

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

DYSON TECHNOLOGY LIMITED AND DYSON, INC.,
Petitioners,

v.

OMACHRON INTELLECTUAL PROPERTY INC.,
Patent Owner.

Case No. IPR2024-01162
U.S. Patent No. 11,903,546

PATENT OWNER'S PRELIMINARY RESPONSE

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PATENT OWNER'S EXHIBIT LIST

Exhibit	Description
2001	Disclaimer to U.S. Patent No. 11,903,546
2002	Disclaimer Receipt

TABLE OF ABBREVIATIONS

Abbreviation	Term
'546 Patent	U.S. Patent No. 11,903,546 (Ex1001)
Butler	International Patent Publication No. WO 2007/084543 (Ex1005)
Jianan	Invention Patent Application Publication, People's Republic of China, Pub. No. CN101061932A (Ex1005; translated version Ex1006)
IPVG	U.S. Patent No. 283,179 (Ex1007)
Conrad335	US Patent Application Publication No. US2007/0209335 (Ex1008)
Challenged Claims	Claims 1-7, 9-13, 15 of U.S. Patent No. 11,903,546
Fig.	Figure
IPR	<i>inter partes</i> review
Patent Owner	Omachron Intellectual Property Inc.
Petitioners	Dyson Technology Limited and Dyson, Inc.
POSITA	person[s] of ordinary skill in the art

I. INTRODUCTION

Patent Owner Omachron Intellectual Property Inc. provides the following Preliminary Response to the Petition filed by Dyson Technology Limited and Dyson, Inc. requesting *inter partes* review of claims 1–15 of U.S. Patent No. 11,903,546. Patent Owner has disclaimed claims 8 and 14 of the '546 Patent. Accordingly, the Challenged Claims are now only claims 1–7, 9–13 and 15.

The Petition asserts two grounds against the Challenged Claims. Both grounds are obviousness challenges based on the combination of two references concerning vacuum cleaners; Petitioners make no single reference anticipation challenges. Petitioners' obviousness challenges are not directed to a single proposed combination product in either ground. On the contrary, Petitioners offer an array of Frankenstein devices for each ground, picking different features from two references in various combinations based on hindsight from reading the claim language, rather than the motivations of a POSITA.

But Petitioners' combinations face a larger problem. Each of Petitioners' two grounds depends on a combination that results in a proposed vacuum cleaner that ***hinders, if not entirely frustrates***, the purposes of the starting vacuum cleaner. In Ground 1, Petitioners rely on various assembled vacuum cleaner combinations that inhibit the cyclonic dirt separation system as well as the dirt collection chamber, the very features that are benefits of the '546 Patent. In Ground 2, Petitioners swap out

the filter bag dirt collection system of one vacuum with the cyclonic dirt separation system of a second vacuum without recognizing that doing so has resulted in a vacuum cleaner that is ***unworkable*** because the necessary air flow architecture has not been maintained.

For at least these reasons and those set forth below, Petitioners fail to show a reasonable likelihood of success on any Challenged Claim, and the Board should deny institution of IPR.

II. CLAIM CONSTRUCTION

A claim subject to IPR shall be construed using the same standard as in a civil action. 37 C.F.R. § 42.100(b). The Board need only construe terms “to the extent necessary to resolve the controversy.” *Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co.*, 868 F.3d 1013, 1017 (Fed. Cir. 2017). At this stage, Patent Owner does not submit any terms for construction. Patent Owner reserves the right to subsequently submit claim terms for construction should the Board institute IPR.

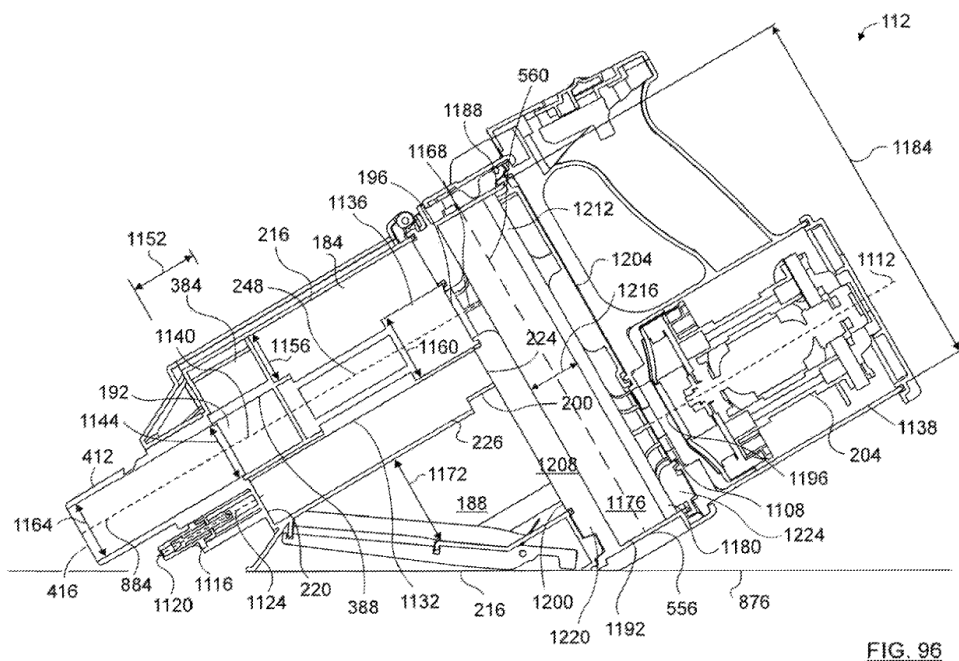
III. LEVEL OF ORDINARY SKILL IN THE ART

Solely for the purpose of this Preliminary Response, Patent Owner does not challenge Petitioners’ proposed definition of a POSITA. Patent Owner reserves the right to provide an alternative definition of a POSITA if IPR is instituted.

IV. TECHNICAL BACKGROUND

A. Summary of the '546 Patent

The '546 Patent is directed to a hand vacuum employing a cyclonic chamber with a dirt collection chamber that is exterior to the cyclonic chamber. Ex1001, 1:50–2:9. As explained in the '546 Patent, one advantage of this configuration is that “the air treatment chamber and the dirt collection chamber may be more easily emptied and any debris that may bridge the dirt outlet, may be more easily removed.” *Id.*, 2:1–5. For example, as shown in Figure 96 below, dirt collection chamber 188 is exterior to cyclone chamber 184.



Id., Fig. 96.

B. Prosecution History of the '546 Patent

For over two years, the United States Patent and Trademark Office examined the application that issued as the '546 Patent. *See generally* Ex1004. The '546 Patent issued from U.S. Patent Application No. 17,830,529, filed on June 2, 2022, which is a continuation of U.S. Patent Application No. 17/351,943, filed on June 18, 2021. On May 30, 2023, the Examiner issued a non-final rejection, partly on the basis of obviousness over JP2014083241 ("Mori") and U.S. Patent Publication No. 2006/0090290 ("Lau"), arguing that these references disclose a surface cleaning apparatus with a cyclone chamber according to the claimed structures. Ex1004, 442–447 (5/30/2023 Office Action at 6–10).

