

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

SHARKNINJA, INC.,
SHARKNINJA OPERATING LLC,
SHARKNINJA MANAGEMENT LLC, AND
SHARKNINJA SALES COMPANY,
Petitioners,

v.

DYSON TECHNOLOGY LIMITED
Patent Owner.

Case No. IPR2023-01322

U.S. Patent No. 10,433,687

**PATENT OWNER'S RESPONSE
PURSUANT TO 37 C.F.R. § 42.120**

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PATENT OWNER'S EXHIBIT LIST

Exhibit	Description
2001	U.S. Patent Publication No. 2017/0071426 A1 (“Krebs”)
2002	GB 2440111B
2003	Chinese Patent Application No. 201610830364.1
2004	Chinese patent document no. CN1178622C
2005	China National Intellectual Property Administration, Case No. 4W114231 (Oct. 19, 2022) original
2006	China National Intellectual Property Administration, Case No. 4W114231 (Oct. 19, 2022) translation
2007	The People’s Republic of China Beijing Intellectual Property Court Administrative Judgment (Oct. 25, 2023) original
2008	The People’s Republic of China Beijing Intellectual Property Court Administrative Judgment (Oct. 25, 2023) translation
2009	U.S. Patent Application Publication 2016/0150923 A1 (“Conrad ’923”)
2010	U.S. Patent No. 8,156,609 (“Milne”)
2011	Chinese patent document no. CN101489454A
2012	Chinese patent document no. CN1361673A
2013	China National Intellectual Property Administration, Case No. 4W114082 (Sept. 23, 2022) original
2014	China National Intellectual Property Administration, Case No. 4W114082 (Sept. 23, 2022) translation
2015	U.S. Patent No. 1,871,624 (“the ’624 patent”)
2016	Declaration of Brianna Lynn Silverstein in Support of Motion for <i>Pro Hac Vice</i> Admission
2017	Declaration of Donald J. Davidshofer
2018	Deposition Transcript of Joseph Fester (Apr. 26, 2024)
2019	U.S. Patent No. 8,789.235 (“the ’235 patent”)
2020	https://www.dyson.com/vacuum-cleaners/cordless/v10/shop-all (accessed May 7, 2024)
2021	Dyson’s Pricey Cordless Vac is So Good, It’s Killing Cords Altogether, Mar. 8, 2018, <i>available at</i> https://gizmodo.com/dysons-pricey-cordless-vac-is-so-good-its-killing-cord-1823469578 (accessed May 7, 2024)
2022	Dyson Cyclone V10: Seriously powerful cordless vacuum starts at \$500, Mar. 5, 2018, <i>available at</i> https://www.cnet.com/reviews/dyson-cyclone-v10-absolute-preview/ (accessed May 7, 2024)

Exhibit	Description
2023	Dyson Cyclone V10 vacuum review: Bigger isn't always better, Mar. 6, 2018, <i>available at</i> https://web.archive.org/web/20180306235846/https://mashable.com/2018/03/06/dyson-cyclone-v10-review/#nWCAg.es4kqi (accessed May 7, 2024)
2024	Dyson to go all cordless with vacuums, starting with the Cyclone V10, Mar. 6, 2018, <i>available at</i> https://www.engadget.com/2018-03-06-dyson-cyclone-v10-vacuum-cordless-handheld.html (accessed May 7, 2024)
2025	Dyson is done with corded vacuums as the powerful Cyclone V10 looks to clean up, Mar. 6, 2018, <i>available at</i> https://www.techradar.com/news/the-dyson-cyclone-v10-wants-to-clean-up-on-powerful-cordless-vacuums (accessed May 7, 2024)

I. INTRODUCTION

Patent Owner Dyson Technology Limited provides the following response to the Petition filed by Petitioners SharkNinja, Inc., SharkNinja Operating LLC, SharkNinja Management LLC, and SharkNinja Sales Company requesting *inter partes* review of claims 1-4, 8, and 10 (“the Challenged Claims”) of U.S. Patent No. 10,433,687 (“the ’687 Patent”). For at least the reasons set forth below, Patent Owner requests that the Board confirms patentability of the Challenged Claims.

Petitioners cannot meet their burden of showing each Challenged Claim is unpatentable by a preponderance of the evidence. 35 U.S.C. § 316(e). Fatal to each of the grounds, Petitioners have failed to show a person of ordinary skill in the art (“POSITA”) would have been motivated to incorporate a handle from Conrad’787 or Dyson into Conrad’630 or Matsumoto in the manner Petitioners propose. Petitioners’ proposed modifications to Conrad’630 and Matsumoto result in vacuums with inferior weight balance that increases wrist, elbow, and arm strain during common use situations compared to unmodified versions of the same. Properly applying the general knowledge of a POSITA and the teachings of Conrad’787 and Dyson to Conrad’630 or Matsumoto either confirms the configuration already present in Conrad’630 or Matsumoto or leads away from the claimed features.

In Grounds 1 and 2, Petitioners assert that a POSITA would have modified Conrad'630 to include Conrad'787's or Dyson's handle oriented at a particular angle at the rear of the handheld vacuum relying heavily on a singular statement within Conrad'630 that even Petitioners' expert, Joseph Fester, agrees does not include any reference to such a handle. The vacuums of Conrad'630 and the secondary references have significant differences, such as the location of the heavy components and suction nozzle, that make it impractical to, and would dissuade one from, attaching Conrad'787's or Dyson's handle on Conrad'630's rear. Further, the alleged benefits of Conrad'787's or Dyson's handles Petitioners cite in the secondary references are already present in Conrad'630 without any modified handle and those alleged benefits would be lost by making Petitioners' proposed modifications.

In Grounds 3 and 4, Matsumoto and the secondary references have significant differences, such as the location of the heavy components and suction nozzle, that would have made it untenable to add Conrad'787's or Dyson's handle on Matsumoto's rear as Petitioners propose. Further, all Petitioners' alleged motivations to substitute Conrad'787's or Dyson's handle for Matsumoto's handle first require modifying Matsumoto to form a hypothetical miniaturized version of the vacuum illustrated in Figure 25. Nothing in Matsumoto would have led a POSITA to miniaturize Matsumoto as Petitioners propose. Finally, the alleged

motivations from Conrad’787’s and Dyson’s teachings are irrelevant to even a hypothetical miniaturized version of Matsumoto.

Therefore, Petitioners have not shown by a preponderance of the evidence that any Challenged Claim is unpatentable.

II. CLAIM CONSTRUCTION

For the purposes of this Response only, Patent Owner agrees with Petitioners that construction of any claim term is not necessary for the Board to find the Challenged Claims not unpatentable, Pet., 5, and Patent Owner does not contest Petitioners’ definition of a POSITA, *id.*, 15-16. Patent Owner reserves the right to contest the construction of claim terms and Patent Owner’s definition of a POSITA at any other point in this proceeding or in any other proceeding involving the ’687 Patent or any patents regarding a related technology.

III. TECHNICAL BACKGROUND

A. Summary of ’687 Patent

The ’687 Patent is directed to “a handheld vacuum cleaner comprising a cyclonic separating unit.” EX-1001, 1:11-12; EX-2017 ¶26. The ’687 Patent describes GB 2440111B (EX-2002) as disclosing “a handheld vacuum cleaner” with a “cyclonic separator” that includes “a collector for collecting dirt,” arranged such that “[i]n order to empty the collector, a user positions the base over a waste bin and then releases the catch [so that] [t]he base swings open and dirt which has

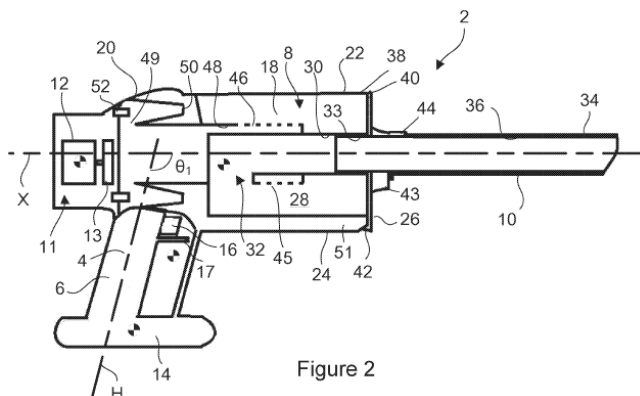
been collected falls from the collector into the waste bin.” EX-1001, 1:16-29; EX-2017 ¶26. The ’687 Patent states that one drawback of this arrangement is that “it is slightly awkward because the user typically has to twist his or her hand to one side or upwardly in order to direct the dirt away from themselves into the waste bin.” EX-1001, 1:29-33; EX-2017 ¶26. The ’687 Patent recognizes that “[a]n improved arrangement is therefore desirable.” EX-1001, 1:33-34; *see also* EX-2017 ¶26; EX-1003 ¶16; EX-2018, 34:23-35:4.

The ’687 Patent discloses a handheld vacuum with both a “cyclonic separating unit comprising an end portion having a closed configuration in which dirt is retained within the dirt collector by the end portion and an open configuration for the removal of dirt from the dirt collector,” as well as a handle that “has a pistol grip configuration in which the handle is inclined with respect to the cyclonic separating unit 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.” EX-1001, 1:38-51; EX-2017 ¶27. The ’687 Patent states that with this arrangement, the vacuum “can be emptied by pointing the cyclonic separating unit away from the user and opening the end portion while maintaining a natural grip on the handle” making “[t]he process of emptying the dirt collector ... both ergonomic and intuitive” and providing “a low risk of the user coming into

contact with the dirt as it is emptied because the dirt collector opens away from user.” EX-1001, 1:52-59; EX-2017 ¶27. Specifically, the ’687 Patent discloses:

Referring to FIG. 8, in order to empty the dirt collector 38 and the fine dust collector 51 of either of the described embodiments, the user first disconnects the cleaning tool 10 or the wand 110. Then, whilst gripping the handle 6, the user points the vacuum cleaner 2 towards a suitable receptacle (e.g. a waste bin or bag) into which the dirt is to be emptied. The catch 42 is then released by the user and the end wall 26 pivoted from its closed position into its open position. Since 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. Consequently, the process by which the dirt collector 38 and the fine dust collector 51 are emptied is very intuitive and ergonomic. Furthermore, 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. Therefore, there is less risk that dirt will spill from the dirt collector 38/fine dust collector 51 onto a user during emptying.

EX-1001, 5:61-6:11; EX-2017 ¶27.



EX-1001 Fig. 2

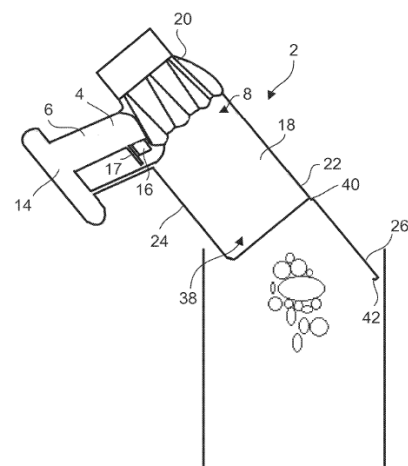
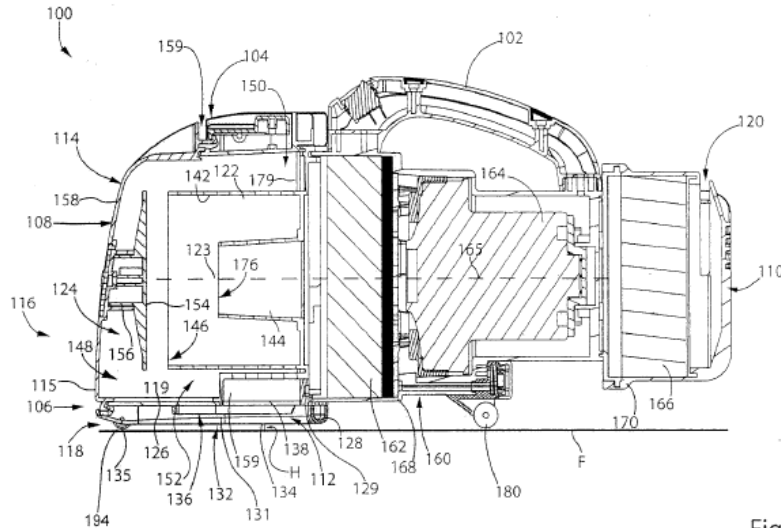


Figure 8
EX-1001 Fig. 8

B. Summary of Asserted Prior Art

1. U.S. Patent Publication No. 2011/0314630 (“Conrad’630”)

Conrad’630 discloses a “hand carried surface cleaning apparatus having a removable dirt chamber.” EX-1004 ¶[0001]; EX-2017 ¶30.



EX-1004 Fig. 6

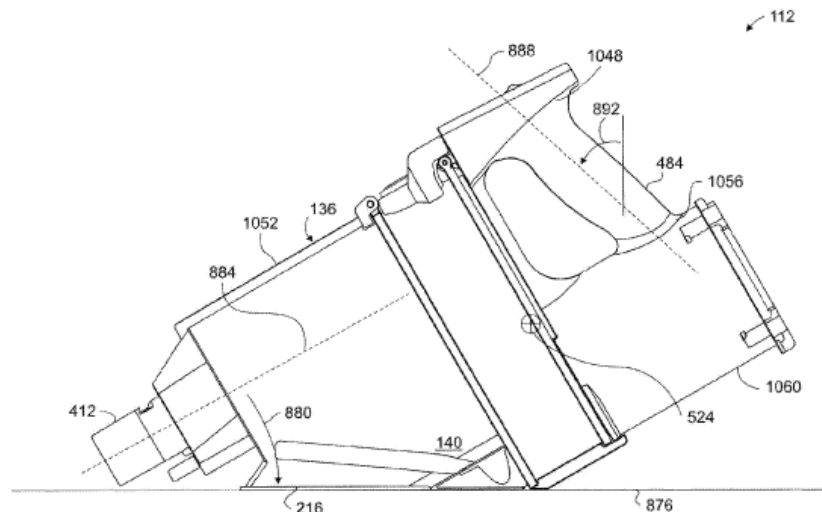
Fig.6

Dirt from the surface to be cleaned is drawn into the vacuum through “[n]ozzle 112 [that] engages a surface to be cleaned, and comprises a dirty air inlet 118.” EX-1004 ¶[0054]; EX-2017 ¶31. The “nozzle 112 is positioned at the bottom of the vacuum cleaner 100, and, preferably, beneath the cyclone unit 114.” EX-1004 ¶[0056]; EX-2017 ¶31. The “handle 102 is provided at the upper portion 104” opposite nozzle 112. EX-1004 Fig. 6, ¶[0052]; EX-2017 ¶31. The vacuum is designed to be “moveable along a surface to be cleaned by gripping and maneuvering handle 102.” EX-1004 ¶[0052]; EX-2017 ¶31. Although Conrad’630 mentions “handle 102 may be provided elsewhere on the vacuum

cleaner 100, for example at the rear 110 and may be of any design,” it does not depict any handle other than that shown in Figure 6. EX-2018, 64:24-65:13, 140:12-23; EX-1004 ¶[0052]; EX-2017 ¶32.

2. U.S. Patent Publication No. 2016/0174787 (“Conrad’787”)

Conrad’787 discloses a “stick vacuum cleaner wherein a hand vacuum cleaner is removably mounted to a drive handle.” EX-1006 ¶[0002]; EX-2017 ¶33. A “handvac” is illustrated and described in one of the embodiments, EX-1006 ¶[0311], Fig. 78; EX-2017 ¶33, and this is the embodiment Petitioners rely on. Pet., 21-22, 29-32, 37-43, 71-74, 80-83; ID, 19.



EX-1006 Fig. 78

Conrad’787 states that the “handvac” includes “a flat bottom wall, for supporting the handvac on a horizontal surface, and which extends at an acute angle (e.g., between 20 and 40 degrees) away from the inlet nozzle axis, and optionally at about the in-use orientation.” EX-1006 ¶[0311]; EX-2017 ¶34.

Conrad’787 discloses “handvac 112 is most comfortably operated in an orientation that does not require an application of torque by the user’s hands when the handvac 112 is held by handle 484.” EX-1006 ¶[0314]; EX-2017 ¶34. “This may be the case where the center of gravity 524 of the handvac 112 is aligned vertically below the user’s hand.” EX-1006 ¶ [0314]; EX-2017 ¶34. “Accordingly, the center of gravity 524 may be vertically aligned below handle 484 in comfortable in-use orientation of handvac 112.” EX-1006 ¶[0314]; EX-2017 ¶34.

