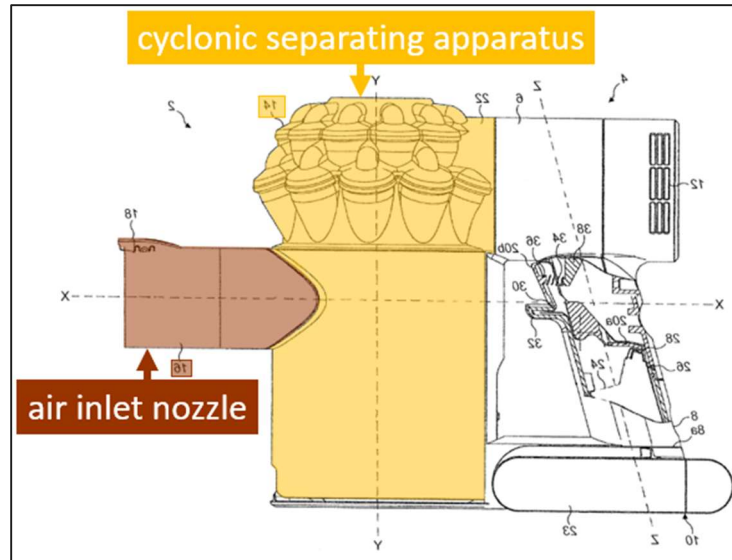
IPVG combined with Nakai renders claim 14 and the remaining limitations of this claim obvious for the same reasons discussed for [1d]. Ground 2, [1d], [14]; Ex1002 ¶¶288-89.

C. Ground 3: IPVG in Combination with Nakai and Sunderland Renders Obvious Claims 1-18

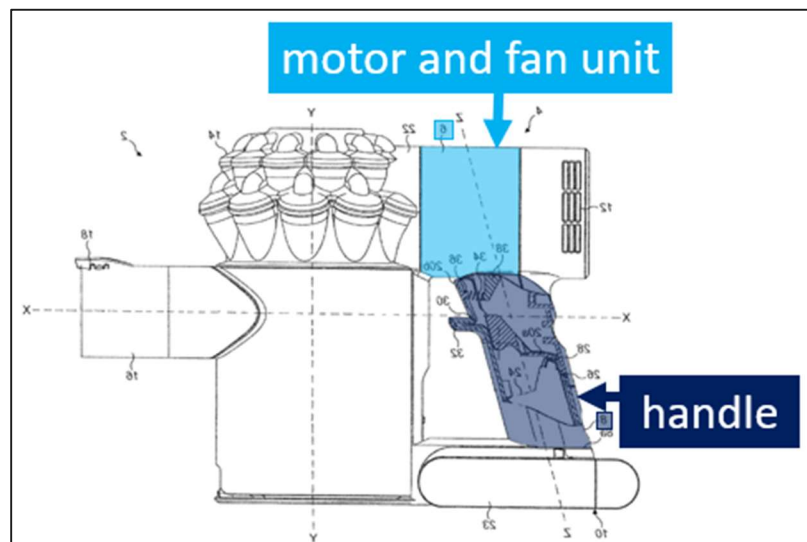
1. A POSA Would Have Combined IPVG, Nakai, and Sunderland

a. Scope and Content of the Prior Art

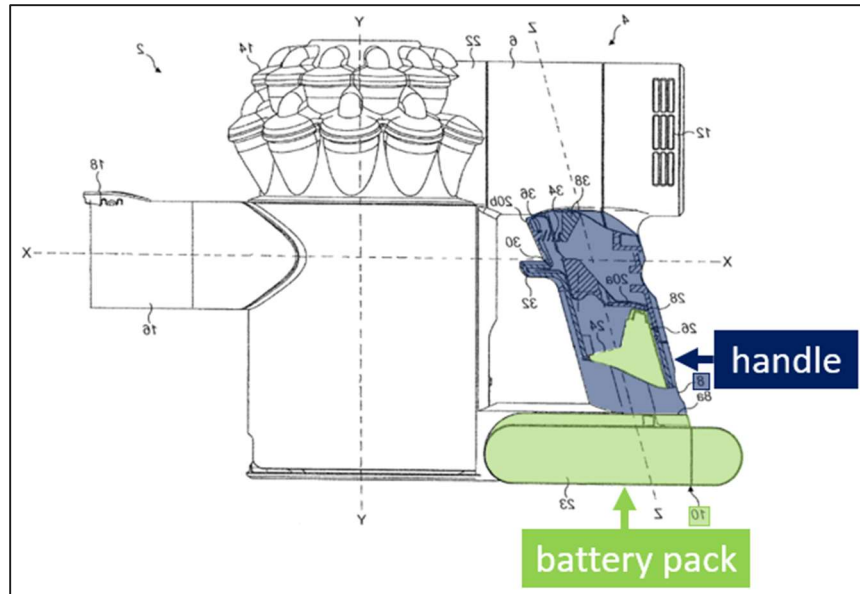
Sunderland teaches a “handheld vacuum cleaner” with a “**cyclonic separating apparatus**” and a “**air inlet nozzle 16**,” wherein “[a]n elongate extension tube or wand (not shown) may also be mounted to the **air inlet nozzle 16**”:



Ex1017, 1:6-7, 5:22-24, 5:30-6:1, Fig. 2; Ex1002 ¶290. Sunderland’s “**motor and fan unit 6** is located above” a “**handle 8**...oriented in a pistol-grip formation”:



Ex1017, 5:17-18, 6:11-12, Fig. 2; Ex1002 ¶291. Sunderland’s “handheld cleaning appliance includes a **removable battery pack [10]**...receivable in a dock opening in the end of [the] **handle [8]**” so “**battery pack 10** may be docked onto the vacuum cleaner”:

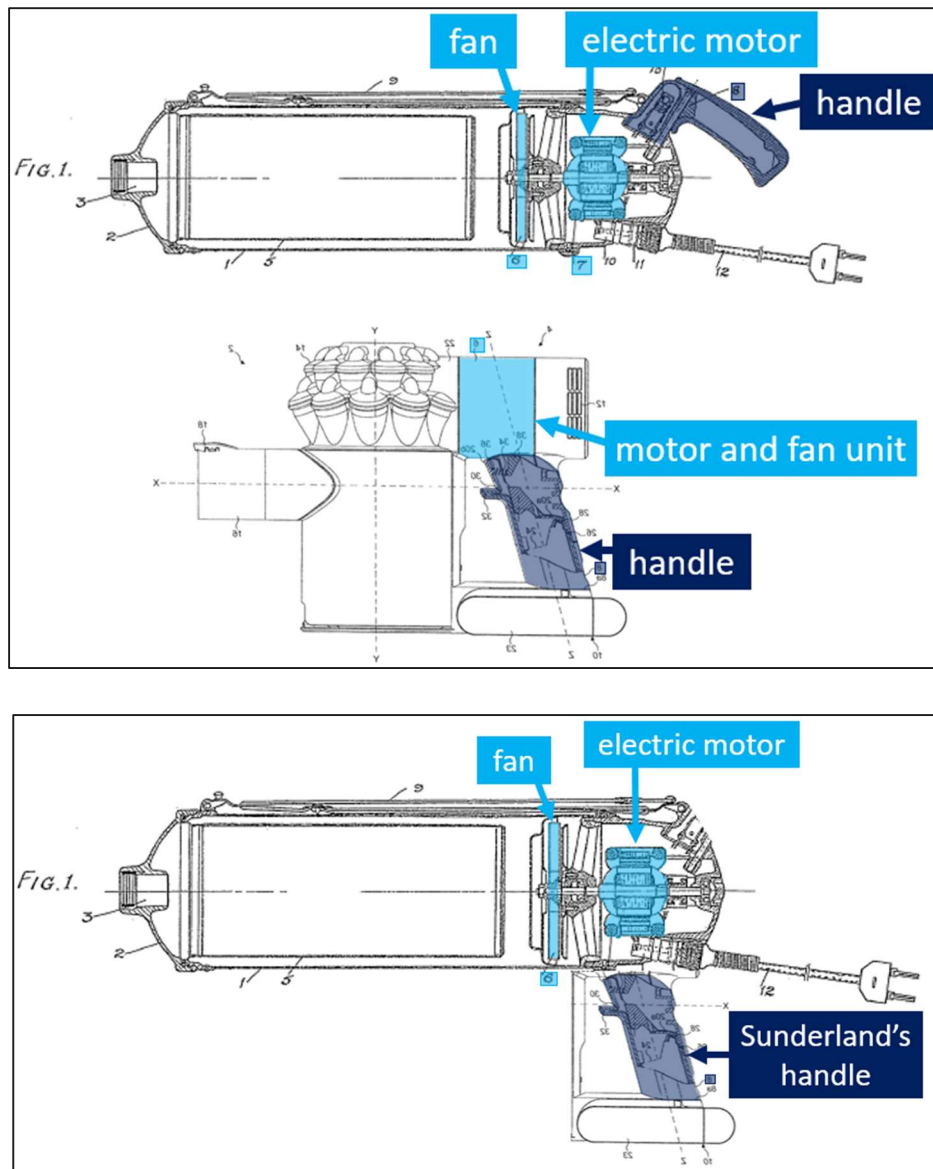


Ex1017, 1:19-22, 7:13-14, Fig. 2; Ex1002 ¶¶292-93.

b. Motivation to Combine

A POSA would have been motivated to combine IPVG and Nakai and would have reasonably expected success. Ground 2, §1. Further, a POSA reading IPVG would have been motivated to modify it to achieve the benefits of Sunderland’s handle and battery teachings, including more-ergonomic handling, increased portability, and part longevity. Ex1007, 1:10-33; 1:51-57; Ex1002 ¶¶294-303. Specifically, a POSA would have been motivated to combine the teachings of IPVG and Nakai with Sunderland as follows:

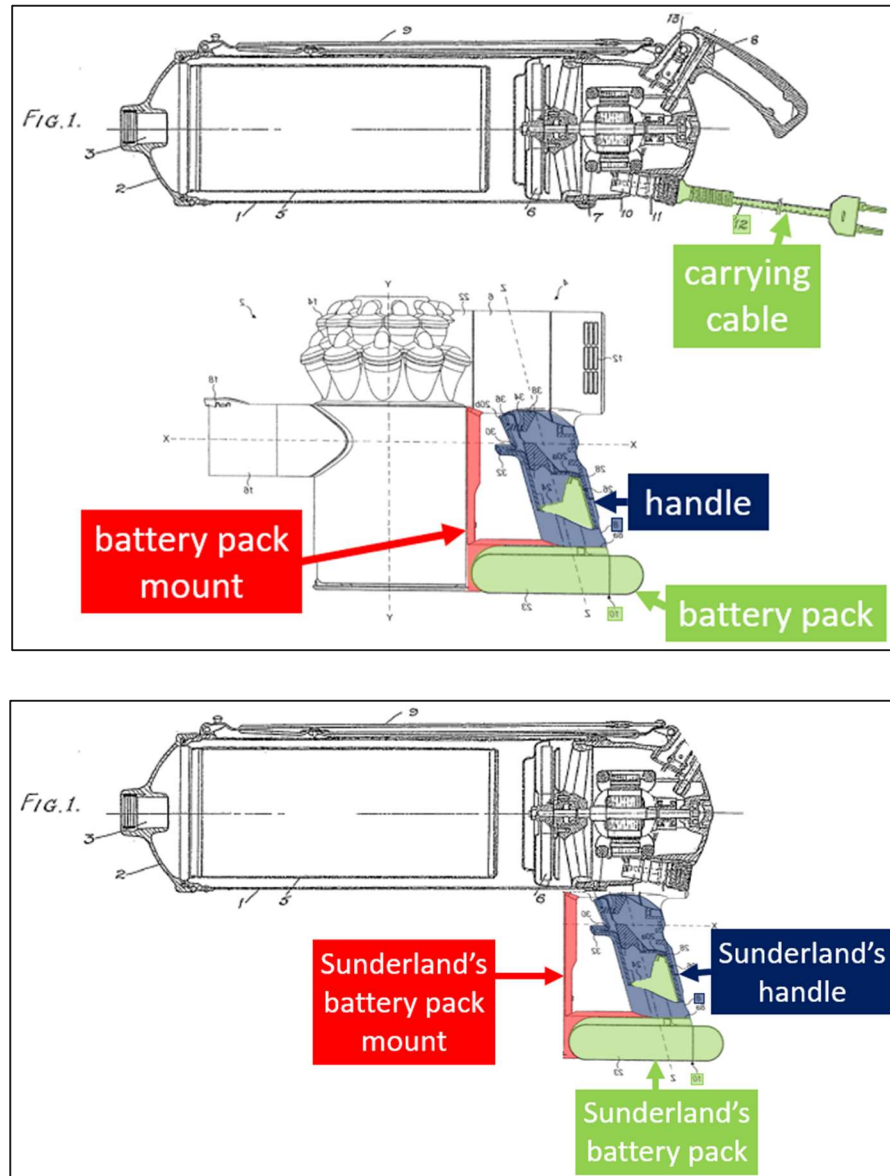
A POSA would have modified IPVG’s pistol-grip “**handle 8**” to use a pistol-grip handle positioned below “**fan 6 driven by an electric motor 7**,” such as Sunderland’s “**handle 8** [that] is oriented in a pistol-grip formation” and positioned below “**motor and fan unit 6**”:



Ex1007, 1:51-62, Fig. 1(modified); Ex1017, 5:17-18, 6:11-12, Fig. 2(modified); Ex1002 ¶295.