In response, on August 24, 2023, the Applicant amended claim element 1(a)(iii), among others, as follows:

1. (Currently Amended) A surface cleaning apparatus comprising:
 - (a) a hand vacuum cleaner having a front end having a dirty air inlet, a rear end, a clean air outlet, an upper end, a lower end and a pistol grip handle, the hand vacuum cleaner comprising:
 - (i) a main body comprising an upper end, a lower end, a front end and a rear end, the main body housing a suction motor and fan assembly, the suction motor and fan assembly having a suction motor axis of rotation; [[and,]]
 - (ii) a cyclone unit comprising a cyclone chamber having a cyclone axis of rotation, a front end, an

- axially spaced apart rear end, a cyclone air inlet, and a cyclone air outlet provided at the rear end of the cyclone unit, wherein the cyclone axis of rotation intersects the pistol grip handle; and
- (iii) a dirt collection chamber that is exterior to the cyclone chamber and a forward end of the dirt collection chamber is openable; . . .

Ex1004, 474 (8/24/2023 Amendment).

The Applicant argued that this amendment incorporates the subject matter previously presented as claim 3, and because the Examiner did not raise any basis to reject that claim, the amended claim 1 is allowable. Ex1004, 483 (8/24/2023 Applicant Remarks).

Following the Examiner's Notice of Allowance on November 8, 2023, the claims were further amended to read as they currently do. Ex1004, 518–25, 539 (12/27/2023 Amendment; 01/08/2024 Examiner Amendment).

C. Overview of Asserted References

1. Butler

Butler is a 2007 PCT publication that details several distinct embodiments of a specialized “Stair Cleaning Vacuum.” Ex1005. Butler discusses various existing solutions such as “upright and canister vacuum cleaners,” “stick vacuums,” and “compact hand-held vacuums,” and concludes that there “exists a need for an improved vacuum cleaner” specifically adapted for cleaning “raised” surfaces, and “particularly stair treads and risers.” Butler discloses vacuum cleaners with

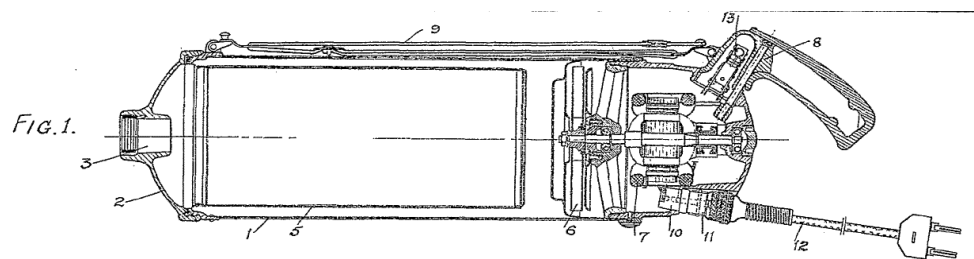
elongated housing and multiple grips, providing a user with the ability to hold the vacuum in multiple orientations to clean stairs or other similar surfaces. *Id.*, 1:5–24, 3:10–16. In particular, the Butler 2007 reference discloses circular shape grips that give the user flexibility in choosing a grip location in its preferred embodiments.

2. Jianan

Jianan (Ex1005 and Ex1006 (translation)) is a Chinese patent publication that published on October 31, 2007. Jianan discloses a rechargeable handheld vacuum cleaner with a detachable dust cup. Ex1006, Abstract. Jianan further discloses the use of two parallel cyclones and two dust collection chambers. *Id.*

3. IPVG

IPVG is a U.K. patent with an acceptance date of August 9, 1928 (U.K. Patent No. 283,179), from Inventia Patent-Verwertungs-Gesellschaft of Switzerland. The patent concerns a portable dust suction apparatus that is improved “with a handle which is rigidly secured to the casing in a simple but inexpensive manner.” Ex1007, 1. The application is comprised of roughly one and a half pages of specification plus three figures, such as the one below:



Id., Fig. 1. IPVG further discloses a front end cover that is screwed onto the front of the dust suction apparatus.

4. Conrad335

Conrad335 is a US Patent Application Publication that published on September 13, 2007. The sole inventor is Wayne Conrad, who is also the sole inventor on the '546 Patent. Conrad335 discloses various cannister vacuum cleaners and vacuum cleaner cyclone separation units that have, inter alia, a moveable plate mounted within. Ex1008, Abstract.

V. SPECIFIC GROUNDS OF UNPATENTABILITY

A. Patent Owners Disclaim Claims 8 and 14

Pursuant to Patent Owner's filing on October 28, 2024, Patent Owner has disclaimed claims 8 and 14 of the '546 Patent. Ex2001, Ex2002. There are no claims that depend from claim 8 or 14.

B. Petitioners Failed to Show that Butler in Combination with Jianan Renders Obvious Challenged Claims 1, 9, 10, and 15 (Ground 1)

1. A POSITA would not have combined Butler's cyclonic chamber with Jianan's separate dirt collection chamber

Each remaining, undisclaimed independent claim requires that the claimed surface cleaning apparatus comprises a dirt collection chamber that is exterior to the cyclone chamber:

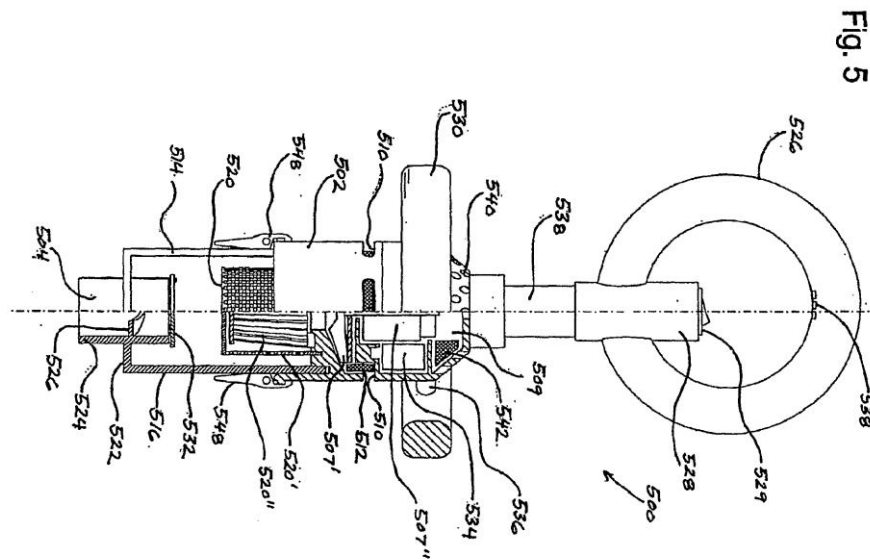
Claim	Petitioners' Claim Limitation	Claim Language
1	1a.3	(iii) a dirt collection chamber that is exterior to the cyclone chamber and a forward end of the dirt collection chamber is openable;
9	9a.2	(ii) a cyclone unit comprising a cyclone chamber and a dirt collection chamber that is exterior to the cyclone chamber
10	10b	(b) a dirt collection chamber that is exterior to the cyclone chamber and a forward end of the dirt collection chamber is openable;
15	15a.2	(ii) a cyclone unit comprising a cyclone chamber and a dirt collection chamber that is exterior to the cyclone chamber,