Conrad’787 describes factors for aligning the handle axis 888 “vertically below handle 484” so that “when a user grasps handvac 112 by handle 484 and lifts handvac 112, handvac 112 may already be in a balanced in-use position with the center of gravity 524 aligned below the user’s hands.” EX-1006 ¶[0315]; EX-2017 ¶35. Conrad’787 continues, “handle axis 888 of handle 484 extends at a (non-zero) forward angle 892 to the vertical ... [that] may provide a comfortable handle alignment for grasping by a user when picking up handvac 112, and when using handvac 112 for cleaning surfaces below the user’s elbows.” EX-1006 Fig. 78, ¶[0317]; EX-2017 ¶35. Accordingly, Conrad’787 alleges that its handle positioning and alignment is based on the center of gravity and alignment of the handvac when picking up the handvac and in use. EX-2017 ¶35.

3. Int'l Publication No. WO 2008/009888 (“Dyson”)

Dyson discloses a “hand-held vacuum cleaner in which the arrangement of the handgrip, the motor and fan assembly and the power source allow the hand-held vacuum cleaner to be manipulated easily and comfortably.” EX-1007, 2:6-8; EX-2017 ¶36. Dyson states that its hand-held vacuum that can be manipulated easily and comfortably is an improvement over the prior art, which “discloses a hand-held vacuum cleaner having a cylindrical main body and a handgrip arranged at one end . . . [, wherein t]he handgrip is arranged transversely to the longitudinal axis of the cylindrical main body and approximately parallel to the suction conduit.” EX-1007, 1:19-23; EX-2017 ¶36. Dyson explains this prior art handle positioning results in the heavy components being forward of the handgrip, causing the center of mass to be located substantially forward of the handgrip. EX-1007, 1:25-29; EX-2017 ¶36. Dyson recognizes that this handle position so far back from the center of gravity “may result in the hand-held vacuum cleaner ... being tiring and uncomfortable to use because the user will have to exert additional effort in order to maintain the hand-held vacuum cleaner in a fixed orientation.” EX-1007, 1:29-2:2; EX-2017 ¶36.

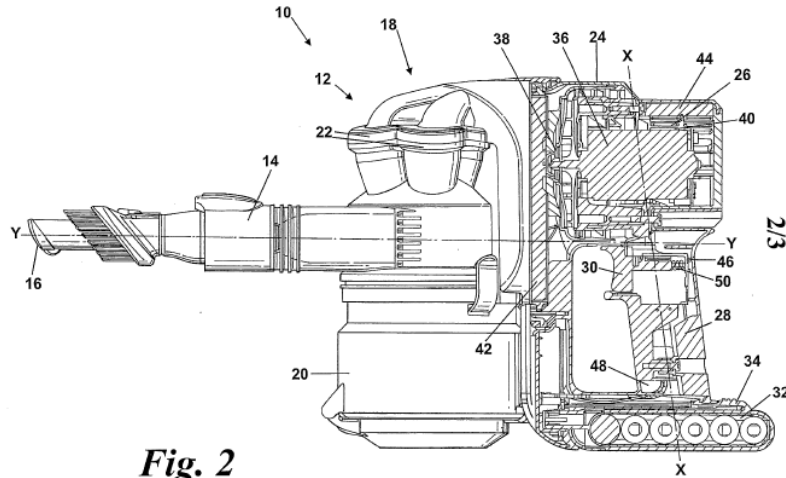


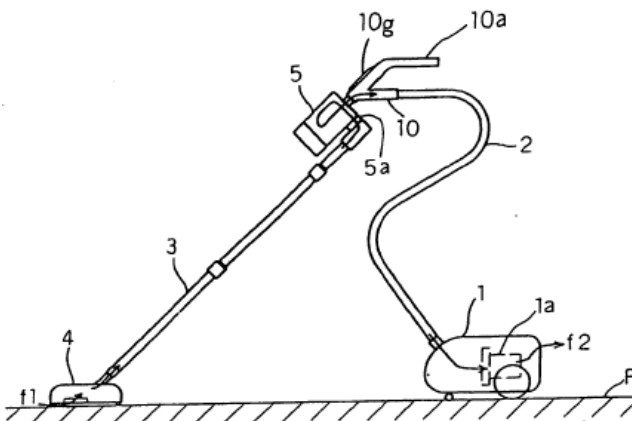
Fig. 2
EX-1007 Fig. 2

In Dyson, the “separating apparatus [18] is located between the suction conduit [14] and the elongate handle [28],” which “improves the weight balance of the hand-held vacuum cleaner.” EX-1007, 2:25-27; EX-2017 ¶37. Dyson’s handle is located “between the airflow generator 36 and the power source 32 allow[ing] the hand-held vacuum cleaner 10 to be manipulated easily in use ... because the user’s hand will be located between the two heaviest components ... result[ing] in a ‘dumbbell-like’ configuration in which the weight of the hand-held vacuum cleaner 10 is distributed on both sides of the user’s hand.” EX-1007, 6:6-11; EX-2017 ¶37. The “elongate handle [28] lies transverse to the longitudinal axis [Y-Y] of the suction conduit,” which allows a user “to maintain a comfortable wrist position and movement of the hand-held vacuum cleaner feels comfortable.” EX-1007, 2:14-19; EX-2017 ¶37. Accordingly, Dyson describes the handle being

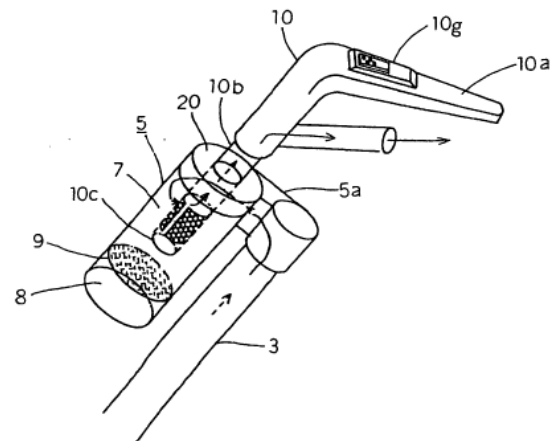
positioned and arranged for weight distribution and alignment with the longitudinal axis of the suction conduit. EX-2017 ¶37.

4. EP Publication No. 1,199,023 (“Matsumoto”)

Matsumoto discloses “a vacuum cleaner having a cyclone dust collecting part that separates dust and dirt by forming suction air into a whirling stream.” EX-1005 ¶[0001]; EX-2017 ¶39. The weight of the vacuum is at least partially distributed to the surface to be cleaned. EX-2017 ¶39; EX-2018, 172:23-173:12.



EX-1005 Fig. 1



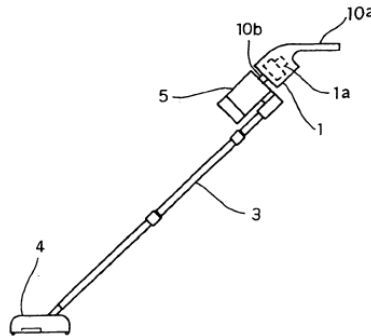
EX-1005 Fig. 2

Matsumoto further discloses that the dust collection chamber, as illustrated in Figure 2, is emptied by “detach[ing] the first and second dust collecting chambers 7 and 8 integrally from the vacuum cleaner, and then separate[ing] the first and second dust collecting chambers 7 and 8 from each other above a trash can or the like.” EX-1005 ¶[0046]; EX-2017 ¶40.

Matsumoto also discloses a fifth embodiment in Figure 25 whereby “[t]he handle 10a held by the user during cleaning is formed integrally with the body 1,”

EX-1005 ¶[0060]; EX-2017 ¶41, and this is the embodiment Petitioners rely on.

Pet., 61-80, 83-98.



EX-1005 Fig. 25

Matsumoto discloses that “a connection pipe is bent so as to function as a handle held by the user during cl[eaning to] reduce the space occupied by the handle [and] miniaturize a vacuum cleaner and enhance the operability thereof.” EX-1005 ¶[0068]; EX-2017 ¶42.

IV. SPECIFIC GROUNDS OF ALLEGED UNPATENTABILITY

Petitioners have not shown by a preponderance of the evidence that any Challenged Claim is unpatentable under any ground. All grounds fail because Petitioners’ proposed modifications to Conrad’630 and Matsumoto result in vacuums with inferior weight balance that increases wrist, elbow, and arm strain during typical use situations and are contrary to the teachings in Conrad’787 and Dyson.

Grounds 2 and 4 fail for the additional reason that Petitioners do not show that the prior art discloses limitation 1d and the additional limitation of claim 2.

Petitioners rely solely on Dyson's disclosure for these limitations, yet Mr. Fester acknowledged that his angle calculations are based upon an incorrect identification of Dyson's longitudinal axis of the cyclonic separating unit.

Finally, Grounds 3 and 4 fail for the additional reason that a POSITA would not have been motivated to miniaturize Figure 25's embodiment as Petitioners propose, which Mr. Fester admitted is necessary for a POSITA to have been motivated to combine Matsumoto with Conrad'787 or Dyson as Petitioners propose. Further, Petitioners fail to show why any of Petitioners' alleged motivations are relevant to the structural configuration of Matsumoto.

Thus, Petitioners have not met their burden of showing by a preponderance of the evidence that any Challenged Claim was obvious, and the Board should find that none of the Challenged Claims are unpatentable.

A. GROUND 1: Petitioners fail to show that Conrad'630 in combination with Conrad'787 would have rendered obvious the Challenged Claims

Acknowledging that Conrad'630 fails to disclose limitation 1d of the Challenged Claims, Petitioners allege that it would have been obvious to place and orient Conrad'787's handle on Conrad'630 in a manner that meets the limitation 1d.¹ *Id.*, 37-41; *see also* EX-1003 ¶¶75-76. However, Petitioners' proposed

¹ Although the Petition and Mr. Fester's declaration both state for Grounds 1 and 2 that the combination replaces Conrad'630's handle with Conrad'787's or Dyson's

combination results in a vacuum with inferior weight balance that increases wrist, elbow, and arm strain during typical use situations and is contradictory to the general knowledge of a POSITA and the teachings of Conrad'630 and Conrad'787 for the reasons provided below.

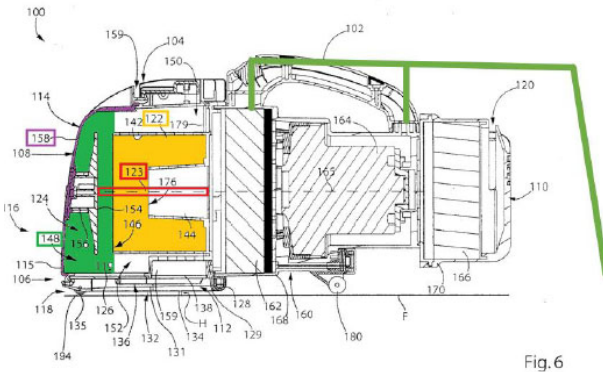
1. Conrad'630's and Conrad'787's disclosures would not have motivated a POSITA to make Petitioners' proposed combination

Petitioners allege that disclosures in both Conrad'630 and Conrad'787 would have motivated a POSITA to make the proposed combination. However, none of these disclosures would have motivated a POSITA to add Conrad'787's handle to Conrad'630. As Mr. Fester admitted, in most cases, the alleged benefits already exist in Conrad'630. In contrast, those alleged benefits are lost if the user modifies Conrad'630.

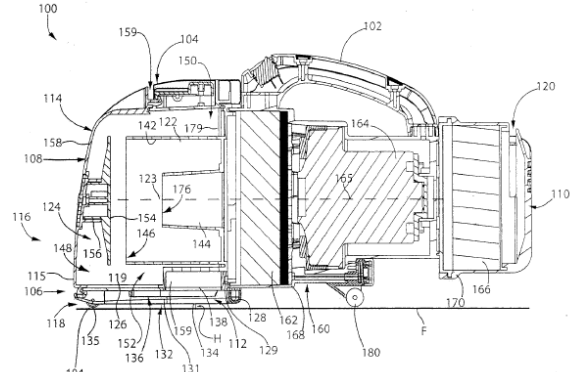
handle (Pet., 23, 37-43, 52, 56-60; EX-1003 ¶¶74-75, 89-106, 128-129, 138-150; ID, 25), Mr. Fester alleged at his deposition that his combination would retain use of Conrad'630's handle and add Conrad'787's or Dyson's handle. EX-2018, 91:6-22, 145:17-146:9. Given that Mr. Fester's declaration does not make this allegation and the only claimed "handle" relied upon for Grounds 1 and 2 are Conrad'787's and Dyson's handles, the only relevant handles to consider in whether a POSITA would have been motivated to make Petitioners' proposed combinations are Conrad'787's or Dyson's handles.

a. Functionality and useability of Conrad'630 would be diminished with Conrad'787's handle at the rear

Petitioners rely heavily on a single sentence in Conrad'630's paragraph [0052] that recites "handle 102 may be provided elsewhere on the vacuum cleaner 100, for example at the rear 110 and may be of any design." Pet., 23; EX-1003 ¶65; *see also* ID, 26. Although this statement may imply that a handle may be provided at Conrad'630's rear, the arm and wrist strain caused by increased torque created by utilizing Conrad'787's handle at Conrad'630's rear would have led a POSITA away from this proposed modification. EX-2017 ¶52. Torque is force times distance, and thus torque increases as the distance between the handle and the heavy components of the object increases. EX-2017 ¶53. Accordingly, a POSITA would have understood it is more difficult to hold an object in a fixed orientation when all the heavy weight is distributed horizontally away from the hand in one direction (Petitioners' hypothetical Conrad'630 with handle in rear) compared to holding an object where the weight is distributed on opposing horizontal sides of the hand (EX-1004 Fig. 6) or distributed closer to the hand. EX-2017 ¶53. The strain on the user caused by torque is compounded if the handle is rotated from an orientation substantially transverse to gravity (as shown in EX-1004 Fig. 6) to an orientation substantially parallel to gravity (as shown in Petitioners' proposal) because the torque adds additional stress on the wrist. EX-2017 ¶53.



EX-1003 ¶75

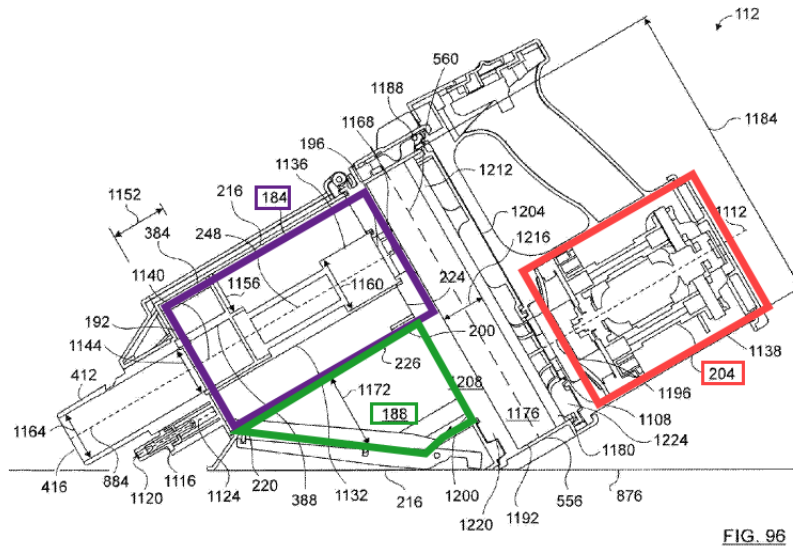


EX-1004 Fig. 6

Dyson confirms this concern as it relates to handheld vacuums stating that when the heavy components are located forwardly of the handle relative to the user's hand during use, the vacuum is "tiring and uncomfortable to use because the user will have to exert additional effort in order to maintain the hand-held vacuum cleaner in a fixed orientation." EX-1007, 1:25-2:2; EX-2017 ¶54. Similarly, Conrad'787 explains that "handvac 112 is most comfortably operated in an orientation that does not require an application of torque by the user's hands when the handvac 112 is held by the handle 484 [which] may be the case where the center of gravity 524 of the handvac 112 is aligned vertically below the user's hand." EX-1006 ¶[0314]; EX-2017 ¶54.

Conrad'630's illustrated examples include handle positioning that allows for the weight to be distributed below the user's hand and substantially evenly in opposing directions along the horizontal. EX-2017 ¶55. Conrad'787's illustrated embodiments also include handle 484 with heavy components vertically below and horizontally on opposite sides of the user's hand. EX-2017 ¶55. For example,

Figure 96 includes suction motor 204 (red) below and behind the handle while cyclone chamber 184 (purple) and dirt collection chamber 188 (green) are below and forward of the handle when oriented as in Figure 96. EX-2017 ¶55.