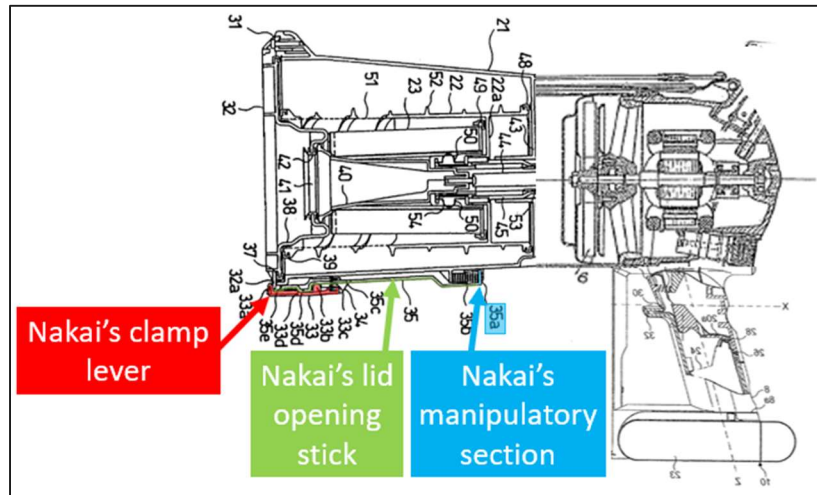
A POSA would have modified IPVG's electrical wiring and power source, including “**carrying cable 12**” (which plugs into a wall outlet), to use a battery, such as Sunderland's “**removable battery pack [10]**...that is receivable in a dock

opening in the end of [the] **handle [8]**,” and Sunderland’s **battery pack mount**, which provides structural support for Sunderland’s “**removable battery pack [10]**”:



Ex1007, 1:63-69, Fig. 1(modified); Ex1017, 1:19-22, 7:13-14, Fig. 2(modified);
Ex1002 ¶296.

A POSA would have understood, when making these modifications, Nakai's cyclonic separating unit would be implemented with the door-actuation mechanism located on the lower side of IPVG's cleaner:



Ex1007, Fig. 1(modified); Ex1008, Fig. 3(modified); Ex1017, Fig. 2(modified); Ex1002 ¶297. Locating the actuation mechanism as shown would have been obvious to try, because a POSA would have understood there were a finite number of identified actuation mechanism positions, including locating it on the lower side of IPVG's cleaner. Ex1002 ¶298. Further, locating the actuator as shown has several benefits, including (1) easy emptying, because simply pushing a manipulatory section located near the handle with one hand while continuing to hold the cleaner's handle with the other hand is an intuitive and ergonomic method of dust emptying, and (2) protecting against accidental bin-opening, since the manipulatory section is less likely to hit objects during use. Ex1002 ¶298.

A POSA would have been motivated to combine IPVG and Sunderland as described. Ex1002 ¶¶299-303. **First**, IPVG and Sunderland are analogous art. Ex1002 ¶299. Like IPVG, which teaches a “portable dust suction apparatus” with “a suction opening [] for attaching a suction pipe 4,” Ex1007, 1:10-12, 1:51-57, Fig. 2, Sunderland teaches “a handheld vacuum cleaner” with an “air inlet nozzle” upon which “an elongate extension tube or wand (not shown) may also be mounted,” Ex1017, 1:6-7, 5:30-6:2. Further, IPVG teaches a pistol-grip “handle 8” located at the cleaner’s rear “by which the apparatus may be readily lifted during operation,” Ex1007, 1:22-33, 1:92-2:2, Fig. 1, and Sunderland teaches a “handle 8 [that] is oriented in a pistol-grip formation” and located at the cleaner’s rear, Ex1017, 5:17-18, 6:11-12, Fig. 2.

Second, IPVG and Sunderland each provide motivations for this combination. Ex1002 ¶300. Sunderland explains its teachings are “suitable for use” in “handheld vacuum cleaner[s],” and positioning “[t]he motor and fan unit 6...above” “pistol-grip” “handle 8” “reduces stress on a user’s wrist during cleaning.” Ex1017, 1:6-7, 5:17-18, 6:11-12. A POSA would have looked for hand/stick references that could use Sunderland’s handle teachings, including IPVG. Likewise, IPVG’s cleaner is designed to be “portable” and “readily lifted during operation.” Ex1007, 1:10-12, 1:22-33. A POSA would have looked for vacuum components that could increase maneuverability and ergonomics “during operation,” including a handle positioned

below the suction motor and fan assembly. Ex1002 ¶300. A POSA would have understood a handle positioned below IPVG's suction motor and fan assembly had benefits over IPVG's rearward-mounted handle, including, (1) less strain on the user's wrist, (2) reduced tension on the handle's mount, thereby increasing part longevity and reducing recurring costs, and (3) closer location to the vacuum's center of gravity, increasing vacuum maneuverability and ergonomics. Ex1002 ¶300.

Third, a POSA would have understood Sunderland's "battery pack" (and battery-pack mount) had certain benefits over IPVG's "carrying cable," and would have been motivated to incorporate Sunderland's battery-pack teachings into IPVG. Ex1002 ¶301. Indeed, Sunderland explains, "in order to provide portability, it is common for handvacs and stick-vacs to be cordless whereby power is supplied to such devices by way of a battery pack." Ex1017, 1:6-7, 1:15-16. Unlike IPVG's power source, which requires plugging "carrying cable 12" into a wall outlet, Sunderland's "battery pack 10" "is receivable in a dock opening in the end of [the] handle [8]." Ex1017, 1:19-22, 7:13-14. By contrast to IPVG's "carrying cable," a POSA would have understood Sunderland's "battery pack" enables the user to move unrestricted around the area to be cleaned. Ex1002 ¶301.

Fourth, this combination would have involved a simple substitution of known elements for others to obtain predictable results. Ex1002 ¶302. IPVG teaches a