The Butler reference does not disclose a dirt collection chamber that is exterior to the cyclone chamber, and Petitioners do not assert otherwise. Rather, according to Petitioners, a POSITA would start with Butler's hand vacuum and modify it to include the wall taught by Jianan to separate an independent dust collection chamber from the cyclone chamber. Pet., 15. Petitioners state that this would be "a simple substitution of known elements to obtain predictable results." Pet., 21. But, as described below, this is not true. Plaintiffs are not simply adding Jianan's independent dirt collection chamber to the Butler vacuum, but are instead creating new Frankenstein combinations of Butler's cyclone separator and Jianan's wall that

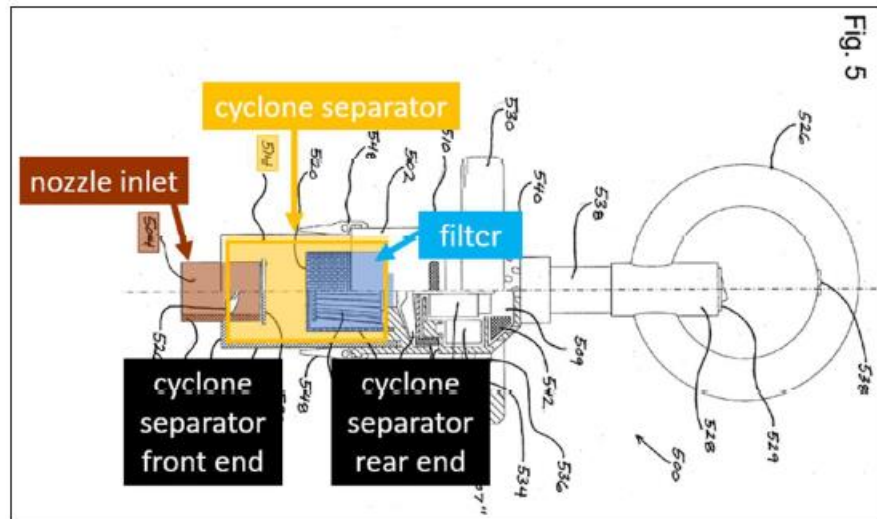
are not disclosed in either reference, and which detract from the stated benefits of each reference.

Demonstrating their own lack of confidence in the combination, Petitioners were unable to settle on a single combination of Butler's vacuum with Jianan's separate chamber but, rather, presented four different creations. As explained below, each creation distorts the relevant components and frustrates the functionality of the vacuum.

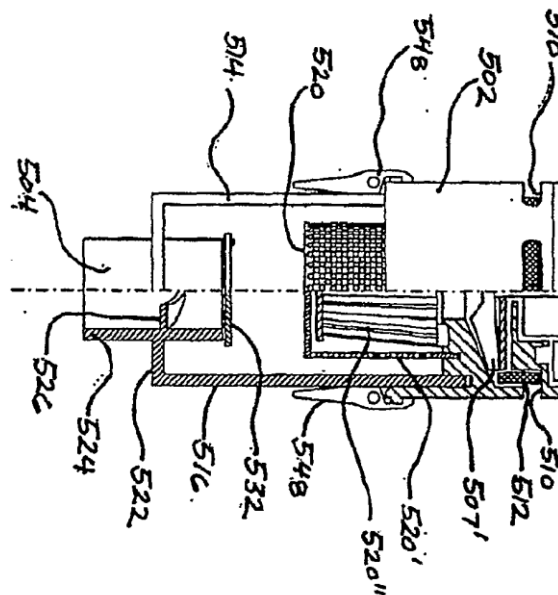
In each of the first three combinations asserted by Petitioners, the starting point is the vacuum shown in Figure 5 of Butler, reproduced below.



Ex1005, Fig. 5. In one embodiment, this vacuum uses cyclonic separation to separate dirt from the air flow. Ex1005, 22:23–25. Petitioners identify the cyclone separator as the area in the receptacle 514 that is outside of the central filter:



Pet., 31 (Petitioners' annotated Fig. 5 from Ex1005). It is not easy to see the filter and other components in Petitioners' annotated figure, but below is a close up of the cyclone chamber of the original Figure 5:



Ex1005, Fig. 5 (closeup). Air enters this vacuum from the left through the entry tube 524, where the air encounters a helical ramp 526 that establishes a cyclonic airflow pattern within the dirt receptacle 514. The air flows in a cyclonic airflow pattern

within the cyclone separation chamber, which acts to remove dirt and dust by centrifugal or cyclonic action, before the air eventually passes through the return filter 520 and progresses to the suction motor and out the back of the vacuum. Figure 5 shows a cutaway of the cylindrical filter 520, which is made of a coarse perforated shroud 520' that acts as a preliminary filter and a pleated fine filter 520'' that acts as a fine particle filter, under a housing 502.

While Butler does not include any air flow diagrams showing the cyclonic airflow, a POSITA would understand that the air flow spirals within the receptacle, including around the central filter. This can be seen in Jianan, which does draw the cyclone airflow swirling around the central slitted return pipe (37):

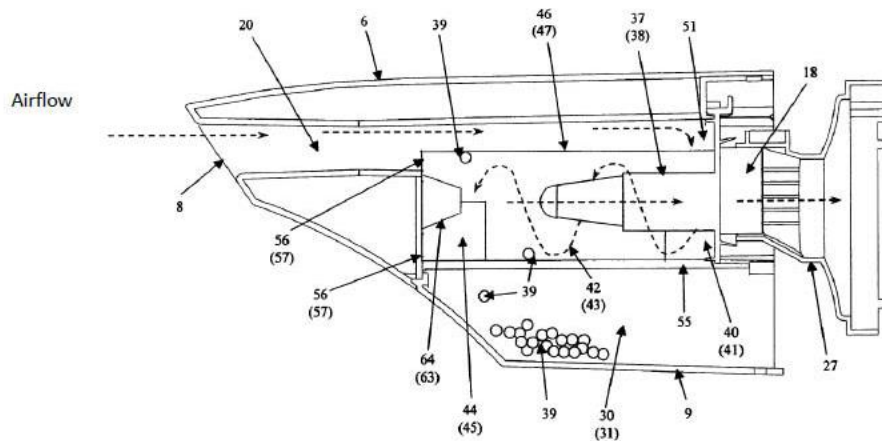
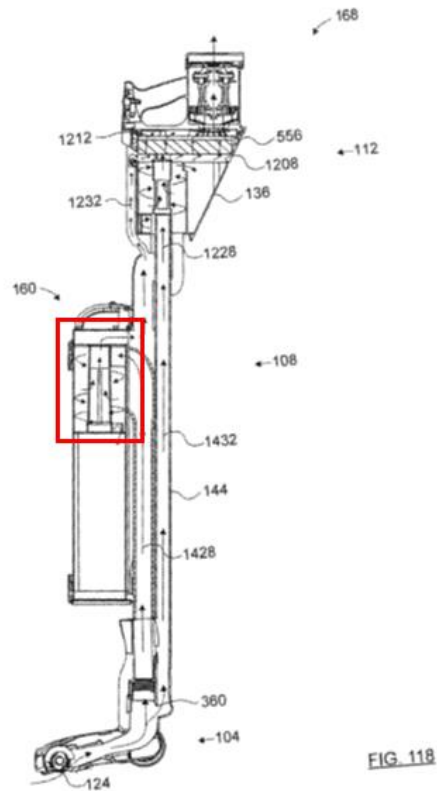
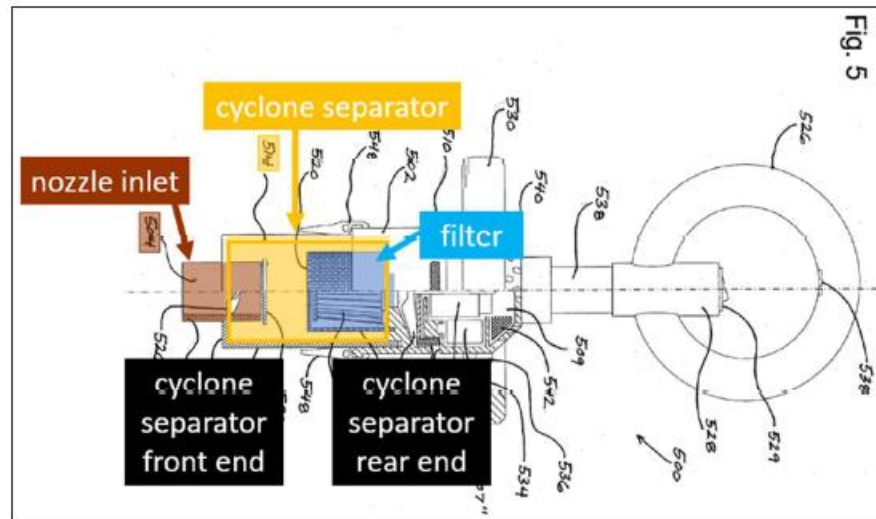