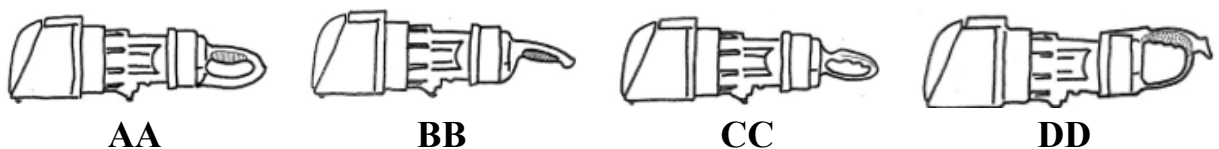


EX-1006 Fig. 96

Petitioners proposed modification would result in the heavy components being forward of the handle contrary to the general knowledge of a POSITA, the illustrated positioning of Conrad'630's and Conrad'787's handles, and Dyson's explicit teachings. A POSITA would have found that all of that evidence would have outweighed Conrad'630's single throw away sentence merely suggesting that a handle could be placed on the rear. EX-2017 ¶56. Therefore, a POSITA would not have expected success in adding Conrad'787's handle to Conrad'630's rear. EX-2017 ¶56.

Further, Conrad'630 provides no guidance as to an alternative handle design. EX-2017 ¶57. As Mr. Fester acknowledged, Conrad'630 does not refer to a handle

such as that in Conrad’787 and there were other alternative handle designs available at the time. EX-2018, 65:7-67:20; *see also* EX-2017 ¶57. For example, because Conrad’630 has wheels, the alternative design could be a handle similar to a push cart where it connects at rear 110 and extends up and/or back to create a handle for pushing the vacuum along the surface. EX-2017 ¶57. The hypothetical examples below offer the user the comfort to manipulate the vacuum fore and aft on a horizontal surface that is below the user’s elbow, which is a common use condition, with the arm in a natural downward position, which reduces strain on the wrist, elbow, and arm compared to Petitioner’s proposed handle orientation that would require bending the arm at the wrist or elbow during movement. EX-2017 ¶57. These hypothetical examples also provide an orientation substantially transverse to gravity that reduces stress on the wrist when holding a vacuum structured like Conrad’630 with the nozzle pointed down compared to a handle that is substantially parallel as Petitioners propose. EX-2017 ¶57.



Petitioners note that Conrad is an inventor of both Conrad’630 and Conrad’787. Pet., 23; EX-1003 ¶63. In fact, Conrad’787’s application was filed five years *after* Conrad’630’s application. *Compare* EX-1004, 1 *with* EX-1006, 1; EX-2018, 67:21-68:3; EX-2017 ¶58. However, Conrad’787 is *not* the vacuum of

Conrad'630 with Conrad'787's handle on the rear. EX-2018, 68:10-19; EX-2017

¶58. Thus, even though the inventor recognized that Conrad’630’s handle could be moved to the rear and be of a different design, there is no evidence of Conrad’787’s handle on the rear of any vacuum with the configuration of Conrad’630. EX-2018, 69:5-11; EX-2017 ¶58.

Notably, Conrad’630’s and Conrad’787’s vacuums are designed to function very differently, and a POSITA would have understood that a major factor in determining handle configuration and placement is how the device is designed to be used. EX-2017 ¶59. Conrad’630 discloses cleaning a surface by a nozzle positioned at the vacuum’s “bottom” engaging the surface to be cleaned such that it is “moveable along a surface to be cleaned by gripping and maneuvering handle 102” and optionally includes front wheels 135 and rear wheels 180 located on the “bottom” in contact with the surface to be cleaned and opposite the handle position. EX-1004 ¶¶[0052], [0054], [0067]; EX-2017 ¶59.

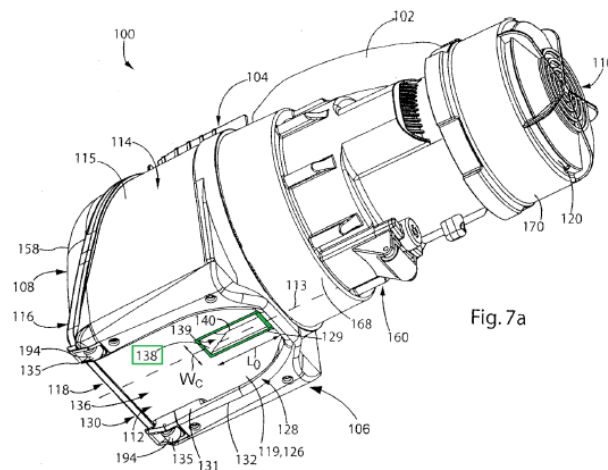


Fig. 7a

In contrast, Conrad’787 discloses a “handvac” with “a flat bottom wall, for supporting the handvac on a horizontal surface, and which extends at an acute angle (e.g., between 20 and 40 degrees) away from the inlet nozzle axis, and optionally at about the in-use orientation.” EX-1006 ¶[0311]; EX-2017 ¶60.

Thus, the positioning of the rear of the vacuum, the nozzle entrance, and how the vacuum is manipulated during cleaning are substantially different between Conrad’630 and Conrad’787. EX-2017 ¶61. A POSITA would have recognized that these differences result in different handle configurations and placements for the vacuums. EX-2017 ¶61. Therefore, a POSITA would not have expected a simple substitution of one handle for the other. EX-2017 ¶61.

At most, a POSITA would have recognized that different handle configurations and positions could be contemplated for Conrad’630’s vacuum. EX-2017 ¶62. Further, for the reasons provided below in Sections IV.A.1.b.-d., none of the alleged “motivations” Petitioners cite would have led a POSITA to modify Conrad’630 to include the specific handle of Conrad’787, much less the specific handle at the claimed location and orientation. EX-2017 ¶62.

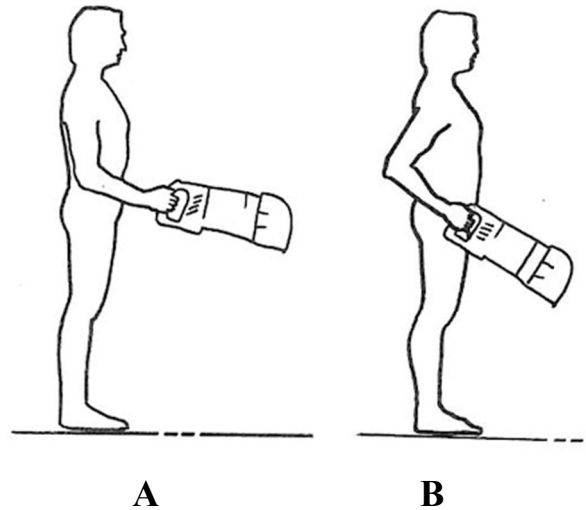
b. Conrad’787’s disclosure of a comfortable handle oriented to reduce torque would not have motivated a POSITA to incorporate Conrad’787’s handle into Conrad’630’s vacuum

Petitioners allege that one motivation to modify Conrad’630’s handle configuration is that Conrad’787 discloses that its handle configuration allows the

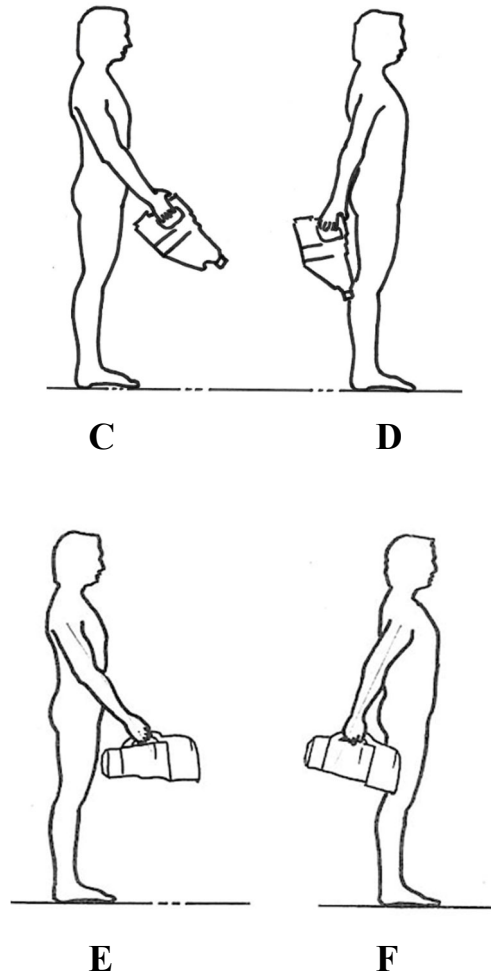
vacuum to be “comfortably operated in an orientation that does not require an application of torque by the user’s hands when the handvac 112 is held by handle 484.” Pet., 23-24; EX-1003 ¶65. However, Petitioners’ proposed combination where a user is operating Conrad’630’s vacuum using Conrad’787’s handle at the rear is in an orientation that creates greater torque on the user’s hand than Conrad’630’s vacuum.

Petitioners rely on Conrad’787’s statement that its handle as positioned reduces torque by the user’s hands when in use because the nozzle axis 884 extends at an angle to the horizontal surface to be cleaned resulting in the rear of the handle 484 being above the center of gravity of the handvac. EX-1006 ¶¶[0312], [0314]; EX-2017 ¶64. As illustrated in A and B below, if a user operates Conrad’630’s vacuum using Conrad’787’s handle located on the rear as Petitioners propose, additional strain of the user’s hands/wrist would be caused during fore/aft action commonly used during cleaning. EX-2017 ¶64; EX-2018, 97:17-98:5. Specifically, the fore/aft action of Conrad’630’s vacuum if modified as Petitioners propose would require a bent elbow position that requires engagement of the wrist, elbow, and shoulder. EX-2017 ¶64; EX-2018, 97:17-98:5. Although embodiments in Conrad’630 include wheels to assist in fore/aft movement, the device, during use, is often lifted or rotated at the end of a stroke to change the angle or move to another path. EX-2017 ¶65. Any advantage in pushing the vacuum from the rear

would be negligible compared to the additional strain on the user to lift and manipulate the vacuum in fore/aft movements where the center of gravity is substantially forward of the handle. EX-2017 ¶¶65.



As compared to Petitioners' proposed combination, a user's hand while operating Conrad'787's or Conrad'630's vacuum would be located more directly below the shoulder similar to when an arm is at rest with less or no bending of the wrist and elbow when the nozzle is at the desired angle to the surface to be cleaned as illustrated in C and D below for Conrad'787 and E and F below for Conrad'630, because both Conrad'787 and Conrad'630 disclose a handle that is opposite the nozzle of the vacuum. EX-1004 Fig. 6; EX-1007 Fig. 78; EX-2017 ¶¶66. Thus, Petitioners' proposed combination requires more engagement of the wrist, elbow, and shoulder when manipulating the vacuum in a fore/aft action commonly used during cleaning than Conrad'787 or Conrad'630. EX-2017 ¶¶66.



- c. **Conrad’787’s disclosure that the handvac’s center of gravity is aligned vertically below the user’s hand would not have motivated a POSITA to incorporate Conrad’787’s handle on Conrad’630’s rear**

Petitioners also allege that a POSITA would have been motivated to modify Conrad’630’s handle configuration because Conrad’787 describes comfortable operation based on “the center of gravity 524 of the handvac 112 [being] aligned vertically below the user’s hand.” Pet., 24; EX-1003 ¶67. Conrad’630 without modification already enjoys this benefit and the proposed combination does not reap it when a user is operating the vacuum using Conrad’787’s handle.

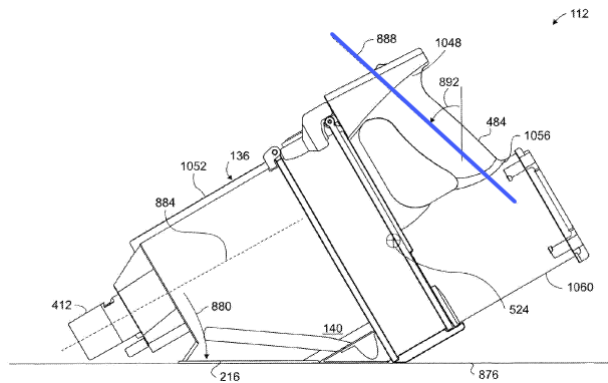
Conrad'787 states that its vacuum's center of gravity 524 is aligned vertically below the user's hand when contacting a horizontal surface to be cleaned. EX-1006 Fig. 78, ¶[0314]; EX-2017 ¶68. Similarly, Conrad'630's handle as illustrated in Figure 6 is positioned vertically above the vacuum's center of gravity as in Conrad'787 because the heavy components such as motor 164 are vertically below the handle in that configuration. EX-2017 ¶68; EX-2018, 72:6-73:13.

In contrast, if a user was operating Conrad'630's vacuum as illustrated in Figure 6 with Conrad'787's handle at the rear, the handle would not be positioned vertically above the vacuum's center of gravity. EX-2017 ¶69; EX-2018, 130:10-131:25.

d. Conrad'787's disclosure of comfort in picking up the vacuum would not have motivated a POSITA to incorporate Conrad'787's handle on Conrad'630's rear

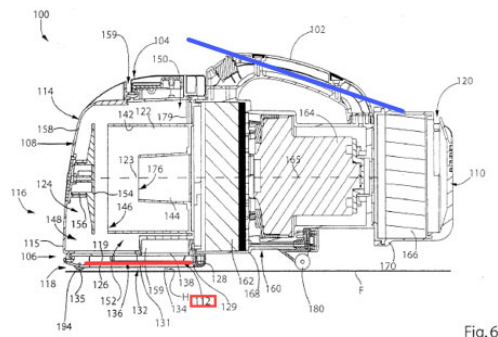
Petitioners also allege that a POSITA would have been motivated to modify Conrad'630's handle configuration because Conrad'787 describes that its configuration provides a comfortable handle alignment for grasping by a user when picking up from a storage surface as well as using the vacuum for cleaning surfaces below the user's elbow. Pet., 24; EX-1003 ¶67. Specifically, Conrad'787 explains that this alleged benefit is derived from the handle axis extending at a non-zero forward angle to the vertical when the vacuum rests on the storage

surface or is aligned to clean a surface below the user's elbow. EX-1006 ¶[0317]; Pet., 24; EX-1003 ¶67; EX-2017 ¶70. As shown below, this non-zero forward angle described in Conrad'787 results in the handle positioned as shown in Figure 78 when the vacuum is on surface 876. EX-2017 ¶70. To pick up the vacuum in Figure 78, a user can maintain their arm in a mostly downward rest position. EX-2017 ¶70.



EX-1006 Fig. 78 (annotated)

Similarly, when Conrad'630's vacuum is resting on a storage surface below the user's elbow as shown in Figure 6, the handle axis maintains an angle similar to that of Conrad'787's Figure 78 and thus would have the same alleged benefits as Conrad'787. EX-2017 ¶71; EX-2018, 74:14-16.



EX-1004 Fig. 6 (annotated)

Thus, Conrad'630's handle is already positioned and angled similarly to Conrad'787 with regard to grasping by a user when picking up the cleaner that is below the user's elbows. EX-2017 ¶72.



In contrast, if Conrad'630's vacuum is modified with Conrad'787's handle in the rear as Petitioners propose, while the handle axis may extend at a non-zero forward angle to the vertical, it is not in an alignment that Conrad'787 alleges is comfortable for grasping by a user when picking up the vacuum or when using the vacuum to clean a surface below the user's elbows. EX-2017 ¶73. Instead, the user must either bend down such that the forearm can be parallel to the surface on which the vacuum is stored or contort the user's wrist in an uncomfortable position when picking up the vacuum or cleaning a surface that is below the user's elbow. EX-2017 ¶73.



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In addition, the center of gravity being so far forward from a rear positioned handle would lead to additional strain on the user when picking up the vacuum from any surface, including one that is not below the user's elbow. EX-2017 ¶73. Thus, for the reasons provided above, a POSITA applying Conrad'787's principles to Conrad'630 would not have been motivated to modify Conrad'630's handle configuration as Petitioners propose. EX-2017 ¶74.

Given that none of Conrad'787's alleged benefits would have motivated a POSITA to use the design of Conrad'787's handle at Conrad'630's rear and a POSITA would have immediately perceived drawbacks in making said modification, Petitioners have not shown that a POSITA would have been motivated to modify Conrad'630 as proposed.