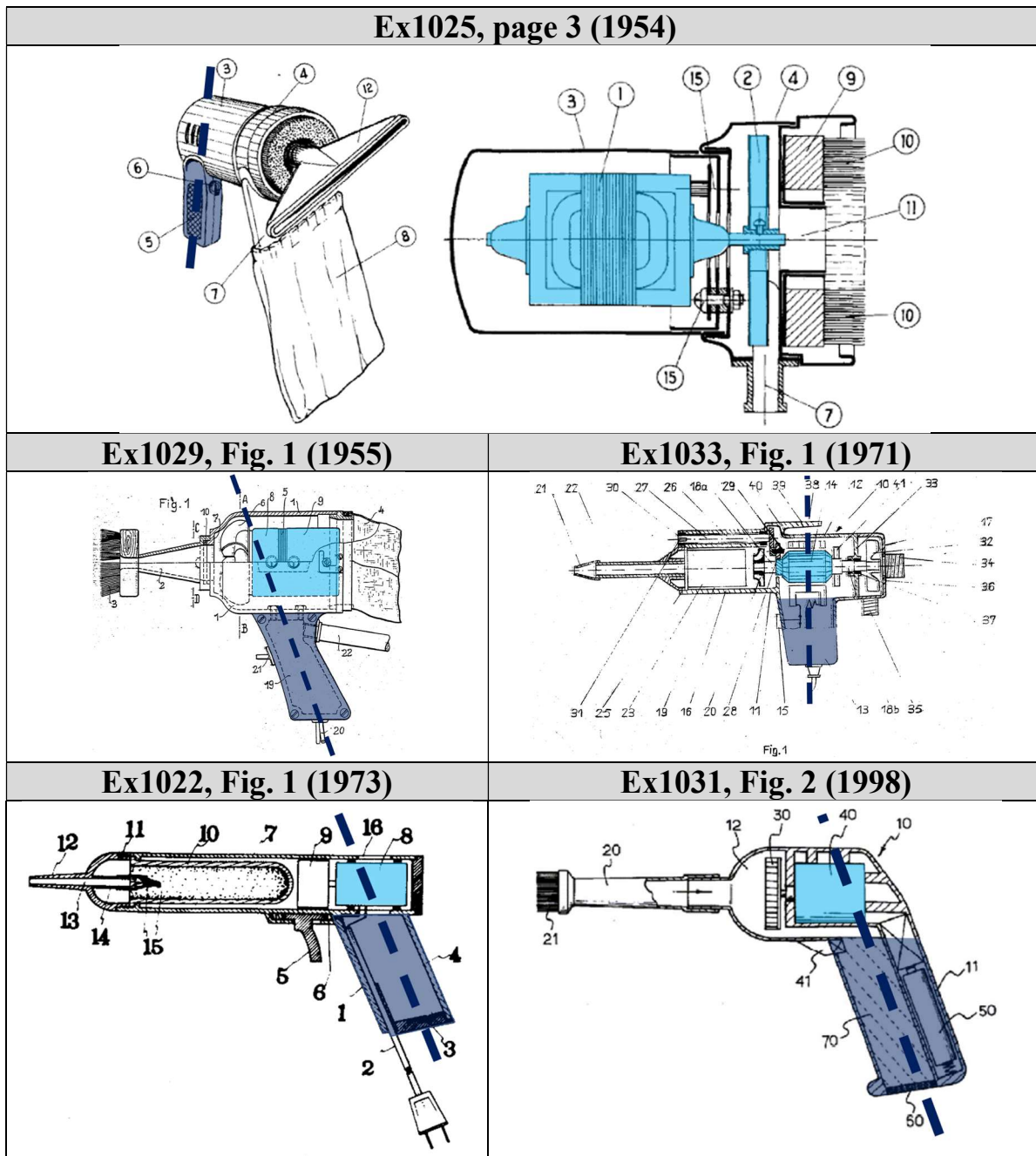
cleaner with a pistol-grip handle located above and rearward of the suction motor and fan assembly, and a power cord that plugs into the wall. Ex1007, Fig. 1. Sunderland teaches a pistol-grip handle located below the suction motor and fan assembly, and a battery pack that is mountable to the pistol-grip handle. Ex1017, Fig. 2. A POSA would have understood the simple substitution of these handles and power supply mechanisms would achieve the predictable results of increased maneuverability and ergonomics. Ex1002 ¶302. Further, as explained above, IPVG and Sunderland are directed to hand/stick vacuums having a similar orientation of handle relative to the cylindrical vacuum cleaner housing. Ex1007, Fig. 1; Ex1017, Fig. 2; Ex1002 ¶302.

Fifth, it would have been at least obvious to try this combination. Ex1002 ¶303. There were a finite number of identified handle positions, including positioning the handle above and rearward of the suction motor, (as IPVG teaches), and positioning the handle below the suction motor (as Sunderland teaches). Ex1002 ¶303. And, there were a finite number of identified suction motor power sources, including a wall-plug power cord (as IPVG teaches), and a battery pack (as Sunderland teaches), and it would have been obvious to try to achieve the known benefits described above. Ex1002 ¶303.

c. Reasonable Expectation of Success

A POSA would have reasonably expected success combining IPVG's and Sunderland's teachings as described. Ex1002 ¶¶304-305. A POSA would have understood these two handles could be used interchangeably, and these two suction motor power sources could be used interchangeably, and would have further expected success for the reasons stated above, including because such modification involves a simple substitution of known elements performing similar functions in similar ways, and because of the express motivations found in IPVG and Sunderland to perform such substitution. Ex1002 ¶304.

Further, a POSA would have reasonably expected success incorporating Sunderland's handle teachings into IPVG because **pistol-grip handles** positioned below the **suction motor** have existed for nearly 70 years:



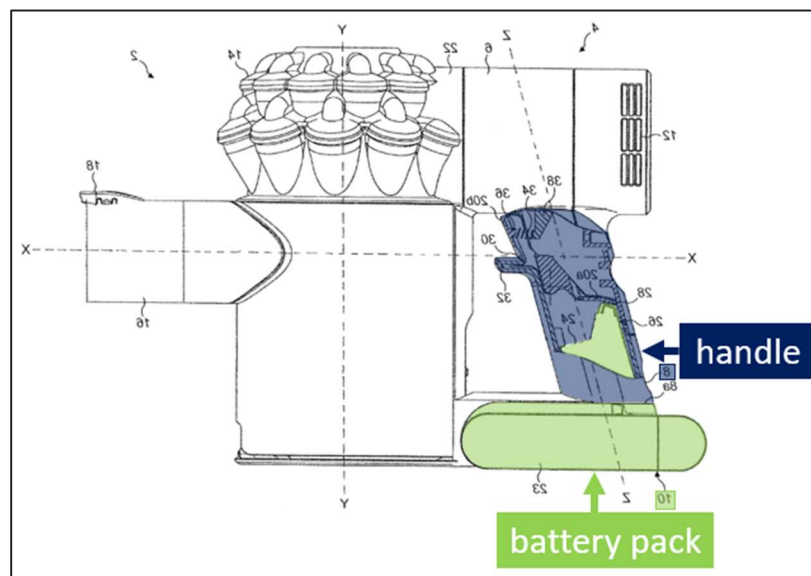
2. [1]/[2]/[8]/[9]/[10]/[17]/[18]

IPVG combined with Nakai renders these claims obvious. Ground 2; Ex1002 ¶¶306-307. Likewise, these claims are obvious in view of the IPVG-Nakai-Sunderland combination for the same reasons discussed above. Ground 3, §1.

3. [3]/[13]

IPVG combined with Nakai and Sunderland renders claims 2/10 and the remaining limitations of these claims obvious. Ex1002 ¶¶308-313.

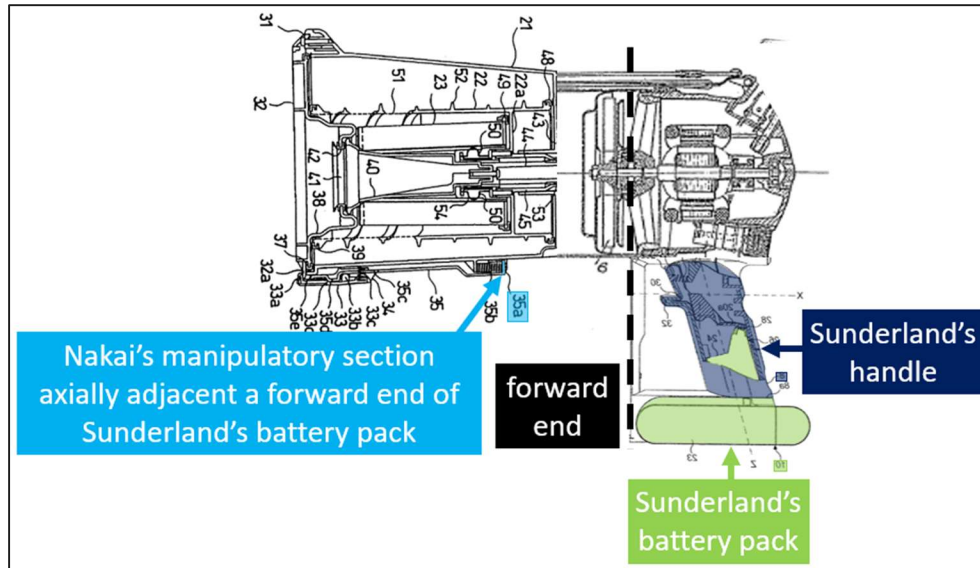
Sunderland teaches a battery pack. Ex1002 ¶310. “[R]emovable battery pack [10]...is receivable in a dock opening in the end of [the] handle [8]” “so that the battery pack 10 may be docked onto the vacuum cleaner 2”:



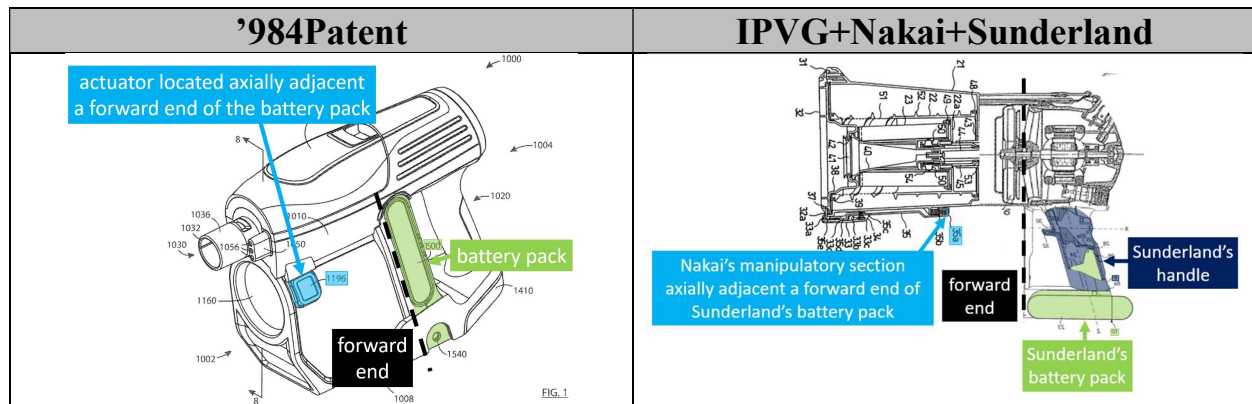
Ex1017, 1:19-22, 7:13-14, Fig. 2; Ex1002 ¶310.

As explained above, Nakai teaches an actuator. Ground 2, [1d]/[10e].

A POSA would have been motivated to combine IPVG, Nakai, and Sunderland and would have reasonably expected success. Ground 3, §1. As combined, the vacuum cleaner comprises a “battery pack 10” wherein the “manipulatory section 35a” (actuator) is axially located adjacent a forward end of the “battery pack”:



Ex1007, Fig. 1(modified); Ex1008, Fig. 3(modified); Ex1017, Fig. 2(modified);
Ex1002 ¶312. This is at least as much disclosure as in the '984Patent:

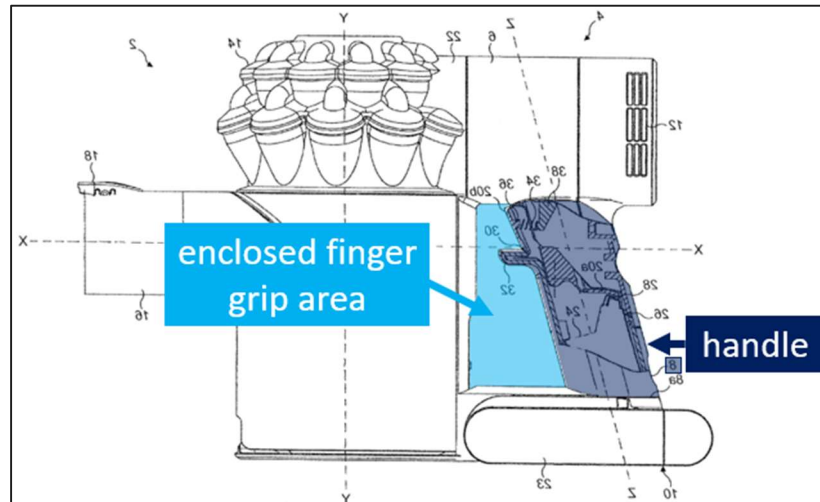


Ex1001, Fig. 1; Ex1007, Fig. 1(modified); Ex1008, Fig. 3(modified); Ex1017, Fig. 2(modified); Ex1002 ¶313.

4. [4]/[14]

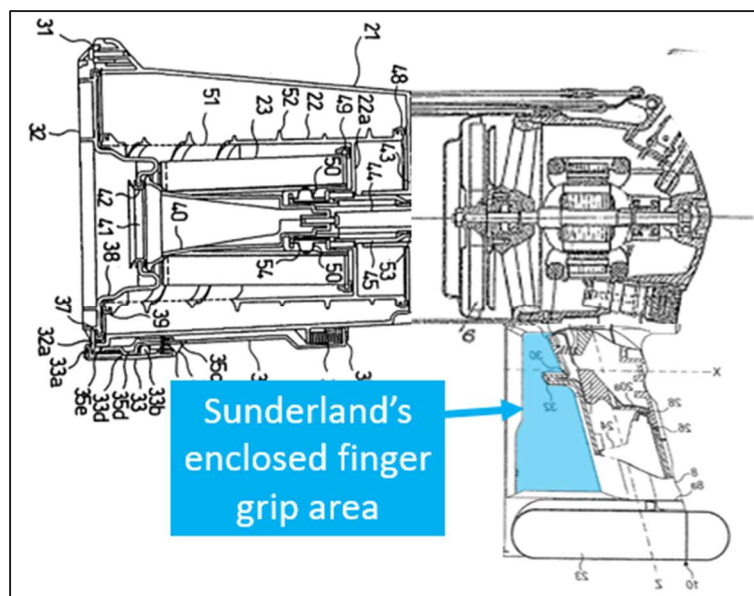
IPVG combined with Nakai and Sunderland renders claims 3/13 obvious and Sunderland teaches the remaining limitations of these claims. Ex1002 ¶¶314-17.

Sunderland teaches an **enclosed finger grip area** where the user “grasp[s] the **handle [8]**”:



Ex1017, 27:31-28:4, Fig. 2; Ex1002 ¶316.