Fig. 5

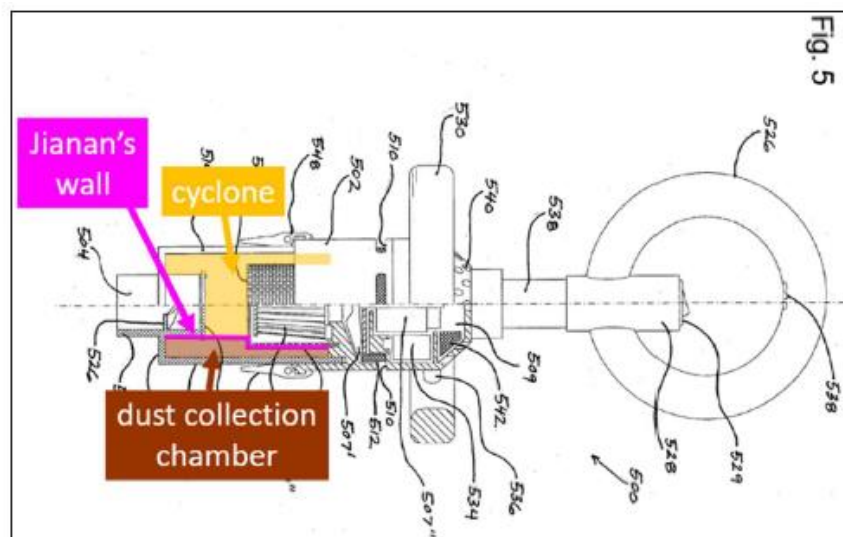
Ex. 1006, Fig. 5. The '546 Patent likewise shows that the cyclonic airflow lines flow in a cyclonic fashion around the return filter in the cyclone separator, highlighted in red below:



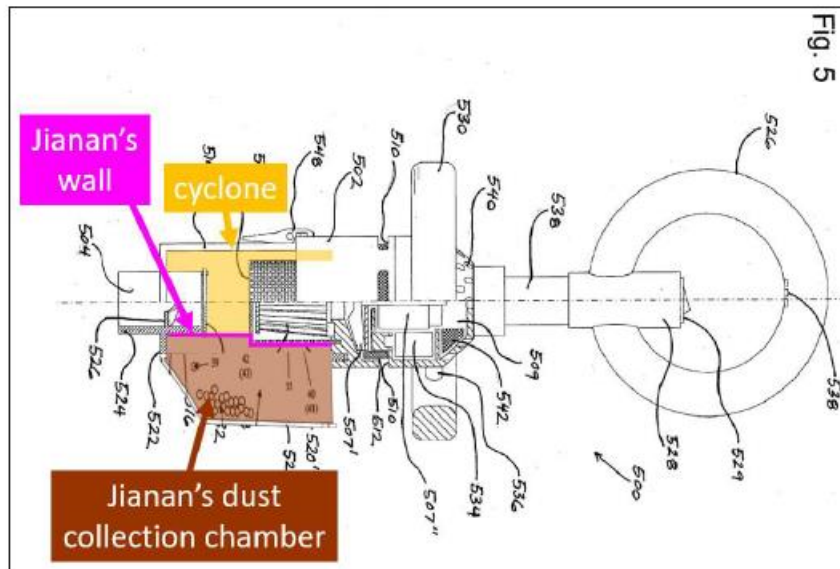
Ex1001 at Fig. 118 (highlighted). Like the cyclone chambers in Jianan and the '546 Patent, the cyclone chamber in Butler has an annular volume around the central return filter, as seen in Petitioners' annotated version of Butler's Fig. 5 showing the yellow cyclone chamber extending around the blue filter:



Pet., at 31 (Petitioners' annotated Fig. 5 from Ex1005). Petitioners' first two proposed combinations of Butler and Jianan do not retain the annular volume around the filter. Rather, Petitioners modify Butler by adding a horizontal dividing wall in the cyclone chamber, cutting through the cyclone chamber volume, and blocking the lower portion of the filter:



Petitioners' First Butler-Jianan Combination. Pet., 16 (Petitioners' modified Fig. 5 from Ex1005).



Petitioners' Second Butler-Jianan Combination. Pet., 17 (Petitioners' modified Fig. 5 from Ex1005). In addition to reducing the volume available for the cyclonic effect, the combination has reduced the surface area of the filter (520) through which air exits chamber 514. Reducing airflow out of the chamber would increase back pressure, inhibiting the cyclonic flow. Lowering the surface area of the filter also results in the need for more frequent cleaning/replacement of the filter as it gets blocked with debris. Furthermore, in both combinations, the Petitioners label the new wall as "Jianan's wall," but Jianan does not disclose a stepped wall like the one that Petitioners have added. The figure in Jianan from which Petitioners claim to take this wall is shown below:

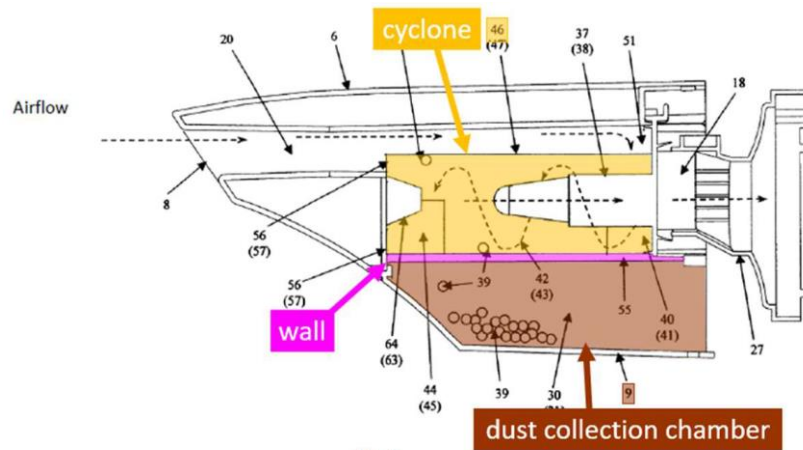
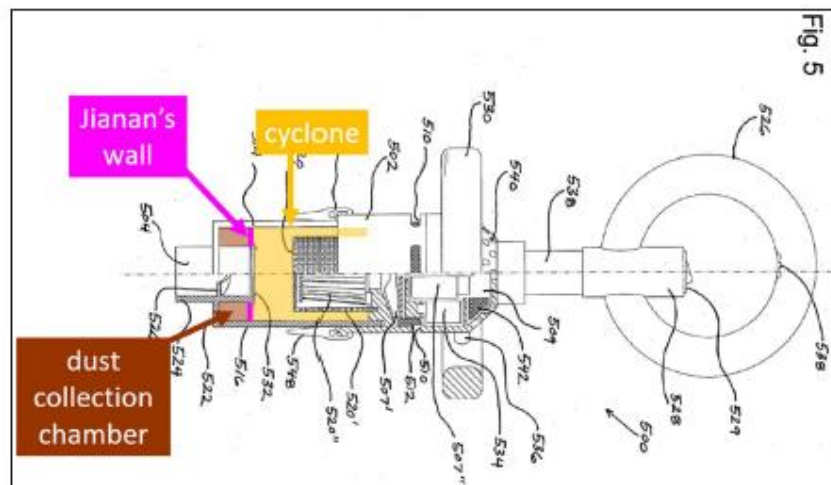


Fig. 5

Ex1002, ¶69 (Petitioners’ annotated Fig. 5 from Ex1006). As can be seen, the actual “Jianan’s wall” in Ex1006 is flat, does not abut the central return pipe, and retains the cylindrical volume for the cyclone flow.

Petitioners' third proposed combination of Butler and Jianan does no better. Here, Petitioners propose placing a vertical wall to define a dust collection chamber:



Petitioners' Third Butler-Jianan Combination. Pet., 17 (Petitioners' modified Fig. 5 from Ex1005). As with the others, this proposed combination cuts off a portion of the cyclone chamber—this time it is the annular portion around the inlet tube 524.

The vacuum disclosed in Figure 5 of Butler previously has an inlet tube that protrudes into the cyclone chamber. Petitioners' third proposed combination eliminates that protrusion, with no discussion or consideration of the effect on the efficiency of cyclonic separation. Petitioners label the new chamber area as a "dust collection chamber", but the volume is small relative to the rest of the device and would require frequent emptying. Petitioners do not explain how a user would empty the dust from the new chamber.

Petitioners' third proposed combination is deficient for another reason. Although the Petitioners again labeled the vertical wall as "Jianan's wall," there is no disclosure in Jianan of a vertical wall, and it would be contrary to its teachings. Every disclosure in Jianan showing a dust collection chamber separated by a horizontal wall that is parallel with the cyclone's axis of rotation.

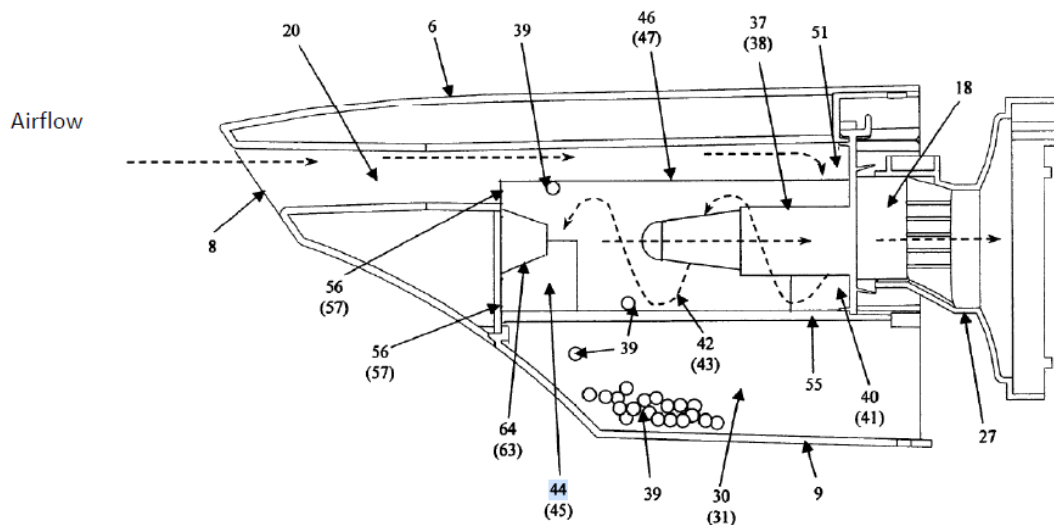
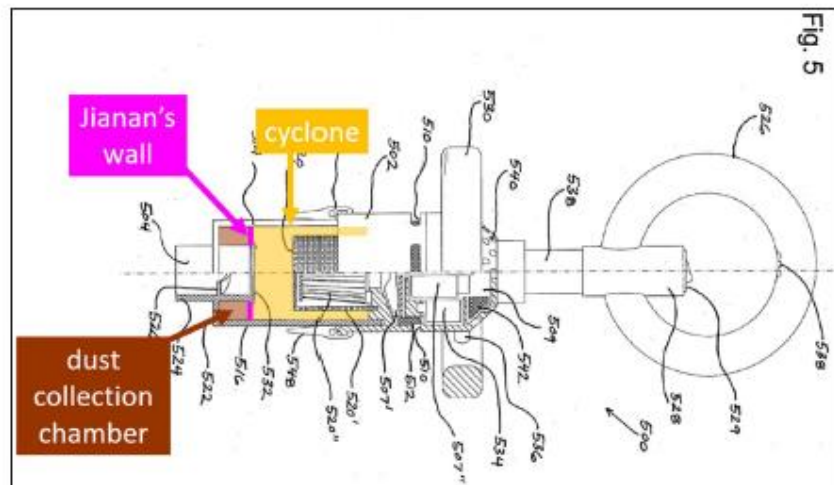