2. The ability to use hose attachments with Conrad'630's vacuum would not have led to Petitioners' proposed modification

Petitioners further argue that a POSITA would have been motivated to incorporate Conrad'787's handle onto Conrad'630's vacuum to reap Conrad'787's

handle's alleged advantages for using attachments. Pet., 24-27; EX-1003 ¶¶69-72.

However, utilizing Conrad'787's handle at Conrad'630's rear would negatively impact the ability to use the hose attachments on which Petitioners rely, and Conrad'787 fails to disclose any advantages for hose attachments in using its handle. EX-2017 ¶75.

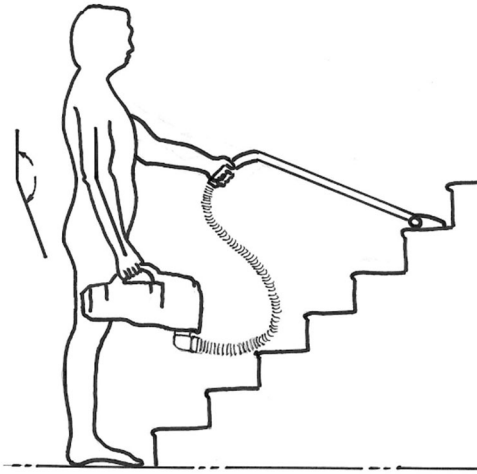
Petitioners recognize that Conrad'630 does not disclose use of attachments, however, they allege that Conrad'663 (EX-1008) is a family member of Conrad'630² and discloses using attachments with Conrad'630's vacuum. Pet., 24-25; EX-1003 ¶71. Notably, Conrad'663 only discloses using hose attachments with a connector as illustrated in Figure 3b that Petitioners cite. Pet., 25; EX-1008, 11:50-52 (“*[F]lexible hose*³ 124 serves as an extended cleaning attachment for the hand vacuum cleaner 400.”), 12:7-12 (“[T]he nozzle 412 may be directly connected to any one of a number of cleaning tools that have been provided with an appropriate attachment member, including wands, brushes, crevasse tools *and other hoses.*”), Fig. 3b; EX-2017 ¶76; EX-2018, 79:15-82:17.

As discussed above in Section IV.A.1.c., Conrad'630 without modification has its handle directly above vacuum's center of gravity when the cleaner is in a

² Petitioners do not explain the family relationship, which is not clear from the face of the patents.

³ Text in bold and italics is added emphasis unless otherwise noted.

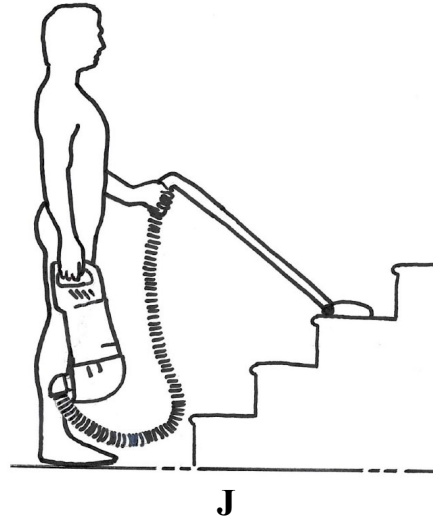
“horizontal” orientation in Figure 6, which Conrad’787 states is a comfortable in-use orientation (EX-1006 ¶[0314]). As illustrated below, the vacuum would be utilized in a similar manner when utilizing the hose attachments Conrad ’663 discloses. EX-2017 ¶77.



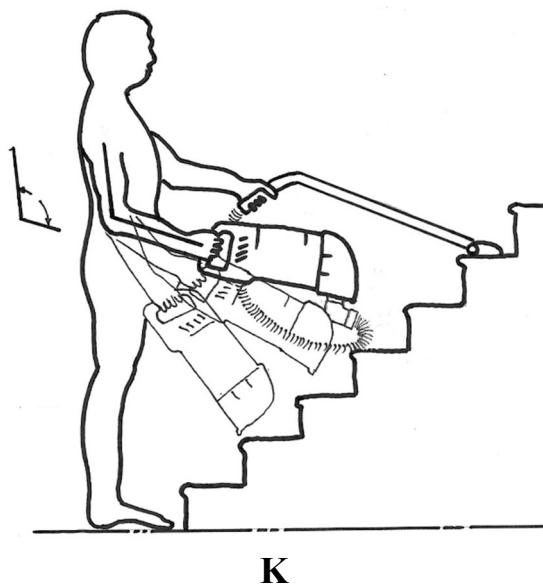
I

Being in a horizontal orientation keeps the lower most part of the cleaner at a higher elevation to better avoid steps or furniture when moving around to clean compared to Petitioners’ proposed modification of Conrad’630. EX-2017 ¶78; EX-2018, 86:9-88:14.

If a user operates Conrad’630’s vacuum with Conrad’787’s handle at the rear as Petitioners propose, the cleaner would “hang” vertically, or near vertically from the user’s hand, when utilizing Conrad’663’s hose attachments. EX-2017 ¶79; EX-2018, 82:19-85:4.



In the vertical position, the lowest portion of the cleaner is at a lower elevation requiring the user to lift the device more often to avoid contact with stairs or furniture when moving around to clean. EX-2017 ¶80. This lifting action would increase user arm/hand stress. EX-2017 ¶80. Such concerns are irrelevant to Conrad'787 because it does not disclose hose attachments that require holding the vacuum in one hand and directing the attachment in the other. EX-2017 ¶81.

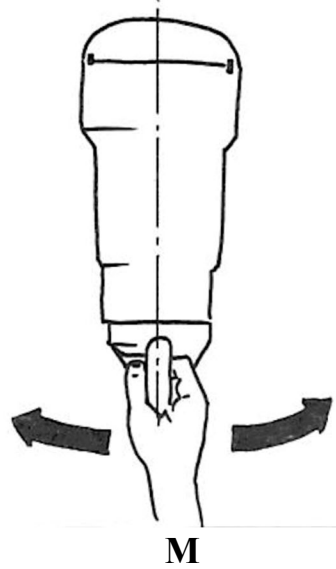


Thus, a POSITA applying Conrad'787's principles to Conrad'630 would not have been motivated to modify Conrad'630's handle configuration as Petitioners propose. EX-2017 ¶82.

3. Conrad'787's handle with Conrad'630's vacuum would have reduced control when cleaning stairs or furniture

Petitioners argue that Conrad'630's vacuum would benefit from Conrad'787's handle configuration when cleaning furniture or stairs because Conrad'787's "drive handle" would provide easier guiding and steering of the vacuum. Pet., 26. However, Petitioners provide no evidence, including expert testimony, to support this conclusion.

Conversely, modifying Conrad'630 to incorporate Conrad'787's handle on the rear would reduce control of the nozzle on the cleaning surface because the nozzle is on the "bottom" of the cleaner. EX-2017 ¶85. Unlike Conrad'787 where the handle is rearward of the nozzle opening along the nozzle axis, Conrad'630's nozzle geometry is approximately perpendicular to the longitudinal axis of the vacuum which would intersect a handle on the rear of the vacuum if modified as proposed by Petitioners. EX-2017 ¶85. Thus, Conrad'787's alleged "drive handle" being placed in the rear of Conrad'630 would result in less control of the nozzle placement relative to the surface to be cleaned than handle 102 as illustrated in Conrad'630. EX-2017 ¶85.



One typical cleaning action for a vacuum cleaner is not fore and aft in parallel passes like in illustration N; rather, the vacuum is moved in a sequentially diagonal direction that “walks” the cleaner across the surface like in illustration O. EX-2017 ¶86.



The movement in illustration O is a more efficient manner that covers a large area in a minimal number of passes. EX-2017 ¶87. This method requires the user to twist the nozzle on the surface to afford the diagonal affect. EX-2017 ¶87. This twisting action is better achieved when the user operates the vacuum using

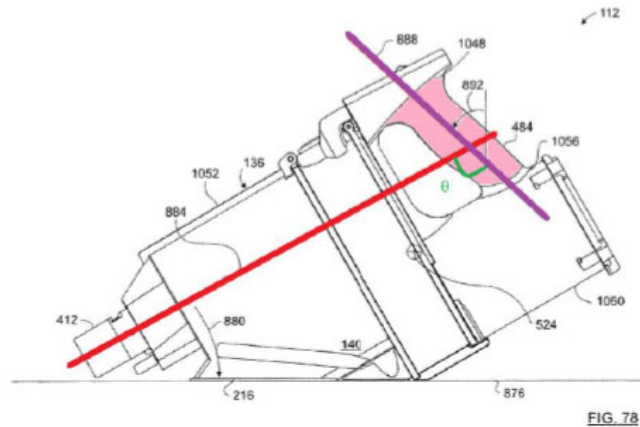
Conrad'630's handle location compared to Petitioners' proposed rear location because in Conrad'630's location, the twist is generated by the axial rotation of the full arm or engaging the wrist and arm, which is a natural use of the arm. EX-2017 ¶87.

Thus, a POSITA would not have found that Conrad'787's "drive handle" would improve the ability to clean stairs or furniture with Conrad'630's vacuum. EX-2017 ¶88. Instead, a POSITA would have recognized that Petitioner's proposed configuration would reduce a user's ability to guide and steer the vacuum when cleaning, including on stairs or furniture, compared to Conrad'630's illustrated handle configuration. EX-2017 ¶88. Therefore, a POSITA would not have been motivated to modify Conrad'630 to incorporate Conrad'787's handle at the rear as Petitioners propose. EX-2017 ¶88.

4. Applying the teachings in Conrad'787 would not result in the handle on Conrad'630 at the claimed angle

Limitation 1d and the additional limitation of claim 2 recite that "the handle is inclined with respect to the cyclonic separating unit to form an angle of not less than [85/100] degrees and not greater than [140/125] degrees between [a/the] handle axis and the longitudinal axis of the cyclonic separating unit." Petitioners argue that Conrad'787 discloses the claimed angles and that a POSITA would have been motivated to incorporate a handle angled like Conrad'787 at Conrad'630's rear in order to meet these limitations. Pet., 37-42; EX-1003 ¶¶88-106; EX-2018,

137:10-18. In doing so, Petitioners identify Conrad’787’s handle axis 888 (purple) as the claimed handle axis and longitudinal axis 884 (red) as the claimed longitudinal axis of the cyclonic separating unit 184. Pet., 37-38; EX-1003 ¶¶91.



Pet., 38; EX-1003 ¶¶91

Petitioners then determine the calculations of the claimed angles utilizing those defined axes. Pet., 37-42; EX-1003 ¶¶88-106. However, Conrad’787 defines line 884 as the “nozzle axis” and the angles Petitioners rely upon for the claimed angles relate to the angle between the handle axis and the nozzle axis. EX-1006 ¶¶[0312], [317]; Pet., 39-40; EX-1003 ¶¶92-93. Thus, if the teachings of Conrad’787 are applied to Conrad’630, then the handle axis would be at an angle related to the nozzle axis in Conrad’630, not the longitudinal axis of the cyclonic separating unit. EX-2017 ¶89. Unlike in Conrad’787, the nozzle axis in Conrad’630 is perpendicular to the longitudinal axis of the cyclonic separating unit. EX-2017 ¶90. If Conrad’787’s handle was positioned on Conrad’630’s vacuum relative to the longitudinal axis of the suction conduit of Conrad’630, the relevant angle would be

outside the values recited in Claim 1 and the relevant axes would not intersect within the vacuum as Claim 1 requires. EX-2017 ¶¶91.

For example, when you use Mr. Fester's calculation that states the angle between the handle axis and the nozzle axis in Conrad'787 is 105° , the handle would be at an angle to the longitudinal axis of the cyclonic separating unit outside of the range claimed in the Challenged Claims. EX-2017 ¶¶91. As illustrated below, when handle axis (purple) is set to 105° relative to the nozzle axis (red) as Petitioners propose, the handle is inclined with respect to the cyclonic separating unit (orange) at an angle of 15° , which is outside of the claimed range. EX-2017 ¶¶91. The handle axis and the longitudinal axis also do not intersect within the vacuum as required by the Challenged Claims. EX-2018 ¶¶91.

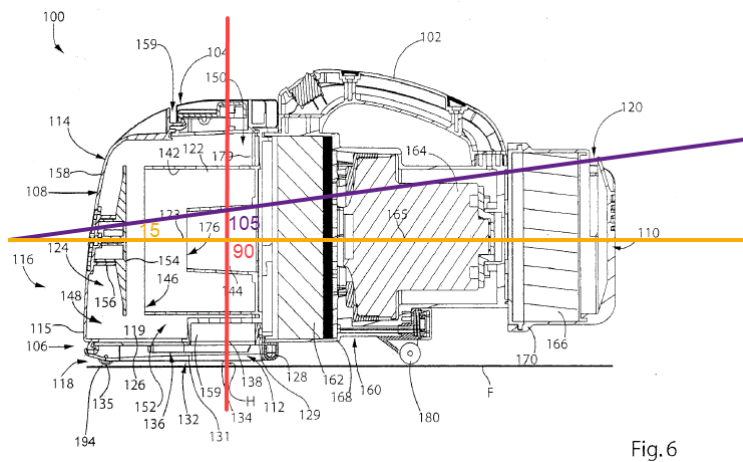


Fig. 6

EX-1004 Fig. 6 (annotated)

Petitioners failed to consider this difference when alleging that a POSITA would have utilized the angles calculated in Conrad'787 in Conrad'630. EX-2017

¶90. Petitioners provide no explanation for why a POSITA would have been motivated to incorporate Conrad'787's handle, which is angled in relation to the nozzle axis, onto Conrad'630's vacuum at Conrad'787's disclosed angle in relation to Conrad'630's longitudinal axis of the cyclonic separating unit as Petitioner proposes. Pet., 27; EX-1003 ¶¶74-46. Thus, Petitioners have not shown sufficient motivation to combine Conrad'630 and Conrad'787 as proposed.

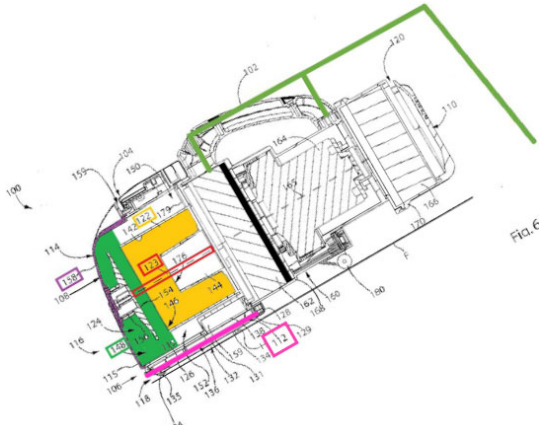
5. Reduced efficiency and poorer cleaning performance would not have motivated a POSITA to modify Conrad'630 as Petitioners propose

As the distance between the suction nozzle and the floor surface increases, a vacuum experiences a loss of suction resulting in reduced efficiency and poorer cleaning performance. EX-2017 ¶92; EX-2018, 29:17-24. This is the concept behind one of Mr. Fester's patents—U.S. Patent No. 8,789,235 (“'235 Patent,” EX-2019⁴). EX-2018, 29:25-30:20; EX-2019 at 1:22-30. As Mr. Fester acknowledged, this concept equally applies when the vacuum is tilted away from perpendicular to the surface to be cleaned resulting in loss of suction. EX-2018, 34:2-9.

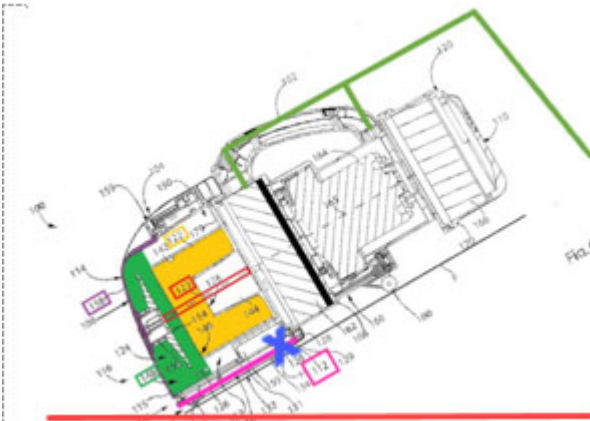
As discussed above in Section IV.A.1.b., because Conrad'630's handle is located opposite of the suction nozzle opening, the nozzle can be located in close proximity to a surface to be cleaned while allowing the user's arm to be extended naturally. EX-2017 ¶93. To use Conrad'787's handle at Conrad'630's rear and

⁴ This document was marked as Exhibit 2 to the deposition.

keep the nozzle in close proximity to the surface to be cleaned, the user either has to bend his or her elbow, causing stress and tension on the user's wrist, elbow, and shoulder, or the surface to be cleaned has to be inclined as illustrated below using Mr. Fester's mockups. EX-2017 ¶¶93.