A POSA would have been motivated to combine IPVG, Nakai, and Sunderland and would have reasonably expected success. Ground 3, §1. As combined, the hand vacuum comprises an **enclosed finger grip area**:

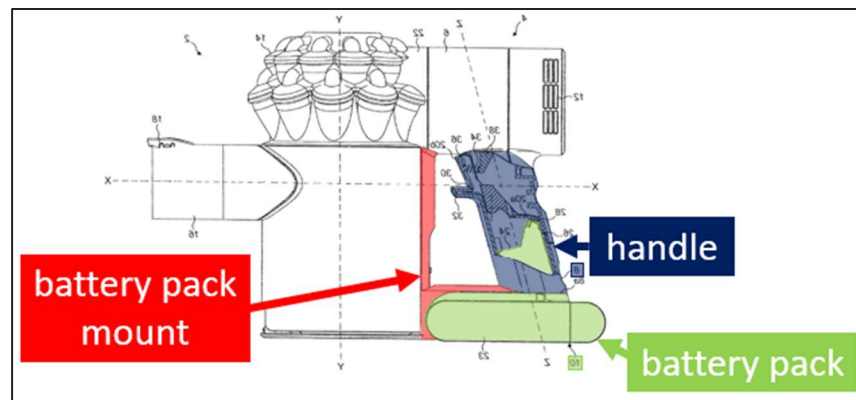
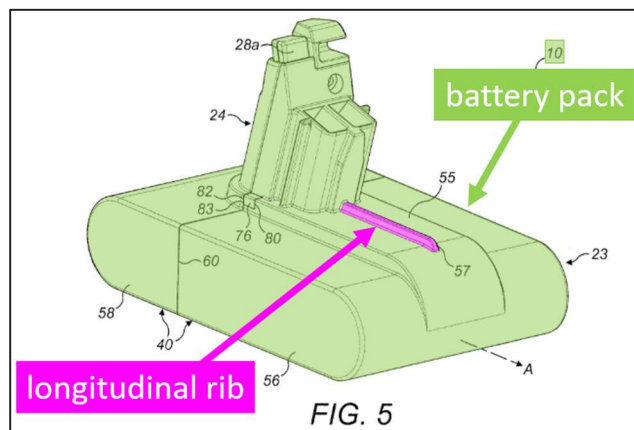


Ex1007, Fig. 1(modified); Ex1008, Fig. 3(modified); Ex1017, Fig. 2(modified); Ex1002 ¶317.

5. [5]/[15]

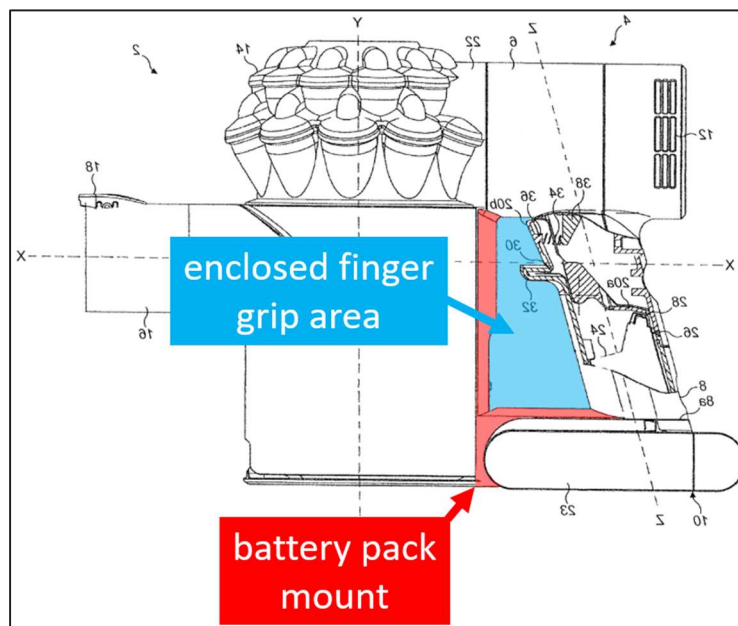
IPVG combined with Nakai and Sunderland renders claims 4/14 obvious and Sunderland teaches the remaining limitations of these claims. Ex1002 ¶¶318-323.

Sunderland teaches a battery-pack mount. Ex1002 ¶320. Sunderland's “removable battery pack [10]...is receivable in a dock opening in the end of [the] handle [8],” and includes “[a] longitudinal rib 57” that “provides a means to strengthen the engagement with the vacuum cleaner[’s]” **battery-pack mount**:



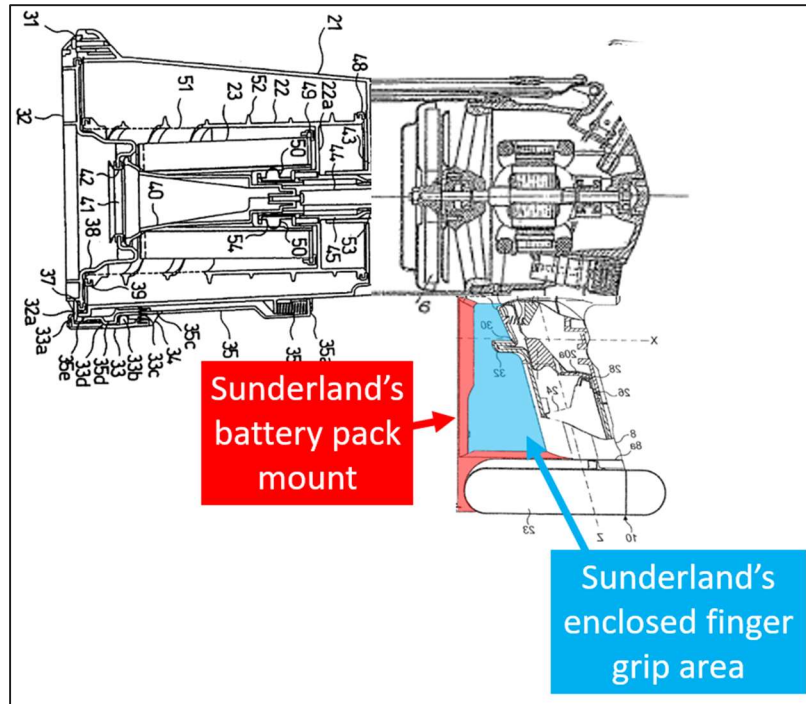
Ex1017, 1:19-22, 7:13-14, 9:24-25, Figs. 2, 5; Ex1002 ¶320. A POSA would have understood Sunderland teaches a battery pack mount as identified above, at least because Sunderland’s “battery pack 10[’s]” “longitudinal rib 57” “engage[s]” with it when attached. Ex1002 ¶321.

Sunderland’s **battery-pack mount** forms part of the **enclosed finger grip area**:



Ex1017, Fig. 2; Ex1002 ¶322.

A POSA would have been motivated to combine IPVG, Nakai, and Sunderland and would have reasonably expected success. Ground 3, §1. As combined, a **battery-pack mount** forms part of the **enclosed finger grip area**:

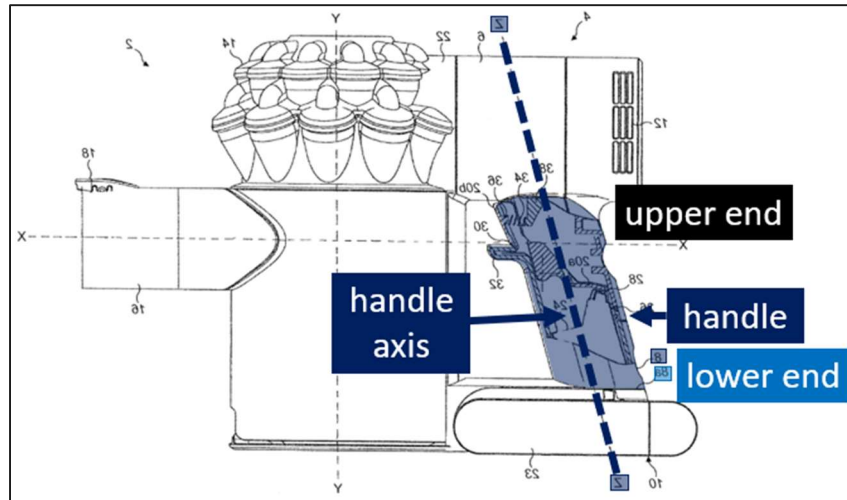


Ex1007, Fig. 1(modified); Ex1008, Fig. 3(modified); Ex1017, Fig. 2(modified); Ex1002 ¶323.