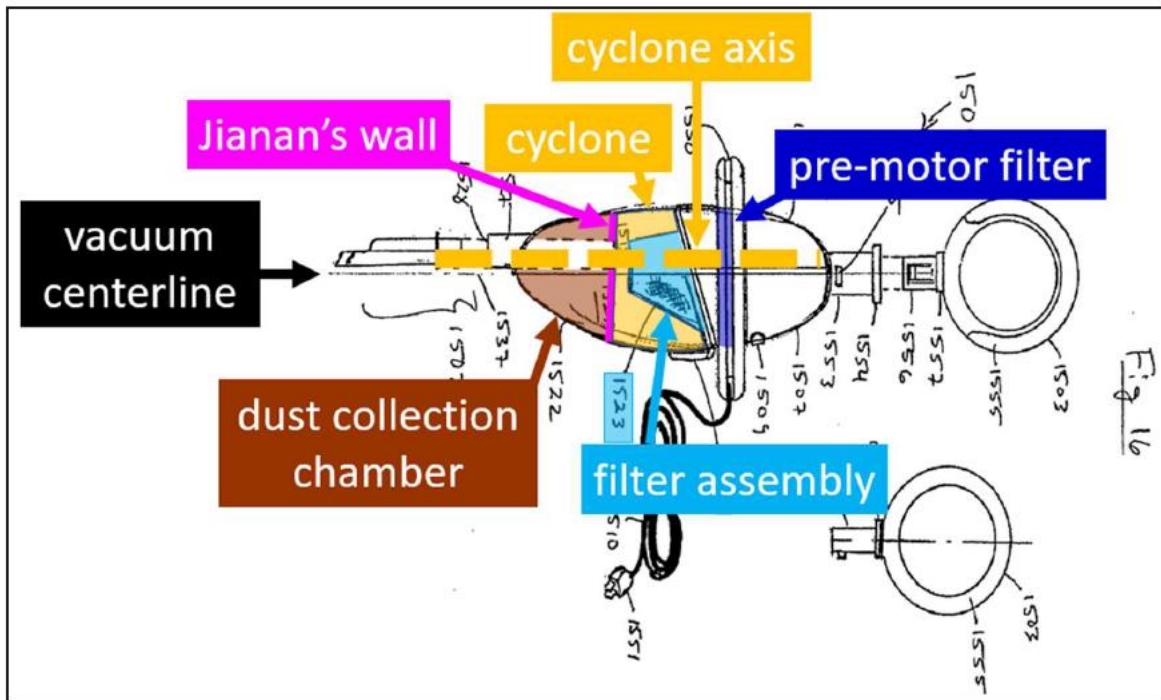
Fig. 5

Ex1006, Fig. 5. Petitioners offer no prior art support for its Third Butler-Jianan Combination. The configuration shown in Figure 5 of Jianan is a flat horizontal wall. A horizontal wall makes sense, as it is parallel to the cyclone axis of rotation such that the centrifugal force of the cyclone would propel the dirt particles toward and against the dividing wall, and eventually through the hole cutouts into the dirt collection chamber. Ex1006, 9 (“As shown in Fig. 6, the dust-laden air flows tangentially onto the inner surfaces of the cyclones 47 and 46, and forms vortices 43 and 42 within the respective cyclones, respectively. This causes dust particles that are heavier than air to move out of the vortex through centrifugal force. This phenomenon is commonly referred to as cyclonic separation and is well known to those skilled in the art.”). In comparison, the vertical wall in Petitioners’ third configuration is not only perpendicular to the cyclone axis of rotation, but the airflow would also be traveling away from that wall (from left to right).



Petitioners' Third Butler-Jianan Combination. Pet., 17 (Petitioners' modified Fig. 5 from Ex1005). Petitioners' Third Combination would not lead to particles being propelled by centrifugal force or by air flow to the dividing wall, and the Petition offers no support for this particular arrangement. Accordingly, Petitioners' third proposed modification changes the layout of Butler's cyclone chamber, limiting the volume available for cyclone separation while failing to establish a dirt collection chamber toward which dirt would be propelled as in Jianan.

Petitioners' Fourth Butler-Jianan Combination fares no better. This combination starts with a different Butler embodiment (Figure 16). The vacuum in Figure 16 of Butler does not show a cyclone separation unit, but the text indicates that the vacuum dust cup can comprise "a bag chamber, a non-cyclonic cup, or a cyclonic separation chamber." Ex1005, 36:2–4. Petitioners combined this embodiment with a vertical wall, just as in the Third Butler-Jianan Combination. Again, the wall would be perpendicular and upstream of the cyclonic axis, should a cyclone separation chamber be chosen instead of a bag chamber or non-cyclonic cup:



Petitioners' Fourth Butler-Jianan Combination. Pet., 17 (Petitioners' modified Fig. 5 from Ex1005). Even if a POSITA were to opt for a cyclone chamber, this configuration would still have the same shortfalls as the third configuration—*e.g.*, it relies on a wall orientation that is not disclosed in Jianan and would fail to operate in the same manner as the horizontal wall that is actually disclosed in Jianan. Likewise, it has removed roughly half of the volume available for the cyclone to operate, limiting its efficiency, and Respondents have not provided any explanation for how a POSA would empty the small dust collection chamber. *See* discussion of Third Butler-Jianan Combination above.

The Petition fails to offer a reasonable justification for how a POSITA would select between its vertical and horizontal "Jianan's walls." Petitioners' expert asserts

that using a vertical wall as in the third and fourth combinations would be beneficial for cleaning horizontal surfaces, while using a horizontal wall would be beneficial for cleaning vertical surfaces. Ex1002, ¶ 92. But he also points out that Butler's stated objectives are for a device that can be used to clean **both** horizontal **and** vertical surfaces. *Id.*, ¶ 92 (citing Ex1005, 7:2–5). By choosing a vertical wall over a horizontal wall, or vice versa, the POSITA will have frustrated Butler's objective of a device designed to clean both horizontal and vertical surfaces.

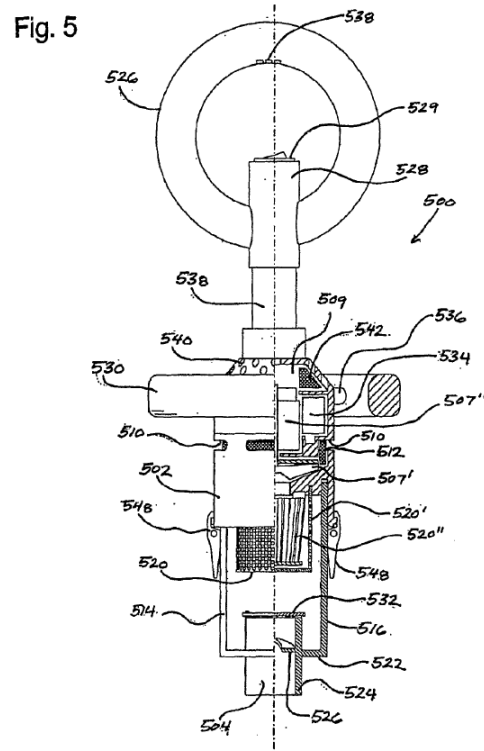
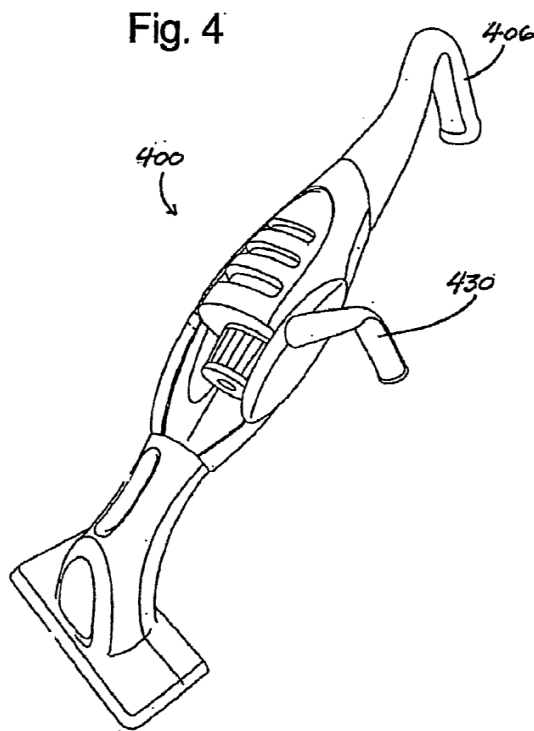
In short, in its proposed combinations, Petitioners have created new cyclone chamber/dust collection chamber architectures that are not disclosed in either Butler or Jianan. Accordingly, Petitioners cannot assume that either Butler's cyclone chamber or Jianan's dust collection chamber will operate with the same benefits or efficiency as they would as separate components. For example, Petitioners' combinations have blocked much of Butler's filter 520 with "Jianan's wall." Likewise, there is no room for the cyclonic air flow above the actual horizontal wall in Jianan.