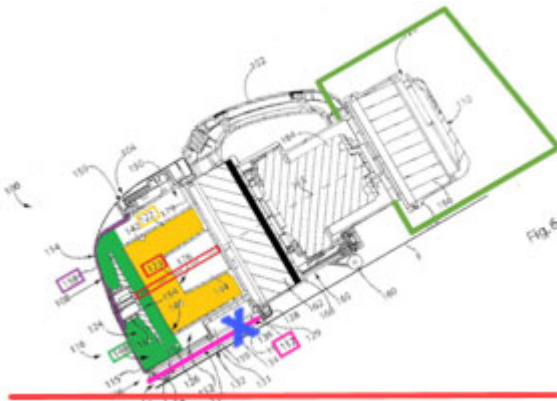
between the suction nozzle and the floor surface would increase as shown by the exemplary illustrations where the red line is the surface to be cleaned. EX-2017 ¶94.



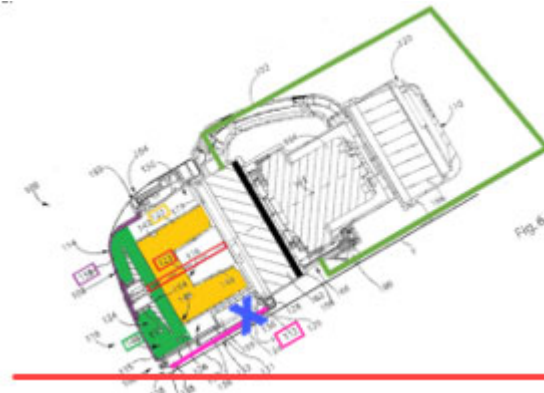
EX-1003 ¶¶ 75, 130
(further annotated)



EX-1003 ¶¶ 76, 131
(further annotated)



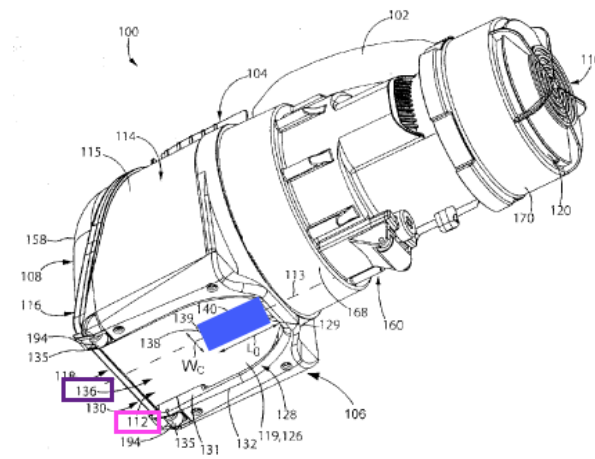
**EX-1003 ¶¶ 76, 131
(further annotated)**



**EX-1003 ¶¶ 76, 131
(further annotated)**

As Mr. Fester recognized, Petitioners' modification would, in most instances, result in reduced efficiency and poorer cleaning performance resulting from the loss of suction that occurs as the distance between the suction nozzle and the floor surface increases. EX-2017 ¶¶97; EX-2018, 34:2-9; EX-2019 at 1:22-30.

This issue is even more pronounced for Conrad'630's embodiment that Petitioners rely upon because of the location of nozzle opening 138. EX-2017 ¶95. Conrad'630 discloses that nozzle 112 (pink) includes airflow chamber 136 (purple) and the opening 138 (blue) is located at the back of nozzle 112. EX-1004 ¶¶[0060]-[0062]; EX-2017 ¶95.



EX-1004 Fig. 74 (annotated)

Thus, when a user utilizes Petitioners' proposed combination with Conrad'787's handle at an angle to decrease stress on the user's wrist, elbow, and shoulder as indicated in the illustrations above, the distance between the opening 138 (blue X) and the surface to be cleaned is vast. EX-2017 ¶96. In addition, nozzle 112 is designed to suck in air and debris using negative pressure created by the suction motor when depending wall 128 is in close proximity to the surface to be cleaned. EX-2017 ¶96. Where depending wall 128 is not uniformly in close proximity to the surface to be cleaned, negative pressure weakens. EX-2017 ¶96. Thus, when

Conrad'630's vacuum is at an angle to the surface to be cleaned as shown, it is unlikely that the vacuum would pick up any debris on the surface. EX-2017 ¶¶96.

This decrease in performance would have discouraged a POSITA from incorporating Conrad'787's handle at Conrad'630's rear. EX-2017 ¶¶98. Thus, a POSITA would not have been motivated to modify Conrad'630 as Petitioners propose. EX-2017 ¶¶98.

In sum, Petitioners do not provide any viable motivations that existed for a POSITA to incorporate Conrad'787's handle on the rear of Conrad'630's vacuum, and Patent Owner and its expert have provided additional reasons that would not have motivated a POSITA to make such a modification. Thus, Petitioners have not shown by a preponderance of the evidence that any Challenged Claim is unpatentable under Ground 1.

B. GROUND 2: Petitioners fail to show that Conrad'630 in combination with Dyson would have rendered obvious the Challenged Claims

Acknowledging that Conrad'630 fails to disclose limitation 1d, Petitioners allege that it would have been obvious to place and orient Dyson's handle on Conrad'630 in a manner that meets limitation 1d. Pet., 56-59; *see also* EX-1003 ¶¶130-131.

This argument fails for two reasons. First, Petitioners have not shown that the proposed combination meets either the limitation 1d or the additional limitation of claim 2. Second, just like in Ground 1, Petitioners' proposed combination results

in a vacuum with inferior weight balance that increases wrist, elbow, and arm strain during common use situations and is contradictory to the general knowledge of a POSITA and the teachings of Conrad'630 and Dyson for the reasons provided below.

1. Petitioners have not shown that the combination discloses limitation 1d or the additional limitation of claim 2

Petitioners rely exclusively on Dyson to disclose limitation 1d and the additional limitation of claim 2. Pet., 56-60; EX-1003 ¶¶ 140-150; EX-2018, 154:6-12, 158:5-21. In this analysis, Petitioners allege that longitudinal axis Y-Y represents the longitudinal axis of Dyson's cyclonic separating apparatus 18 as depicted in red. Pet., 56-57; EX-1003 ¶¶ 141; EX-2018, 154:18-155:19.

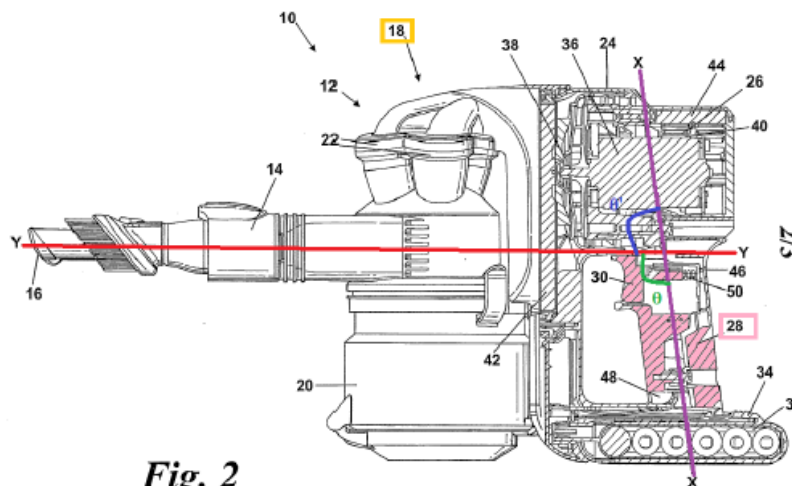


Fig. 2
Pet., 57; EX-1003 ¶¶ 141

However, Dyson defines longitudinal axis Y-Y as the longitudinal axis of suction conduit 12. EX-1007, 4:24-26; EX-2018, 155:23-156:8. Further, Dyson states, “The cyclonic separating apparatus 18 comprises an upstream cyclone 20 and a

plurality of downstream cyclones 22.” EX-1007, 3:16-18; EX-2018, 156:13-157:4.

Thus, as Mr. Fester testified:

Q: Given that we’ve established that 18 is comprised of 22 and 20, wouldn’t the longitudinal axis of the Dyson cyclonic separating unit be perpendicular to the Y-Y axis in Dyson?

A: It appears that’s a true statement.

EX-2018, 157:11-15.

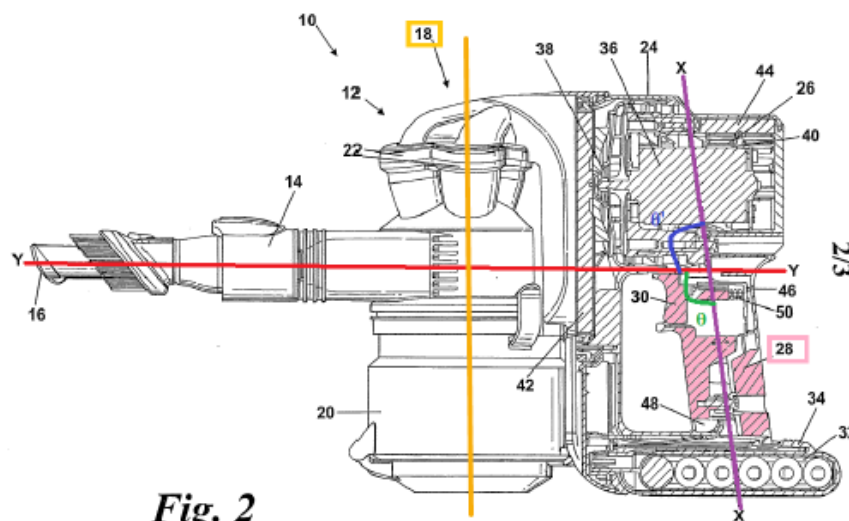


Fig. 2
Pet., 57; EX-1003 ¶141 (further annotated)

As Mr. Fester recognized, Dyson does not disclose that “the handle axis and the longitudinal axis intersect within the vacuum cleaner” as claimed by limitation 1d.

EX-2018, 157:16-21. Further, the calculations Petitioners and Mr. Fester provide related to the claimed handle angle incline of limitation 1d and the additional limitation of claim 2 are based on the wrong axis and thus do not support that Dyson meets the claimed handle angle. EX-2018, 157:22-159:22.

Therefore, Petitioners have not shown that limitation 1d and the additional limitation of claim 2 are taught by the proposed combination. Thus, Petitioners

have not shown by a preponderance of the evidence that any Challenged Claim is unpatentable under Ground 2.

2. Conrad'630's and Dyson's disclosures would not have motivated a POSITA to make Petitioners' proposed combination

Similar to Ground 1, Petitioners' proposed motivations would not have motivated a POSITA to modify Conrad'630 to incorporate Dyson's handle at the rear as Petitioners propose.

a. Functionality and useability of Conrad'630 would be diminished with Dyson's handle at the rear

Just like in Ground 1, Petitioners rely heavily on the single sentence in paragraph [0052] of Conrad'630. Pet., 52; EX-1003 ¶124. As discussed in Section IV.A.1.a., although this statement may imply that a handle may be provided at Conrad'630's rear, the combination of a POSITA's general knowledge, the illustrated positioning of Conrad'630's and Conrad'787's handles, and Dyson's explicit teachings would have led a POSITA away from this proposed modification. EX-2017 ¶102.

Dyson discusses disadvantages of handheld vacuums where heavy components are forward of the handle during use resulting in additional effort to maintain the vacuum in a fixed orientation. EX-1007, 1:25-2:2; *see also* EX-2017 ¶103. Dyson provides a solution to this problem by placing an elongate handle between the airflow generator and the power source. EX-1007, 2:4-19; *see also*

EX-2017 ¶103. Specifically, Dyson states that locating a handle between the airflow generator and power source allows the handheld vacuum to be manipulated easily in use because the user's hand is located between the vacuum's two heaviest components resulting in a "dumbbell-like" configuration. EX-1007,6:6-11; *see also* EX-2017 ¶103. Thus, Dyson disparages Petitioners' modification that places Dyson's handle at Conrad'630's rear because such a configuration would not create a "dumbbell-like" configuration. EX-2017 ¶103. Notably, Conrad'630's handle as illustrated in Figure 6 includes the heaviest objects distributed on opposite sides of the handle compared to Petitioners' proposed modification in which all heavy objects are distributed on the same side of the handle. EX-2017 ¶103. Therefore, a POSITA would not have expected success in adding Dyson's handle to Conrad'630's rear. EX-2017 ¶103.

As also discussed in Section IV.A.1.a., Conrad'630's paragraph [0052] does not elaborate on the design type of the handle that could be used and does not refer to any handle similar to Dyson's, which was one of many handle designs available at the time. EX-2017 ¶104; EX-2018, 140:12-23.

Just as in Ground 1, Conrad'630's vacuum is designed to function very differently with a different layout from those with a handle described in Dyson, and a POSITA would have understood that a major factor in determining handle configuration is how the device is designed to be used. EX-2017 ¶105. Conrad'630

discloses cleaning a surface by a nozzle positioned at the “bottom” of the vacuum engaging the surface to be cleaned. § IV.A.1.a. In contrast, Dyson discloses a vacuum that includes a handle that is “disposed between the airflow generator [36] and the power source [32] and dimensioned and arranged to be gripped by a user’s hand, wherein the elongate handle [28] lies transverse to the longitudinal axis [Y-Y] of the suction conduit,” which allows a user “to maintain a comfortable wrist position and movement of the hand-held vacuum cleaner feels comfortable.” EX-1007, 2:14-19; EX-2017 ¶105.

Because the vacuums function differently with a different layout, a POSITA would not have expected a simple substitution of one handle for the other for the same reasons articulated in Section IV.A.1.a. EX-2017 ¶106. At most, a POSITA would have recognized that different handle configurations could be contemplated for Conrad’630’s vacuum. EX-2017 ¶107. However, for the reasons below in Section IV.B.2.b., none of Petitioners’ alleged “motivations” would have led a POSITA to modify Conrad’630 to include the specific handle of Dyson, much less the specific handle at the claimed location and orientation. EX-2017 ¶107.

b. Dyson’s disclosures would not have motivated a POSITA to incorporate its handle into Conrad’630’s vacuum

Petitioners cite two statements within Dyson related to the comfort of the handgrip for the user as providing alleged motivation for incorporating that handgrip into Conrad’630. Pet., 53; EX-1003 ¶125. However, Dyson states that

comfort of the handgrip depends upon the handle axis being transverse to the suction conduit. EX-2017 ¶108. Figure 6 in Conrad’630 includes a handle axis transverse to the suction conduit. EX-2017 ¶108. Petitioners’ proposed modification of Conrad’630 does not have a handle axis transverse to the suction conduit. EX-2017 ¶108. Thus, Dyson disparages Petitioners’ proposed modification of Conrad’630. EX-2017 ¶108.

Petitioners allege that a POSITA would have been motivated to modify Conrad’630’s handle configuration by Dyson’s disclosure that its handle configuration allows the vacuum to “maintain a comfortable wrist position and movement of the hand-held vacuum cleaner feels comfortable” and “[t]his arrangement feels comfortable for a user.” Pet., 54 (citing EX-1007, 2:17-19, 4:27-29); EX-1003 ¶125 (citing same). However, as Mr. Fester acknowledged, the comfort of Dyson’s handle in these disclosures depends upon Dyson’s arrangement wherein the handgrip 28 lies transverse to the longitudinal axis Y-Y of the suction conduit. EX-1007, 2:17-19, 4:27-29; EX-2018, 140:24-145:15; EX-2017 ¶109. Dyson explains that it is important that the longitudinal axis of the suction conduit and the handle axis are transverse to one another such that the user’s manipulation of the hand-held vacuum feels comfortable. EX-1007, 6:13-22.