6. [6]/[11]

IPVG combined with Nakai and Sunderland renders claims 2/10 obvious and Sunderland teaches the remaining limitations of these claims. Ex1002 ¶¶324-29.

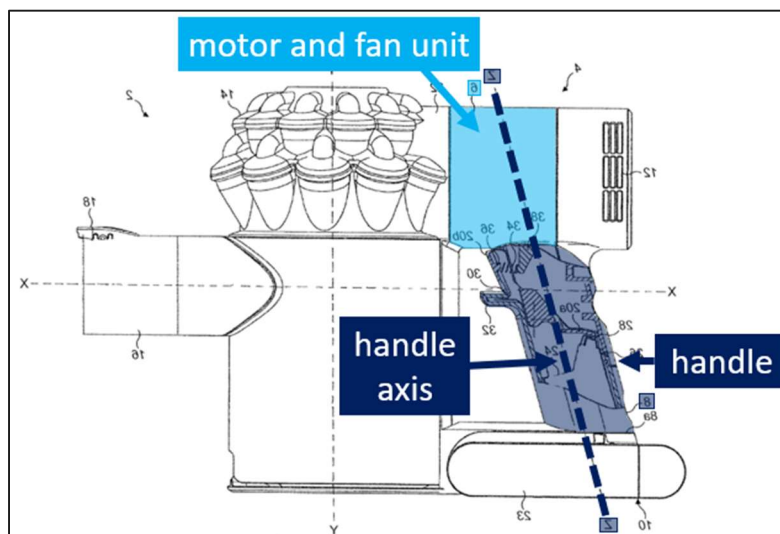
Sunderland teaches a pistol-grip axis extends through the pistol-grip handle from a lower end of the pistol-grip handle to an/the upper end of the pistol-grip handle. Ex1002 ¶326. Sunderland's "**handle 8**...oriented in a pistol-grip formation" has "an **axis Z-Z**" that extends from "[t]he **lower end 8a** of the **handle 8**" to an/the **upper end**:



Ex1017, 6:7-12, Fig. 2; Ex1002 ¶326.

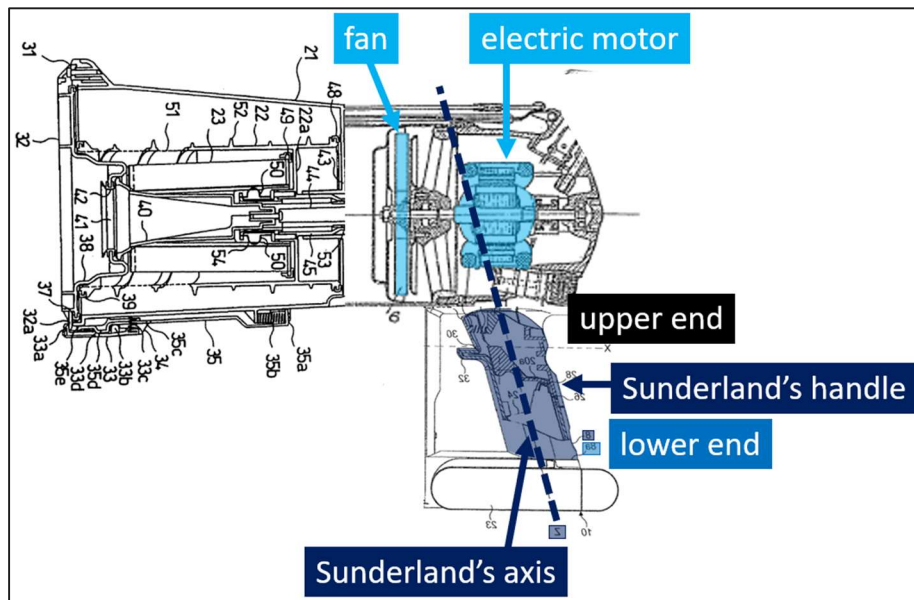
Sunderland teaches the pistol-grip axis intersects the suction motor. Ex1002

¶327-28. Sunderland's "**handle 8**" "**axis Z-Z**" intersects "**motor and fan unit 6**":



Ex1017, 5:17-18, 6:7-12, Fig. 2; Ex1002 ¶327. A POSA would have understood Sunderland's "motor" and "fan" of "motor and fan unit 6," individually or together, are a suction motor. Ex1002 ¶328.

A POSA would have been motivated to combine IPVG, Nakai, and Sunderland and would have reasonably expected success. Ground 3, §1. As combined, the “**handle 8**” “**axis Z-Z**” extends from a “**lower end 8a**” of “**handle 8**” to an/the **upper end** of “**handle 8**,” and the “**axis Z-Z**” intersects the “**fan 6 driven by an electric motor 7**”:



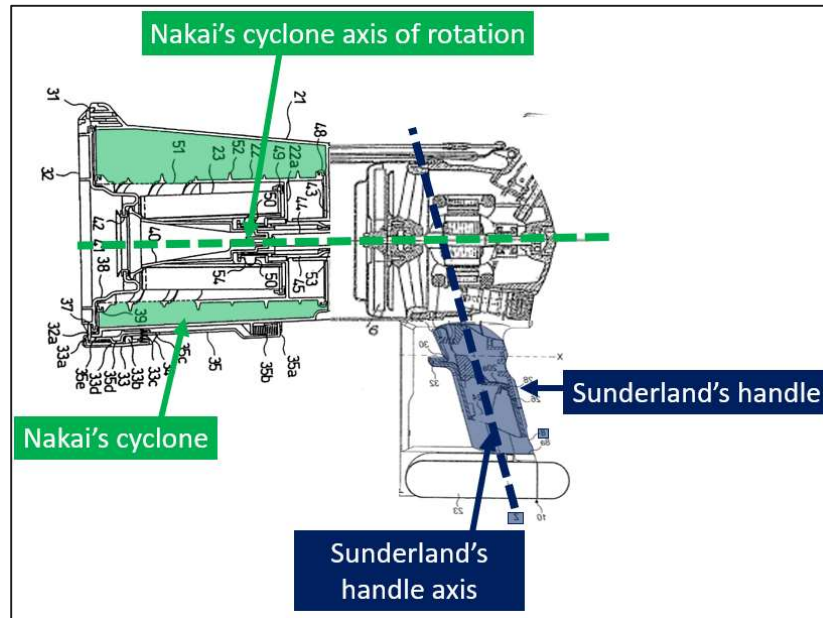
Ex1007, Fig. 1(modified); Ex1008, Fig. 3(modified); Ex1017, Fig. 2(modified); Ex1002 ¶329.