Petitioners failed to provide any motivation for why a POSITA would be willing to limit the cyclonic air flow of Butler's vacuum or the dust collection chamber of Jianan in order to implement its new version of "Jianan's wall." On the contrary, Petitioners merely assert that a POSITA would understand that "the simple substitution of an integrated dirt-collection chamber for a separated one would

achieve the predictable result of more efficient cyclonic air filtration and reduced pre-filter maintenance.” Pet., 21. But that statement ignores that the cyclonic air filtration portion of the Butler device is no longer intact, and Jianan’s dust collection chamber is in a new orientation relative to the cyclonic air flow. Petitioners are not combining two separated components whereby a POSITA would assume to reap the additive benefits of both; rather, they are making a tradeoff by integrating the two references in a way taught by neither. *See, e.g., Nike*, 963 F.3d at 1358; *In re Fritch*, 972 F.2d 1260, 1266 n.12 (Fed. Cir. 1992) (“[A] proposed modification [is] inappropriate for an obviousness inquiry when the modification render[s] the prior art reference inoperable for its intended purpose.”).

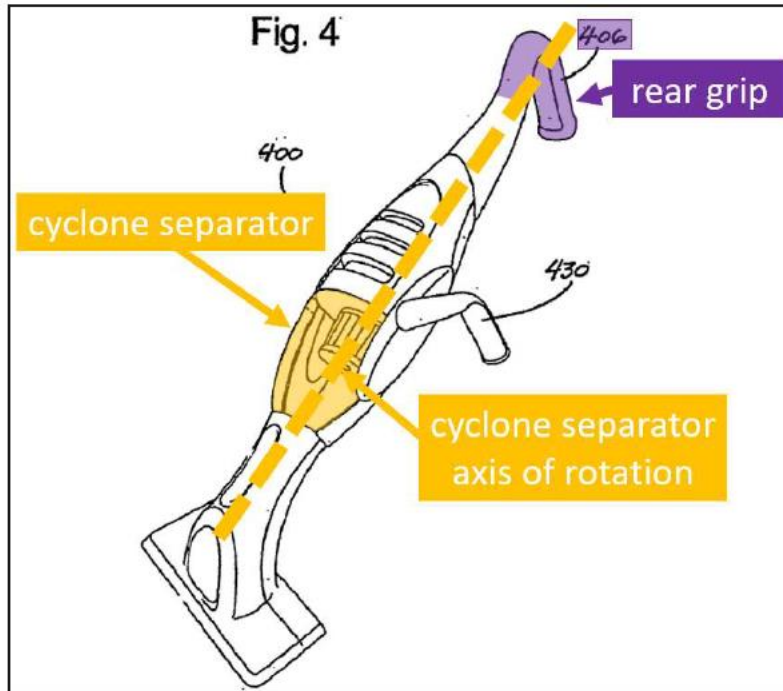
2. Petitioners failed to show that the cyclone axis of rotation in the combinations of Butler with Jianan would intersect the pistol grip handle [1a.2]/[9a.2]

Independent claims 1 and 9 both require that “the cyclone axis of rotation intersects the pistol grip handle.” In all of its proposed combinations, the Petition cites to element 406 in Figure 4 of Butler as being the alleged pistol grip handle. *See, e.g., Pet.*, 34–35. Critically, however, Butler’s Figure 4 is a *different* embodiment than Figure 5, and Petitioners offers no reasons *why* a POSITA would have—let alone *how* it would have—combined those two embodiments. Ex1005, 19–18–22:25 (“Referring now to Figure 5, another embodiment of the invention is illustrated and described in detail.”).

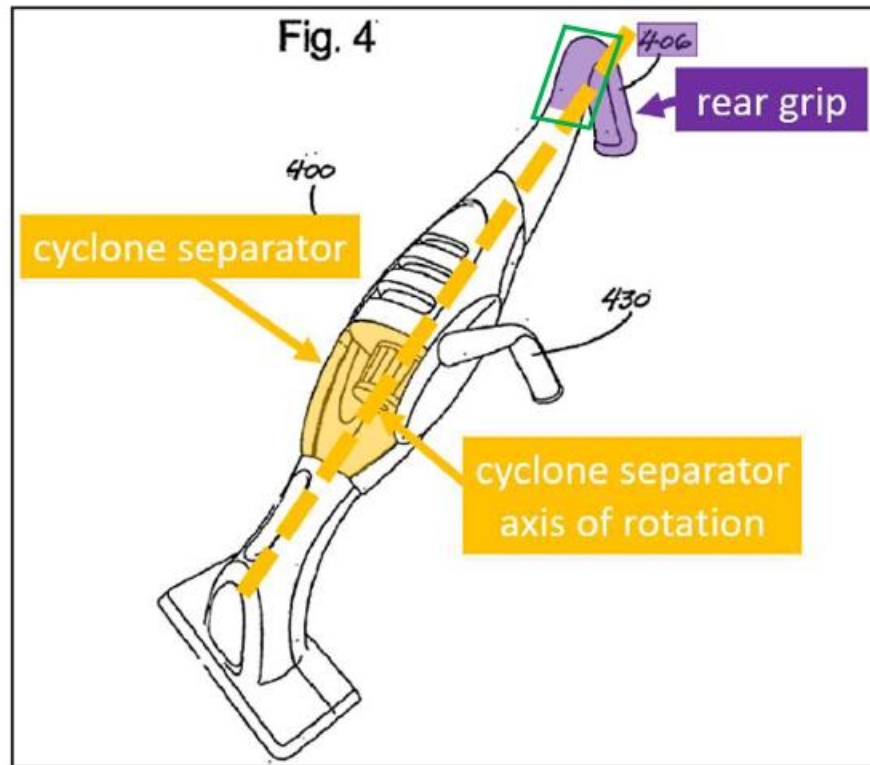


Ex1005, Figs. 4, 5.

Even setting aside Petitioners' improper combination of embodiments, Petitioners fail to show that the Figure 4 embodiment discloses this limitation. In the figure above, element 406 extends down from the center line of the vacuum cleaner. Figure 4 does not show whether the cyclone axis of rotation intersects element 406. Petitioners assert that the axis intersects the pistol grip handle by shading not only element 406 but also the vacuum body well past element 406:



Pet., 35 (Petitioners' annotation of Ex1005, Fig. 4). Without the shading that extends well beyond any reasonable interpretation of element 406, the Petition fails to show that Butler discloses a cyclonic separator axis of rotation intersecting a pistol grip handle. Indeed, the Petition offers no explanation of why a POSITA would consider the part of the body Petitioners indicated in the green parallelogram below to be part of the handle and not part of the body. It is clear that no part of the user's hand is designed to hold that part of the body.