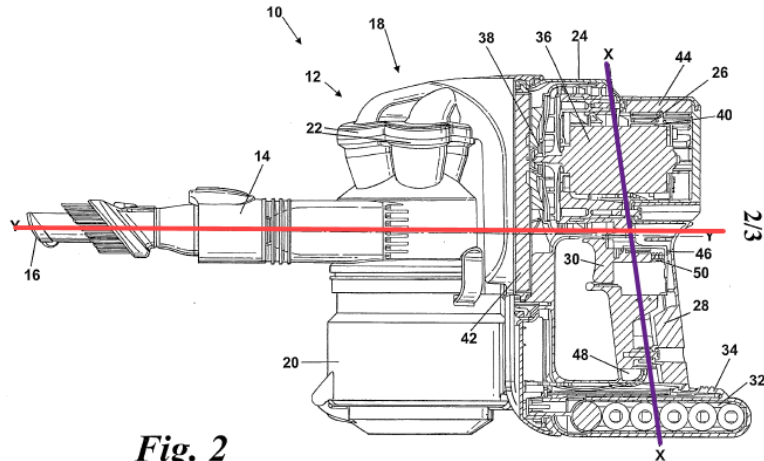


Fig. 2
EX-1007 Fig. 2 (annotated)

Similarly, in Conrad'630, the handle axis (purple) is transverse to the longitudinal axis of the suction conduit (red). EX-2017 ¶110; EX-2018, 48:22-25.

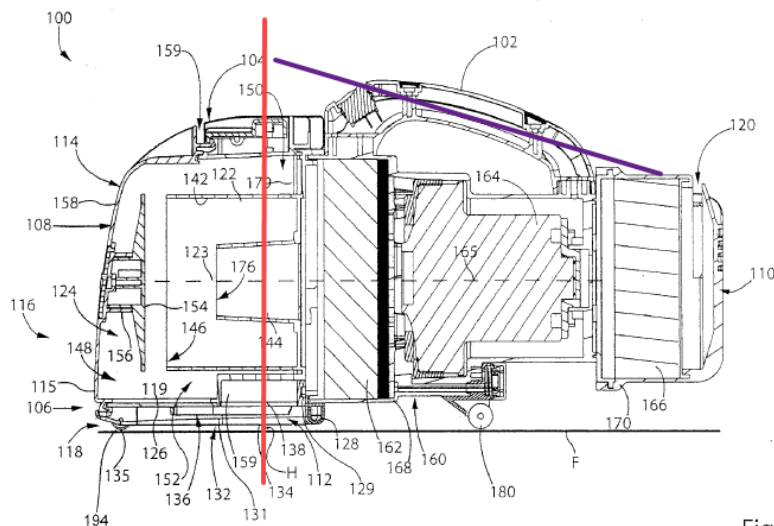


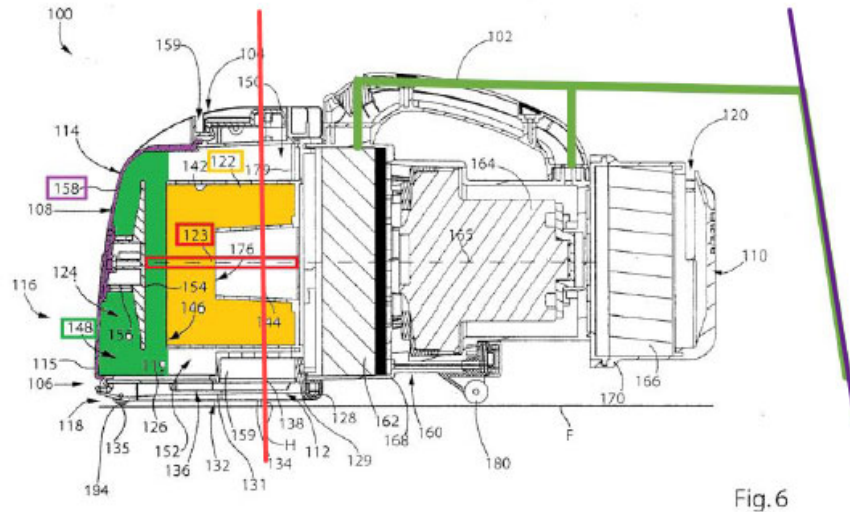
Fig. 6

EX-1004 Fig. 6 (annotated)

Conversely, if Conrad'630 is modified to incorporate Dyson's handle at Conrad'630's rear as Petitioners propose, the handle axis (purple) would be substantially parallel to the longitudinal axis of the suction conduit (red) and would

not enjoy the comfort that Dyson discloses based on its arrangement. EX-2017

¶111.⁵



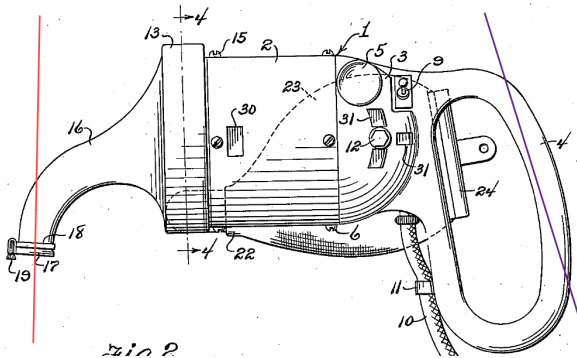
EX-1003 ¶130 (further annotated)

Thus, Dyson's disclosures would not have led a POSITA to Petitioners' proposed combination.

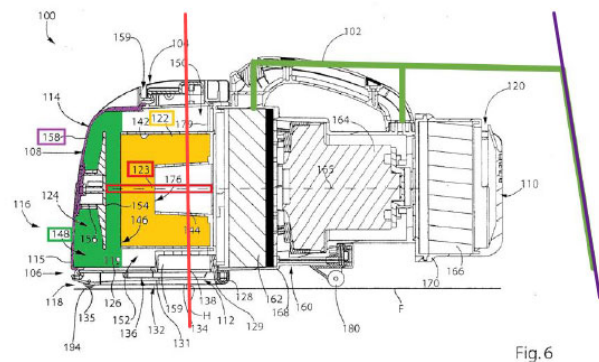
Petitioners also ignore Dyson's additional guidance as to the handle configuration, placement, and orientation that is particular to the intended use and positioning of Dyson's vacuum. EX-2017 ¶112. Dyson recognizes, and attempts to solve, the problem presented in the '624 patent (EX-2015). EX-1007, 1:19; EX-

⁵ When questioned about the location of the longitudinal axis of the suction conduit in his mockups, Mr. Fester referred to Conrad'630 Figure 8. EX-2018, 147:9-148:16. However, the mockup is based on Figure 6 that defines the suction nozzle as 112. EX-1004, ¶[0068]. Figure 8 is a different embodiment. *Id.*, ¶[0094].

2017 ¶112. Dyson recognizes that having the handle positioned so far back from the vacuum's center of mass, as well as the handle being arranged approximately parallel to the suction conduit, makes it tiring and uncomfortable to use the hand-held vacuum. EX-1007, 1:29-2:2; EX-2017 ¶112. As shown by the lines indicating the handle position (purple) and suction position (red) in the annotations, when a user operates the vacuum with Dyson's handle on Conrad'630's rear, Petitioners proposed modification would result in the same configuration as the '624 patent, which Dyson disparages as uncomfortable. EX-2017 ¶112.



**EX-2015 ('624 patent) Fig. 1
(annotated)**



**EX-1003 ¶¶75, 130
(further annotated)**

Thus, a POSITA applying the principles of Dyson to Conrad'630 would not have been motivated to modify Conrad'630's handle configuration as Petitioners propose. EX-2017 ¶113.

3. The ability to use hose attachments with Conrad'630's vacuum would not have led to Petitioners' proposed modification

Petitioners make the same argument in Ground 2 that they did in Ground 1—that a POSITA would have been motivated to incorporate Dyson's handle into Conrad '630's vacuum to reap the alleged advantages that Dyson's handle provides for using attachments. Pet., 54-55; EX-1003 ¶126. Petitioners rely upon the same evidence for Ground 2 as Ground 1. Pet., 54-55; EX-1003 ¶126; EX-2018, 151:11-152:20. Thus, for the same reasons as in Section IV.A.2. above, a POSITA applying the principles of Dyson to Conrad'630 would not have been motivated to modify Conrad'630's handle configuration as Petitioners propose. EX-2017 ¶114.

4. Conrad'630's vacuum with Dyson's handle has reduced control when cleaning stairs or furniture

As discussed in detail in Section IV.A.3. above, Petitioners' proposed modification to place Dyson's handle in Conrad'630's rear would reduce the ability to guide and steer nozzle of Conrad'630 when cleaning, including on stairs or furniture, compared to the handle placement in Conrad'630's illustrated embodiments. Thus, for the same reasons articulated in Section IV.A.3., this decrease in performance would have discouraged a POSITA from incorporating Dyson's handle at Conrad'630's rear. Thus, a POSITA would not have been motivated to modify Conrad'630 as Petitioners propose. EX-2017 ¶115.

5. Reduced efficiency and poorer cleaning performance would not have motivated a POSITA to modify Conrad '630 as Petitioners propose

As discussed in detail in Section IV.A.5. above, Petitioners' proposed modification would result in reduced efficiency and poorer cleaning performance because of loss of suction due to the increased distance between the suction nozzle and the floor surface. Thus, for the same reasons articulated in Section IV.A.5., this decrease in performance would have discouraged a POSITA from incorporating Dyson's handle at Conrad'630's rear. Thus, a POSITA would not have been motivated to modify Conrad'630 as Petitioners propose. EX-2017 ¶116.

6. A POSITA would have been discouraged from placing Dyson's handle on the rear of Conrad'630 because use of such handle would add strain

As discussed above in Section IV.A.1.b., if Conrad'630's handle is incorporated at the rear and placed at the angle in the manner Petitioners propose, additional strain or torque of the user's hands/wrist would be caused during fore/aft action. EX-2017 ¶117. Specifically, if a user was utilizing Dyson's handle in the rear of Conrad '630's vacuum as Petitioners propose, the fore/aft action of the vacuum would require a bent elbow position that requires engagement and/or torque of the wrist, elbow, and shoulder as compared to Conrad'630's vacuum utilizing the original handle where the user's hands are provided with reduced torque by allowing for a straight line downward with less or no bending of the wrist, elbow, and shoulder when manipulating the vacuum in a fore/aft action

commonly used during cleaning. EX-2017 ¶117; § IV.A.1.b. Thus, for the same reasons articulated in Section IV.A.1.b., a POSITA would not have been motivated to modify Conrad’630’s handle configuration as Petitioners propose. EX-2017 ¶117.

For the above reasons, Petitioners do not provide any viable motivations that existed for a POSITA to incorporate Dyson’s handle on Conrad’s rear and a POSITA would not have been motivated to make Petitioner’s proposed modification. Thus, Petitioners have not shown by a preponderance of the evidence that any Challenged Claim is unpatentable under Ground 2.

C. GROUNDS 3 and 4: Petitioners fail to show that Matsumoto in combination with either Conrad’787 or Dyson would have rendered obvious the Challenged Claims

Petitioners’ proposed modification miniaturizing Figure 25’s embodiment and replacing the handle with either Conrad’787’s or Dyson’s is unsupported and is contrary to the general understandings of a POSITA, and Petitioners’ alleged motivations are irrelevant to Matsumoto’s vacuum. Specifically, for the reasons provided below, a POSITA would not have placed Conrad’787’s or Dyson’s handle on the rear of Matsumoto as Petitioners propose; would not have been motivated to miniaturize Figure 25’s embodiment; and would not have found any relevance in Conrad’787’s or Dyson’s teachings with respect to Matsumoto. In addition, Ground 4 also fails because, just like in Ground 2, Petitioners have not

shown that the proposed combination discloses limitation 1d or the additional limitation of claim 2.

1. A POSITA would not have placed Conrad’787’s or Dyson’s handle on Matsumoto’s rear

In Matsumoto Figure 25, the vacuum’s weight is distributed between the user and the floor on which the suction port is resting during use. EX-2018, 173:5-12; EX-2017 ¶132. Because much of the weight is distributed to the floor and the handle is maintained at a comfortable height based on the length of connection pipe 3, the design considerations for the handle placement and design are substantially different than for Conrad’787 or Dyson. EX-2017 ¶132. Recognizing these differences in design considerations, Mr. Fester acknowledged that the motivations he alleged for modifying Matsumoto with Conrad’787’s or Dyson’s handle at the claimed angle require a miniaturized version of Figure 25’s embodiment, in which the weight would be borne solely by the user in much of the use scenarios. EX-2018,163:7-14. However, a POSITA would have understood the change in weight distribution in making such a modification would have led to severe disadvantages in adding Conrad’787’s or Dyson’s handle to the rear of Petitioners’ proposed miniaturized version of Matsumoto. EX-2017 ¶132. As discussed above in Sections IV.A.1.a. and IV.B.2.a., general knowledge of a POSITA, the illustrated positioning of Conrad’630’s and Dyson’s handles, and

Dyson's explicit teachings would have led a POSITA away from this proposed modification. EX-2017 ¶133.

In particular, Dyson specifies that comfort and ease of manipulating the vacuum during use is improved for vacuums in which weight is being borne solely by the user when the weight of the vacuum is distributed on both sides of the user's hand "result[ing] in a 'dumbbell-like' configuration." EX-1007, 6:6-11; EX-2017 ¶134. Matsumoto with Conrad'787's or Dyson's handle as Petitioners propose fails to result in the handle being positioned and configured to ensure that the weight of the vacuum is distributed on both sides of the user's hand as shown below with the green dots indicating the heaviest portions of the vacuums. EX-2017 ¶134.

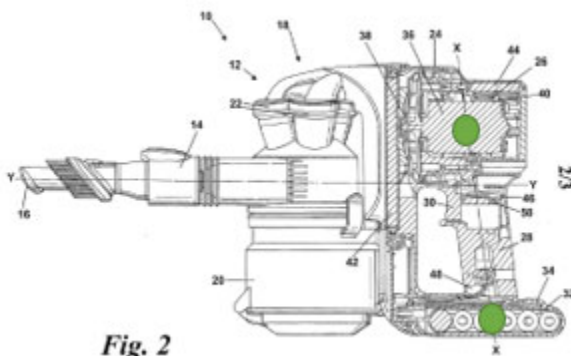
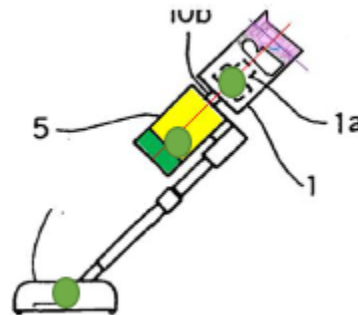


Fig. 2
EX-1007 Fig. 2 (annotated)



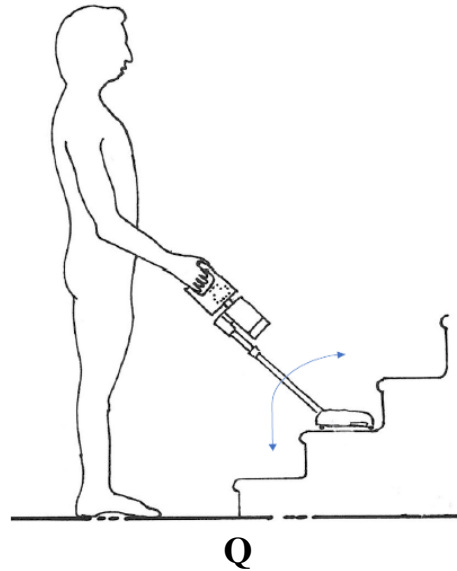
Pet., 94 (annotated)

Based on the above teachings, a POSITA would not have expected success in replacing Matsumoto's handle with that of Conrad'787's or Dyson's in the miniaturized version of Matsumoto's Figure 25 Petitioners propose. EX-2017 ¶135. In fact, to more evenly distribute weight on either side of the user's hand, the handle would be moved forwardly from the rear of Matsumoto's miniaturized

version and may result in a different angle and/or handle shape than the ones shown in Conrad'787 or Dyson. EX-2017 ¶135.

Where a POSITA was designing the vacuum for the main use condition of Petitioners' proposed combination, in which the weight is to be borne by the surface to be cleaned as in Matsumoto, the handle before modification is already oriented to reduce torque-caused stress on the user's hand whereas Petitioners' proposed modification to include Conrad'787's or Dyson's handle increases the stress on the user. EX-2017 ¶136. For example, when cleaning stairs, the weight borne by the user, as opposed to the weight borne by the surface to be cleaned, is a downward force causing the connection pipe to pivot with respect to the suction port, as illustrated by the blue arrow below. EX-2017 ¶136. Because this force is directly downward, the user is able to counter the force more efficiently where the handle is parallel to the surface to be cleaned (see illustration P), rather than at an angle to the surface that requires bending the wrist and/or elbow (illustration Q).