7. [7]/[12]

IPVG combined with Nakai and Sunderland renders claims 6/11 and the remaining limitations of these claims obvious. Ex1002 ¶¶330-32.

IPVG combined with Nakai and Sunderland renders obvious the pistol-grip axis and the cyclone axis of rotation intersect within the hand vacuum cleaner. Ex1002 ¶332. A POSA would have been motivated to combine IPVG, Nakai, and

Sunderland and would have reasonably expected success. Ground 3, §1. As combined, the “**handle 8**” “**axis Z-Z**” and the **cyclone axis of rotation** intersect within the handvac:



Ex1007, Fig. 1(modified); Ex1008, Fig. 3(modified); Ex1017, Fig. 2(modified); Ex1002 ¶332.

8. [16]

IPVG combined with Nakai and Sunderland renders claim 14 and the remaining limitations of this claim obvious for the same reasons explained for [1d]/[10e]. Ground 2, [1d]/[10e]; Ex1002 ¶¶333-34.

IX. DISCRETIONARY FACTORS FAVOR INSTITUTION

A. §314(a)

Fintiv should not be followed because it exceeds the Director’s authority, is arbitrary and capricious, was adopted without notice-and-comment rulemaking,

violates the APA and AIA, and because it “does not apply to parallel U.S. International Trade Commission (ITC) proceedings....” USPTO Interim Procedure For Discretionary Denials In AIA Post-Grant Proceedings With Parallel District Court Litigation, June 21, 2022, 2, 4-5 (the “Guidance”).

B. §325(d)

The §325(d) factors favor institution, as all six *Becton Dickinson* factors weigh in favor of institution. *Becton, Dickinson, & Co. v. B. Braun Melsungen AG*, IPR2017-01586, Paper 8 at 17–18 (PTAB Dec. 15, 2017). The prior-art combinations in this Petition were not previously before the Office, and the relied-upon references are not cumulative, do not appear on the ’984Patent’s face, and were not addressed during the ’984Patent’s prosecution. *See Advanced Bionics, LLC v. Med-El Elektromedizinische Geräte GmbH*, IPR2019-01469, Paper 6 at 8, 9-11 (PTAB Feb. 13, 2020) (precedential).

Nor were the Dimbylow, Howes, IPVG, and Nakai references materially considered by the Office during the ’984Patent’s parent applications’ prosecutions. IPVG was not disclosed or cited during prosecution of any of the ’984Patent parent applications. Versions of Dimbylow, Howes, and Nakai, were cited in the ’984Patent’s parent applications, however, the Examiner neither discussed nor applied them, and thus citations to those references do not support §325(d) denial.

Fasteners for Retail, Inc. v. RTC Indus., Inc., IPR2019-00994, Paper 9 at 7-11 (PTAB Nov. 5, 2019).

While the Examiner discussed a version of Sunderland (US2013/0207615 (“Sunderland615”)) during prosecution of one of the ’984Patent’s parent applications (US15/642,781), this does not support §325(d) denial. There, the Examiner found Sunderland615 discloses “a battery pack” and a “handle” (the same limitations for which Petitioners cite Sunderland). Ex1026, 543–48; §XIII.C. The Applicant did not dispute those findings, distinguishing Sunderland615 based on limitations not claimed by the ’984Patent and unrelated to this Petition. Ex1026, 653–62. This does not support §325(d) denial because Sunderland615 was not considered in combination with either IPVG or Nakai, and thus Petitioners are not rehashing arguments previously made before the Office. *See Reflex USA LLC v. Longyear TM, Inc. et al.*, IPR2023-00642, Paper 11 at 15–16 (PTAB Sept. 26, 2023) (rejecting PO’s §325(d) argument where petition relied on one disclosed reference and one undisclosed reference because “although [disclosed reference] was considered by the Examiner, the combination of [disclosed reference] and [undisclosed reference] was not,” and “for the grounds that rely on the combination of [disclosed reference] and [undisclosed reference], the Petition relies on [disclosed reference] essentially to teach the same limitations that the Examiner previously found [it] to teach or suggest”). Thus, *Advanced Bionics* step one is not satisfied.

SharkNinja, Inc. v. Dyson Technology Limited, IPR2023-01322, Paper 7 at 12–14 (PTAB Feb. 27, 2024) (*Advanced Bionics* step one not satisfied where petition relied on at least one undisclosed reference, and while the petition relied on one disclosed reference and another that was “similar to” a disclosed reference, PO could not show that the “‘same arguments’ were previously considered by and resolved by the Office” because the Examiner “‘chose not to combine’” those references “to form an obviousness rejection”).

Even if the Board finds *Advanced Bionics* step one is met, this Petition demonstrates, under step two, the Office committed material error. During prosecution, the Office overlooked the key disclosures of Dimbylow, Howes, Nakai, and Sunderland relied upon in this Petition; namely, Dimbylow discloses a cyclonic hand vacuum cleaner with a pistol-grip handle, openable door, and in-line configuration; Howes discloses a convenient door-release actuator compatible with Dimbylow’s cleaner; Nakai discloses a cyclonic vacuum cleaner with an openable door and door-release actuator that are compatible for use in a hand vacuum cleaner; and Sunderland discloses a hand vacuum cleaner with a pistol-grip handle and battery pack that are compatible with other hand vacuum cleaners, including IPVG’s. §§VIII.A–C.

Further, Dr. Giachetti’s expert testimony cited in this Petition shows how the references disclose or render obvious every limitation of the challenged claims and

the reasons a POSA would have made the relied-upon combinations. Thus, this Petition advances additional evidence and arguments that the Office did not consider, which weighs against exercising discretion under §325(d). *Mylan Pharms. Inc. v. Merck Sharp & Dohme Corp.*, IPR2020-00040, Paper 21 at 20 (PTAB May 12, 2020) (unconsidered expert testimony weighs against §325(d) denial).

Because Petitioners “cannot be expected to anticipate every argument that may be raised by a patent owner” regarding §325(d), if PO raises such a challenge, Petitioners request 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) (vacating denial of institution based on §325(d)).

X. SECONDARY CONSIDERATIONS

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

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

A. Real Parties-in-Interest

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

B. Related Matters

To the best of Petitioners’ knowledge, apart from the above-mentioned litigation, *Certain Surface Cleaning Devices and Components Thereof*, Dkt. No. 337-TA-1404 (the “ITC Litigation”), the ’984Patent has not been involved in any

litigation, *inter partes* or post-grant review prior to this proceeding.

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

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

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

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

Date: July 2, 2024

Respectfully submitted,

/s/ Christian Huehns

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Attorneys for Petitioners

CERTIFICATE OF COMPLIANCE

This Petition complies with the type-volume limitations as mandated in 37 C.F.R. § 42.24, totaling 13,863 words. Counsel has relied upon the word count feature provided by Microsoft Word.

/s/ Christian Huehns

CERTIFICATE OF SERVICE

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

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

A copy was also served via electronic mail and FTP on the following attorneys of record in the related matter of Inv. No. 337-TA-1404, *In the Matter of Certain Surface Cleaning Devices and Components Thereof at:*

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/s/ Sheryl A. Brongiel
Sheryl A. Brongiel