Similarly, the ergonomics of Matsumoto's handle is superior to that of Matsumoto's vacuum cleaner with Conrad'787's or Dyson's handle as Petitioners propose. EX-2017 ¶138. Similar to the discussion in Sections IV.A.1.b. and IV.B.6., Matsumoto's handle is at an angle and location that enables less restricted fore/aft travel by being parallel to the ground and at a height that allows full extension of a user's arm during movement back and forth. EX-2017 ¶138; *see also* illustration P. In contrast, Petitioners' proposed modification of Matsumoto to include handles similar to Conrad'787's and Dyson's would limit the fore-aft travel of the cleaner. EX-2017 ¶139. Conrad'787's or Dyson's handle being located at Matsumoto's vacuum's rear requires a bent elbow during use, restricting the total amount of travel resulting in additional elbow and wrist strain as compared to Matsumoto's vacuum without modification. EX-2017 ¶139.

Thus, a POSITA would not have been motivated to make Petitioners' proposed combination.

2. Petitioners fail to show that it would have been obvious to miniaturize Matsumoto

Petitioners rely upon Matsumoto's Figure 25 for Grounds 3 and 4. Pet., 61, 65-66, 69, 71-73, 93-94; EX-1003 ¶¶162-164, 170, 172-173, 175-176, 210-212, 218, 220-221. However, as Mr. Fester acknowledged:

Matsumoto in the figure 25, it ... basically is disclosing there a handheld stick-type vacuum cleaner that's more for kind of cleaning floors. Matsumoto does not explicitly disclose a miniature handheld vacuum to be used as a handheld configuration that would be suited for cleaning other types of surfaces such as couches and bedding; ...

The torque argument would be specific to what 787 is saying about the use of their hand vac. So the equivalent argument in terms of specific to the center of gravity would be a use case this is primarily seen with the hand vac of Matsumoto.

EX-2018, 163:7-14, 175:3-8. The only proposed modification of Matsumoto that Petitioners propose with Conrad'787's or Dyson's handle is Petitioners' miniaturized version of Matsumoto. Thus, Petitioners' Grounds 3 and 4 require first showing that a POSITA would have been motivated to miniaturize Matsumoto to be useful for non-floor surfaces, like Conrad'787 and Dyson. *Id.*; *see also id.*, 176:17-21, 183:7-11 (Mr. Fester confirming for Grounds 3 and 4 the only proposed modifications to Matsumoto are miniaturizing the vacuum and replacing the handle

with Conrad'787's or Dyson's handles); Pet., 64 (citing EX-1003 ¶162), 91 (citing EX-1003 ¶¶161-170, 210-212). Petitioners have not met this burden.

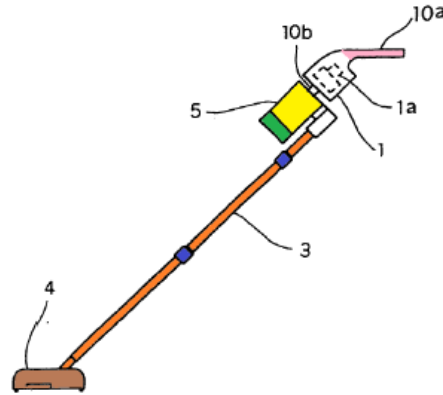
Neither of Matsumoto's disclosures that Petitioners cite support their contention that a POSITA would have been motivated to miniaturize Matsumoto. EX-2017 ¶121.

Petitioners first allege that "Matsumoto explicitly suggests that 'miniaturiz[ing] [the] vacuum cleaner' would 'enhance the operability thereof.'" Pet., 64 (citing EX-1005 ¶[0068]), 91 (citing same); *see also* EX-1003 ¶¶77, 210. However, Matsumoto's disclosure about miniaturization is focused on making the handle smaller, not the entirety of the vacuum cleaner:

Moreover, according to the present invention, a connection pipe is bent so as to function as a handle held by the user during cl [sic]. ***This helps reduce the space occupied by the handle. In this way, it is possible to miniaturize a vacuum cleaner and enhance the operability thereof.***

EX-1005 ¶[0068]. As Mr. Fester acknowledged, Matsumoto does not disclose miniaturizing the entirety of the vacuum cleaner as Petitioners propose. EX-2018, 164:19-24; EX-2017 ¶122.

Petitioners then allege that Figure 25 indicates that there are collars on the connection pipe 3 (annotated in blue by Petitioners) that "indicate the connection pipe 3 is made of multiple pipes connected to one another." Pet., 65; *see also* Pet., 91; EX-1003 ¶¶77, 211.



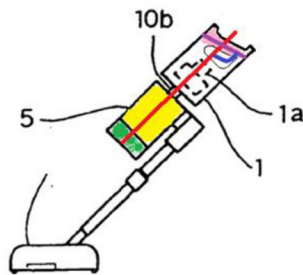
Pet., 65

However, as Mr. Fester acknowledged, Matsumoto does not disclose that the portions annotated in blue are in fact “collars” or that connection pipe 3 is made up of multiple pipes connected to one another. EX-2018, 165:7-166:16; EX-2017 ¶124. A POSITA reviewing these figures in light of Matsumoto’s disclosures could have concluded that the blue portions were not collars, but instead physical friction-fit interfaces, physical bayonet mount interfaces, structural elements to strengthen the air path, or design features for aesthetic purposes. EX-2017 ¶124. In addition, if the blue portions were intended to be collars connecting different pipes, a POSITA would have expected Matsumoto’s Figure 25 to also include a collar connecting connection pipe 3 to suction port 4. EX-2017 ¶124.

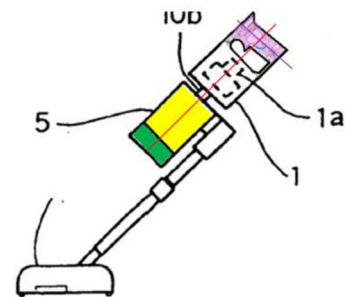
Thus, none of the evidence Petitioners cite supports miniaturizing Matsumoto’s vacuum cleaner as Petitioners require for the combinations in Grounds 3 and 4.

3. Petitioners have not shown that a POSITA would have been motivated to combine Matsumoto with Conrad'787 or Dyson as Petitioners propose

In Grounds 3 and 4, Petitioners argue that it would have been obvious to modify Matsumoto to include handles from Conrad'787 or Dyson because Matsumoto's handle is allegedly unergonomic and Conrad'787 and Dyson allegedly provide advantages for use of the handles disclosed in those references.



Pet., 69 (Conrad'787)



Pet., 94 (Dyson)

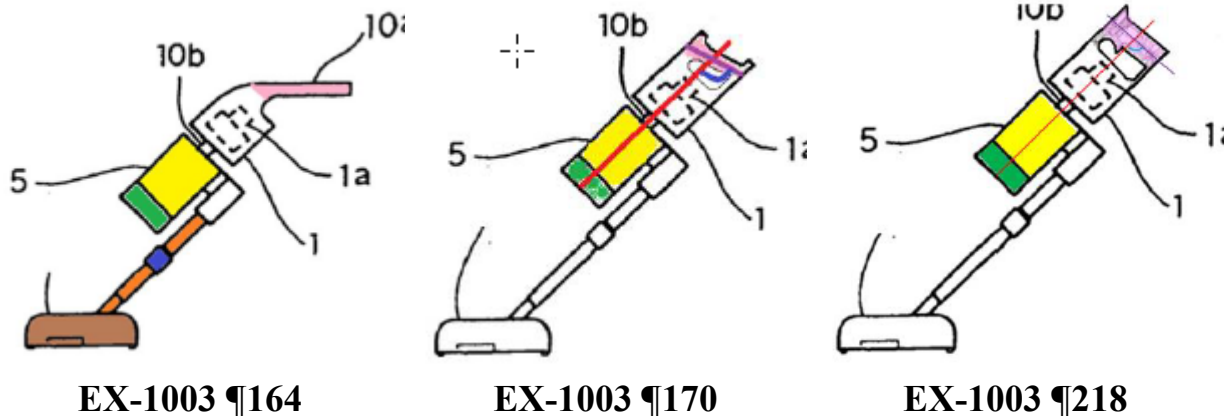
However, Petitioners have failed to show the requisite motivation to combine because Matsumoto teaches away from increasing the size of the handle and Petitioners' proposed motivations are irrelevant to Matsumoto's vacuum.

a. Matsumoto teaches away from increasing the size of the handle

Matsumoto teaches away from any combination that would increase the size of the handle. "A reference may be said to teach away when a [POSITA], upon reading the reference, would be discouraged from following the path set out in the reference, or would be led in a direction divergent from the path that was taken by the applicant." *Polaris Indus., Inc. v. Arctic Cat, Inc.*, 882 F.3d 1056, 1069 (Fed.

Cir. 2018) (internal quotations omitted); *see also In re Fulton*, 391 F.3d 1195, 2001 (Fed. Cir. 2004). That is the case here.

As discussed above, Matsumoto teaches that the handle should be a bent portion of the connection pipe to **reduce** the space occupied by the handle. EX-1005 ¶¶0068]; *see also id.* ¶¶0057]; EX-2017 ¶129; EX-2018, 164:7-17. While Petitioners erroneously used this disclosure as a basis to miniaturize the entirety of the vacuum, Petitioners have ignored this disclosure for its actual relevant purpose—modification of Matsumoto’s handle. As illustrated below, the handles in Petitioners’ proposed combinations are larger and more robust than Matsumoto’s existing handle.



See also EX-2018, 169:8-170:25; EX-2017 ¶129. Thus, a POSITA reviewing Matsumoto’s full disclosure, including paragraphs 57 and 68, would have been discouraged from using larger more robust handles on Matsumoto’s vacuum. EX-2017 ¶129.

Further, a POSITA would have known that miniaturization of a handle has benefits that would be lost with incorporating larger handles. EX-2017 ¶130. For example, smaller handles reduce weight-in-hand, reduce cost, reduce storage space required, and reduce packaging size and shipping cost. EX-2017 ¶130.

Thus, Petitioners fail to show how, in light of Matsumoto's full disclosure, a POSITA would have been motivated to replace Matsumoto's compact handle with either Conrad'787's or Dyson's handles that would *increase* the size of the handle.

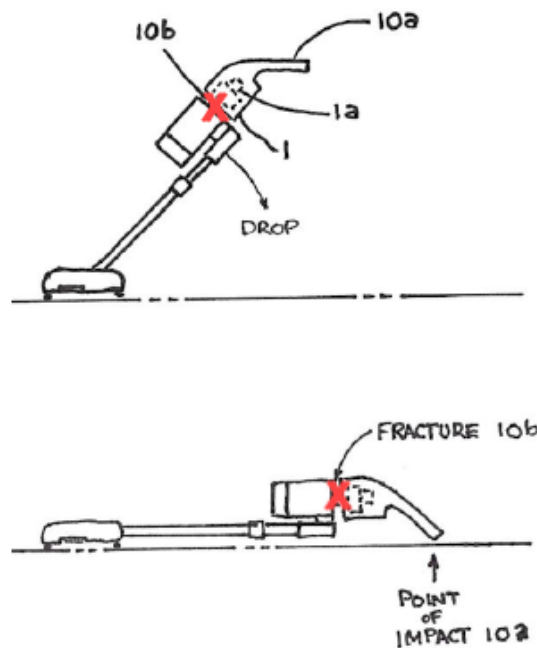
b. Petitioners' alleged motivations related to ergonomics and breakage risks are unfounded

Petitioners fail to show why a POSITA would have been motivated to replace Matsumoto's handle with Conrad'787's and Dyson's handles. The only support Petitioners provide as motivation to replace Matsumoto's handle are conclusory, unsupported statements from their expert related to the handle being allegedly "unergonomic and uncomfortable" and it would "be likely to break." Pet., 66 (citing EX-1003 ¶¶165-166), 91; EX-1003 ¶¶213-214. However, neither Matsumoto itself nor Conrad'787 or Dyson identify *any* issues with Matsumoto's handle. EX-2017 ¶137. Mr. Fester confirmed that his only support for these statements is his own experience. EX-2018, 166:18-169:7. This is not enough to meet Petitioners' burden. *TQ Delta, LLC v. Cisco Sys., Inc.*, 942 F.3d 1325, 1359 (Fed. Cir. 2019) ("This court's opinions have repeatedly recognized that

conclusory expert testimony is inadequate to support an obviousness determination”).

As explained above in Section IV.C.1., the ergonomics of Matsumoto’s handle is actually superior to that of Conrad’787’s or Dyson’s handles for the expected use conditions of Matsumoto. EX-2017 ¶138.

In addition, a POSITA would not expect the handle to be the biggest break risk if the vacuum fell to the floor line. EX-2017 ¶140. Where there is such an impact, a POSITA would have expected the failure to occur at the separation vessel outlet 10b (red X) because the heavy portion of the vacuum is 1 and 1a, which would put extra force on the separation vessel outlet when impacting the floor. EX-2017 ¶140.



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Additionally, Petitioners have not shown why, if a POSITA were to modify Matsumoto's handle, a POSITA would have been motivated to replace it with either Conrad'787's or Dyson's handle. Mr. Fester agreed that his and Petitioners' alleged deficiencies in Matsumoto's handle—that it is “unergonomic and uncomfortable” and “likely to break”—could have been rectified by replacing Matsumoto's handle with a handle other than Conrad'787's or Dyson's handle. EX-2018, 167:19-24, 171:1-5.

c. Petitioners' alleged motivations are irrelevant to Matsumoto

Conrad'787's and Dyson's disclosures that Petitioners rely upon are irrelevant to Matsumoto's vacuum because in Matsumoto, the relationship between the handle axis and the suction port is not static and can fluctuate depending upon the angle of the connection pipe. EX-2017 ¶142. For Ground 3, Petitioners point to the same disclosures they relied upon in Ground 1—a comfortable handle oriented to limit or reduce torque by the user's hand; the handvac's center of gravity is aligned vertically below the user's hand; and comfort in picking up the vacuum cleaner due to the angle of the handle relative to the vertical. Pet., 67; EX-1003 ¶168. Similarly, in Ground 4, Petitioners point to the same disclosures as they relied upon in Ground 2—the arrangement where the longitudinal axis of the suction conduit lies transverse to the handle axis allowing for comfort to the user. Pet., 92; EX-1003 ¶215; EX-2018, 181:20-182:11. However, as Mr. Fester

acknowledged, these alleged benefits are dependent upon a static relationship between the handle axis and other portions of the vacuum cleaner, such as the suction nozzle or the vertical when the vacuum cleaner is positioned on the surface to be cleaned. EX-2018, 140:24-145:15, 182:17-22; EX-2017 ¶141.

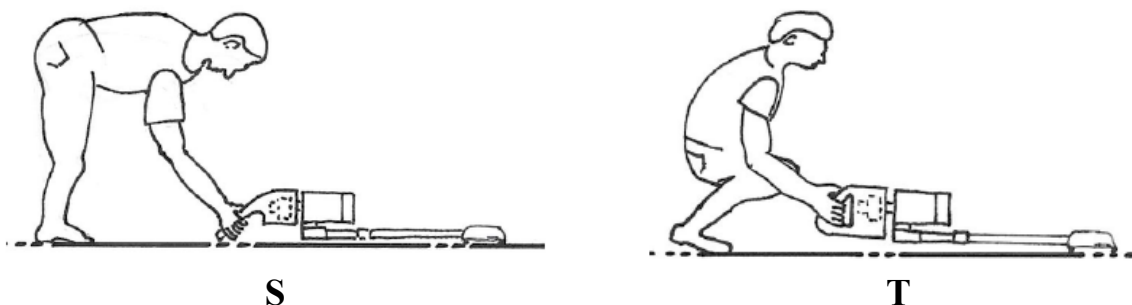
Matsumoto's vacuum's orientation and operation is significantly different. Matsumoto's handle is not statically connected to the suction port; instead, the handle and suction port body 4 are pivotably connected through connection pipe 3. EX-1005 ¶¶[0027], [0029]; EX-2017 ¶142. Because of this, the orientation of the handle axis relative to other parts of the vacuum fluctuates depending upon the angle of connection pipe 3 relative to suction port body 4. EX-2017 ¶142. Petitioners do not even recognize this important difference, let alone account for it in providing Conrad'787's and Dyson's⁶ alleged support for their position that a POSITA would have been motivated to substitute Matsumoto's handle with Conrad'787's or Dyson's handle. EX-2017 ¶142.

Further, to the extent they are relevant to Matsumoto, neither Conrad'787's nor Dyson's disclosures would have motivated a POSITA to use its handle with

⁶ Mr. Fester confirmed that the only modifications he proposed to Matsumoto in Grounds 3 and 4 are to miniaturize Matsumoto and replace the handle with Conrad'787's or Dyson's handle. EX-2018, 183:7-15.

Matsumoto. As discussed above in Section IV.C.1., Matsumoto's handle is oriented to reduce the torque by the user's hand during common use whereas Matsumoto as modified by Petitioners increases the stress on the user. EX-2017 ¶143. This is further supported by the fact that Petitioners have not shown that Matsumoto's vacuum's center of gravity is vertically below Matsumoto's handle in Petitioner's proposed modification. EX-2017 ¶143.

Further, in contrast to Conrad'787, the handle axis in Matsumoto modified with Conrad'787's or Dyson's handle as Petitioners propose is not in a comfortable alignment for grasping by a user when picking up the vacuum below the user's elbows. EX-2017 ¶144. Instead, as illustrated, the user must either bend down such that the forearm can be parallel to the surface on which the vacuum is stored or contort the user's wrist in an uncomfortable position when picking up the vacuum and using it on a surface to be cleaned that is below the user's elbow. EX-2017 ¶144.



Additionally, Petitioners do not consider the recognized problem at the time of the invention of reducing the amount of dust and other particles released into the

air when the dirt collector was opened. EX-2017 ¶145; EX-1003 ¶16; EX-2018, 34:23-35:4. Patent Owner discovered that particular advantages could be obtained by orienting the handle as recited in Claim 1 in order to address this problem. EX-2017 ¶145. One of the advantages provided by the particular orientation and position of the '687 Patent's handle is to allow, "whilst gripping the handle 6, the user [to point] the vacuum cleaner 2 towards a suitable receptacle (e.g. a waste bin or bag) into which the dirt is to be emptied." EX-1001, 5:64-66; EX-2017 ¶145. This advantage cannot be accomplished in Petitioners' modification of Matsumoto with Conrad'787's or Dyson's handle because the nozzle port 4 and connection pipe 3 extends beyond the wall of the dust collecting chambers. EX-2017 ¶145. Further, such considerations are not relevant to Matsumoto, which discloses that the dust collection chamber, as illustrated in Figure 2, is emptied by "detach[ing] the first and second dust collecting chambers 7 and 8 integrally from the vacuum cleaner, and then separate[ing] the first and second dust collecting chambers 7 and 8 from each other above a trash can or the like." EX-1005 ¶[0046]; EX-2017 ¶145. Matsumoto only teaches positioning its handle to push and pull the vacuum to move the suction port 4 along the floor and does not disclose optimizing the handle for emptying the dirt collector, which is accomplished without use or consideration of the handle placement. EX-1005 ¶[0046]; EX-2017 ¶145.

Accordingly, when the references are properly considered as a whole, a POSITA would have had no reason to modify Matsumoto in the manner Petitioners propose and would have been dissuaded from such modification. EX-2017 ¶146. Thus, Petitioners have not met their burden of showing that a POSITA would have been motivated to combine Matsumoto with either Conrad’787 or Dyson in a way that discloses all of the limitations of the Challenged Claims. EX-2017 ¶146.

In sum, Petitioners do not provide any viable motivations that existed for a POSITA to incorporate either Conrad’787’s or Dyson’s handle in Matsumoto’s vacuum, and Patent Owner and its expert have provided additional reasons that would not have motivated a POSITA to make such a modification. Thus, Petitioners have not shown by a preponderance of the evidence that any Challenged Claim is unpatentable under Grounds 3 and 4.

4. As to Ground 4 Petitioners have not shown that the combination discloses limitation 1d and the additional limitation of claim 2

Just as with Ground 2, in Ground 4, Petitioners rely exclusively on Dyson to disclose limitation 1d and the additional limitation of claim 2. Pet., 94-98; EX-1003 ¶¶224-234; EX-2018, 185:18-186:17. Mr. Fester admitted that he used the same calculations in Dyson to determine that the combination of Ground 4 discloses these limitations as he did to determine the combination of Ground 2 discloses these limitations. EX-2018, 185:18-186:17; *Compare* Pet., 94-98; EX-

1003 ¶¶224-234 *with* Pet., 56-60; EX-1003 ¶¶140-150. Thus, Mr. Fester’s calculations in Ground 4 also incorrectly rely upon the longitudinal axis Y-Y of the suction conduit 12 and not the longitudinal axis of the cyclonic separating unit. § IV.B.1. Therefore, for the same reasons articulated above in Section IV.B.1., Petitioners have not shown that limitation 1d and the additional limitation of claim 2 are taught by the proposed combination. Accordingly, Petitioners have not shown by a preponderance of the evidence that any Challenged Claim is unpatentable under Ground 4.

D. Secondary considerations also support a finding that the Challenged Claims were not obvious

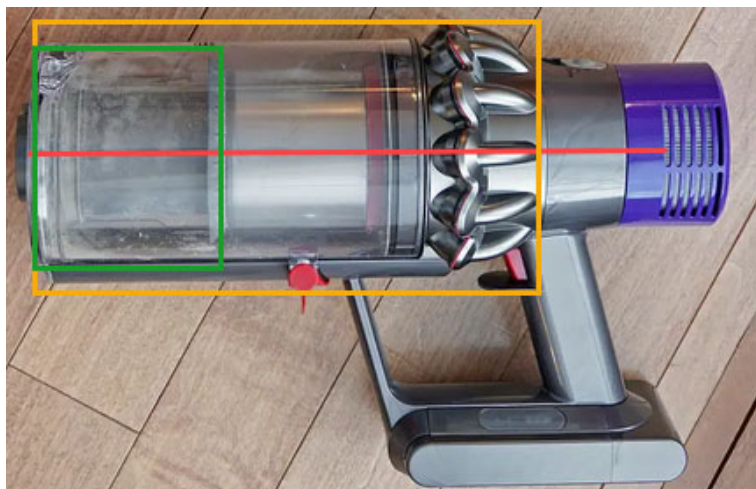
Petitioners’ failure to show a *prima facie* case of obviousness as explained above must also be considered in light of the strong secondary considerations showing that the claimed and novel features of the Challenged Claims solved a long-felt need and were subject to industry praise. Secondary considerations “serve to guard against slipping into the use of hindsight,” which is an important consideration here given Petitioners’ tenuous evidence of motivation to combine. *Artic Cat Inc. v. Bombardier Recreational Products, Inc.*, 876 F.3d 1350, 1359 (Fed. Cir. 2017) (internal quotations omitted). Thus, Petitioners grounds fail for this additional reason.

1. There is a sufficient nexus between the secondary considerations and the claimed and novel features of the Challenged Claims

To show nexus, Patent Owner must show that the secondary considerations are “a direct result of the unique characteristics of the claimed invention.” *Volvo Penta of the Amers., LLC v. Brunswick Corp.*, 81 F.4th 1202, 1210 (Fed. Cir. 2023). The secondary considerations here all relate to the Dyson V10 vacuum, which was released in the U.S. in 2018. *See generally* EX-2020-2025. Specifically, the secondary considerations focus on the V10’s point-and-shoot feature that allows a user to point the vacuum and eject dust into the bin in one action. *Id.* The point-and-shoot feature is reflected in the Challenged Claims, and in particular in the limitations that recite “the end wall [of the cyclonic separating unit] is movable relative to the longitudinal axis [of the cyclonic separating unit] and, when the end wall is in the closed configuration, the longitudinal axis extends through a region bounded by a perimeter of the end wall” from limitation 1c and “wherein the handle . . . is inclined with respect to the cyclonic separating unit to form an angle of not less than 85 degrees and not greater than 140 degrees between a handle axis and the longitudinal axis of the cyclonic separating unit, and wherein the handle axis and the longitudinal axis intersect within the vacuum cleaner” from limitation 1d. EX-1001, Fig. 8, 1:52-59, 5:61-6:11; *see also* EX-2017 ¶174. It is the combination of these elements that provides for the ability to point-and-shoot the debris into the dust bin. EX-2017 ¶173. Petitioners do not contend any single prior

art reference discloses both of these limitations. *See* Pet., 34-41, 56-59, 77-82, 94-97; EX-2018, 13:18-14:7.

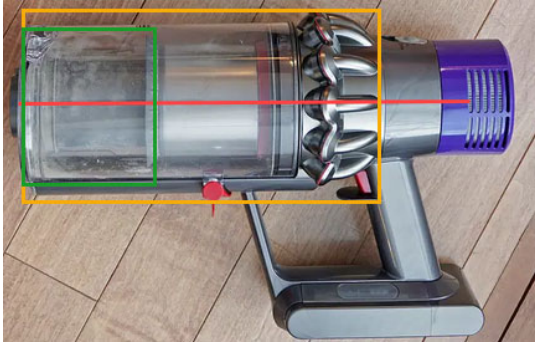
The V10 practices all of the limitations of the Challenged Claims including the point-and-shoot limitations. As recited in the preamble and limitation 1a, the V10 is a handheld vacuum cleaner with a handle by which the vacuum cleaner is supported during normal use. EX-2017 ¶150. As recited in limitation 1b, the V10 has a cyclonic separating unit (yellow) having a longitudinal axis (red) and a dirt collector (green) at one end of the cyclonic separating unit. EX-2017 ¶151.



EX-2021 (annotated)

As recited in limitation 1c, the cyclonic separating unit comprises an end wall having a closed configuration in which dirt is retained within the dirt collector by the end wall and an open configuration for the removal of dirt from the dirt collector, wherein the end wall is movable relative to the longitudinal axis and,

when the end wall is in the closed configuration, the longitudinal axis extends through a region bounded by the perimeter of the end wall. EX-2017 ¶154.



**Closed Configuration
EX-2021 (annotated)**

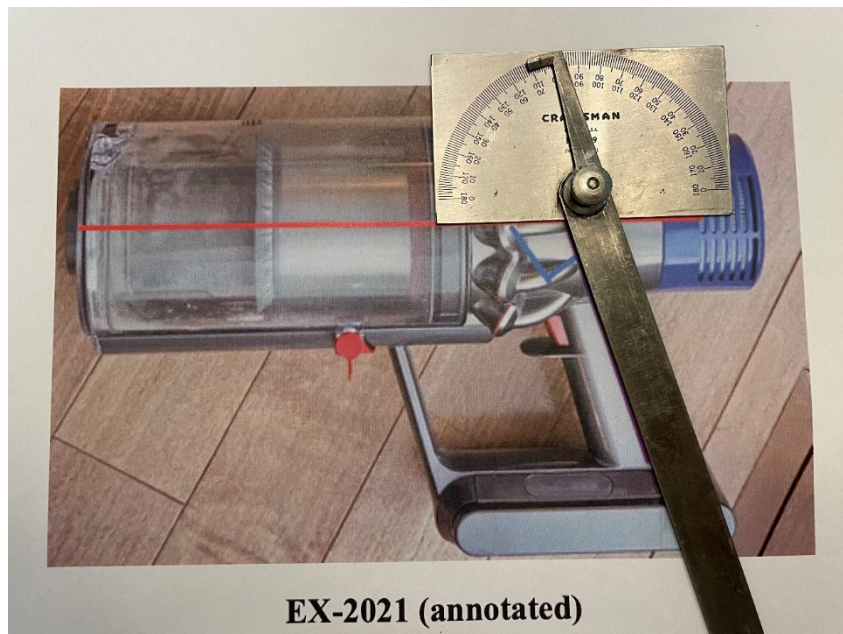


**Open Configuration
EX-2021 (annotated)**

As recited in limitation 1d, the handle has a pistol grip configuration in which the handle is inclined with respect to the cyclonic separating unit to form an angle (blue) of not less than 85 degrees and not greater than 140 degrees between a handle axis (purple) and the longitudinal axis of the cyclonic separating unit, and wherein the handle axis and the longitudinal axis intersect within the vacuum cleaner. EX-2017 ¶¶155,157. Specifically, Mr. Davidshofer has measured the angle and determined it is approximately 107 degrees. EX-2017 ¶156.



EX-2021 (annotated)



EX-2021 (annotated)

EX-2017 ¶156

Based on the same calculation, the V10 also practices the additional limitation recited in claim 2 that the handle is inclined with respect to the cyclonic separating unit to form an angle of not less than 100 degrees and not greater than 125 degrees between the handle axis and the longitudinal axis of the cyclonic separating unit. EX-2017 ¶160. Finally, as illustrated above, the V10 also practices the additional

limitations of claims 3, 4, and 10—the end wall comprises an end wall of the cyclonic separating unit; the end wall is arranged to pivot between the closed configuration and the open configuration; the dirt collector is disposed forward of the handle; and the cyclonic separating unit comprises a cyclonic separator having an axis that defines the longitudinal axis of the cyclonic separating unit. EX-2017 ¶¶161, 164, 171.

2. There is strong evidence of long-felt need and industry praise for the claimed point-and-shoot feature

The V10's point-and-shoot feature satisfied a long-felt need and the V10 was praised for this point-and-shoot feature. Mr. Fester admitted that reducing the amount of dust and other particles released into the air when the dirt collector is opened was a known problem at the time of the invention and he cited to a June 2014 article discussing this issue. EX-1003 ¶16; EX-2018, 34:23-35:4. The '687 Patent also recognizes this problem. EX-1001, 1:26-35. The secondary considerations evidence likewise shows that the V10's point-and-shoot feature solved this problem by highlighting that the point-and-shoot feature allows for less dust being released into the air when emptying the dirt collector:

- EX-2021, 5: “Dyson has also changed the orientation of the Cyclone V10's dust bin, facilitating an improved ‘point-and-shoot’ method for emptying it. It's definitely a lot easier to dump its contents into a trash can without spilling dust everywhere, ...”

- EX-2022, 4: “The dustbin now empties from the front, not the bottom like the old model. That improvement may sound minor *but it’s quite welcome*. The solution is easier to aim towards the trash can. That prevents less collected dirt from escaping back to the floor.”
- EX-2023, 3-4, 8: “What makes Dyson’s new flagship vac tempting for everyone are its multitude of improvements over previous designs, like the new bin that’s 40 percent bigger and points forward for easier dumping, ... In this new design, the bin faces forward, whereas every previous Dyson handheld had it facing downward, just in front of the trigger handle. ... One advantage of the front-facing bin design is that it’s slightly less awkward to empty—Dyson calls it ‘point and shoot’ emptying—and just as easy to re-seal.”

The above quotes in addition to those below also show industry praise for the point-and-shoot feature⁷:

⁷ “An invention may be praised or commercially successful for reasons other than the claimed invention but nexus may still exist as long as it can be shown that such praise or success is also due in part to the claimed invention.” *Ex parte Whirlpool Corp.*, 2013-008322, 16 (Oct. 30, 2013) (informative) (citing *Apple, Inc. v. Int’l Trade Comm’n*, 725 F.3d 1356, 1366 (Fed. Cir. 2013)).

- EX-2024, 3: “The new bin also benefits from a larger capacity, along with more intuitive dirt eject mechanism: just remove the head, point at a trash can and push the eject button. It’s literally just point and shoot.”
- EX-2025, 4: “As for where the dirt and dust goes once you’ve whisked it away using the Cyclone V10’s powerful suction, there’s a bin that will dump its contents with a ‘point and shoot’ mechanism.”

Thus, secondary considerations support a determination that the Challenged Claims are non-obvious, which further supports a finding that the Challenged Claims are not unpatentable.

V. CONCLUSION

For the foregoing reasons, the Challenged Claims should be found not unpatentable.

Respectfully submitted,

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Date: May 22, 2024

CERTIFICATE OF COMPLIANCE

Pursuant to 37 C.F.R. § 42.24(d), counsel for Patent Owner certifies that this document complies with the type-volume limitations of 37 C.F.R. § 42.24(b).

According to Microsoft Office Word's word count, this document contains approximately 13,789 words, including any statement of material facts to be admitted or denied in support, and excluding the table of contents, table of authorities, exhibit list, certificate of service or word count, or appendix of exhibits or claim listing.

Date: May 22, 2024

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Case No. IPR2023-01324

U.S. Patent No. 9,414,662

CERTIFICATE OF SERVICE

The undersigned hereby certifies that the foregoing **PATENT OWNER'S RESPONSE PURSUANT TO 37 C.F.R. § 42.120** was served upon Petitioners by email on May 22, 2024:

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Date: May 22, 2024

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