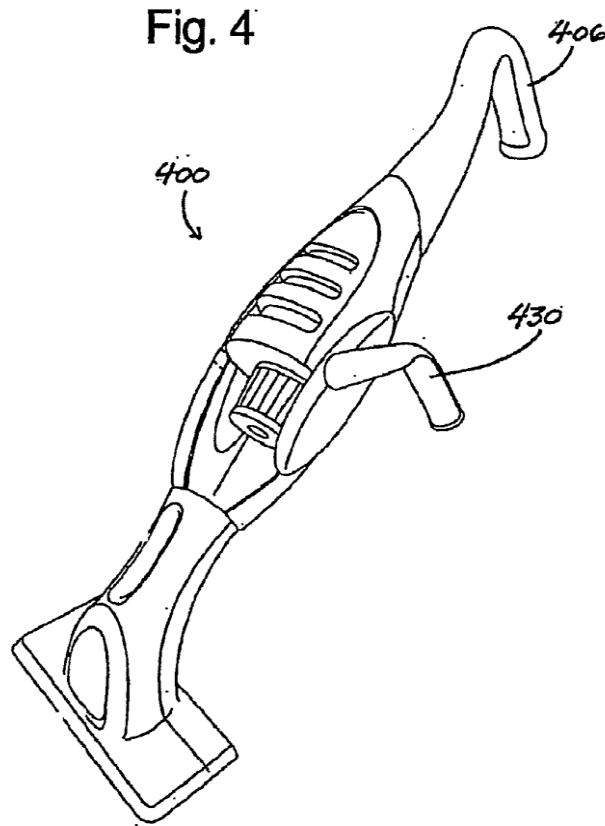
Ex1005, Fig. 4 (with Petitioners' labeling (yellow and purple, from Pet., 25) and additional annotation (green)).

Accordingly, Petitioners failed to show that the combination of Butler and Jianan in Ground 1 renders obvious every element of independent claims 1 and 9, as well as the claims that depend from those claims (dependent claims 2–7).

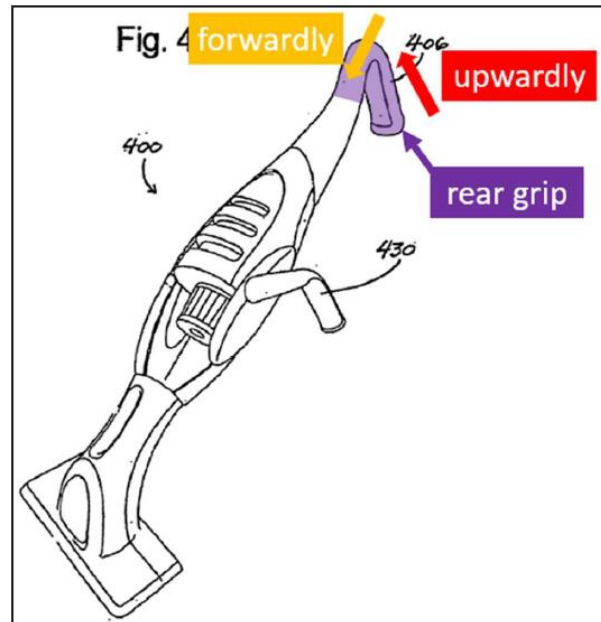
3. Petitioners failed to show a pistol grip handle that extends upwardly and forwardly [10a.1]/[15a.1]

Independent claims 10 and 15 both require that “the pistol grip handle is provided at the rear end of the main body and extends upwardly and forwardly when the hand vacuum cleaner is positioned with the front end forward of the rear end.” But Petitioners failed to show this limitation in the references in this Ground.

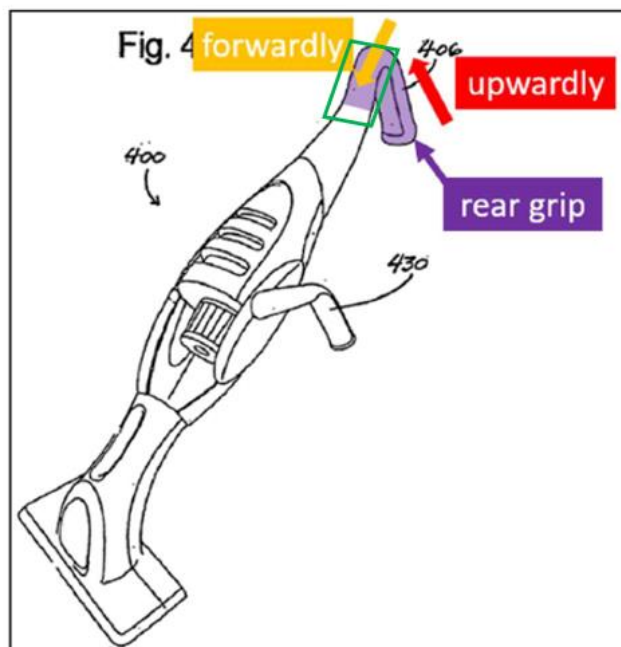
As in the previous discussion, the Petition relies on element 406 from Butler as the alleged pistol grip handle. Pet., 26.



Ex1005, Fig. 4. The vacuum cleaner in Butler's Figure 4, however, is not shown at an angle that indicates whether element 406 extends upwardly in the forward direction. Petitioners attempt to overcome Butler's ambiguity by again shading an area well beyond any reasonable definition of what a pistol grip handle is, extending onto the body of the vacuum, in order to argue that the handle extends upwardly:



Pet., 35 (Petitioners' annotation of Ex1005, Fig. 4). Again, Petitioners have extended its purple shading beyond the handle. In particular, the portion of the body in the green parallelogram below is well beyond what could be considered the pistol grip handle:



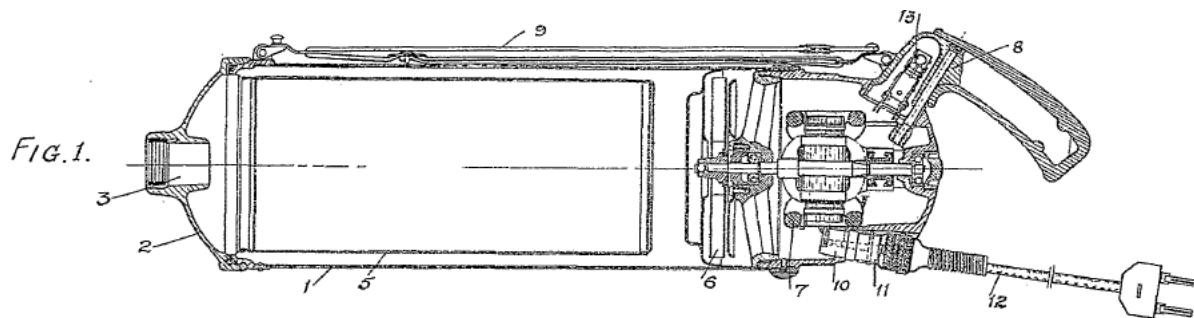
Ex1005, Fig. 4 (with Petitioners' labeling (yellow and purple, from Pet., 35) and additional annotation (green). Ignoring Petitioners' misleading purple shading, it is clear that Butler fails to disclose a pistol grip handle that extends upwardly and forwardly.

Accordingly, Petitioners failed to show that the combination of Butler and Jianan in Ground 1 renders obvious every element of independent claims 10 and 15, as well as the claims that depend from those claims (dependent claims 11–13).

C. Petitioners Failed to Show that IPVG in Combination with Conrad335 Renders Obvious Challenged Claims 1, 9, 10, and 15 (Ground 2)

1. A POSITA would not have placed the cyclone chamber/dirt collection chamber from Conrad335 into the vacuum cleaner of IPVG

The vacuum cleaner disclosed in the 1926 UK patent ("IPVG") is a rudimentary design by modern standards. The dirt air enters the inlet on the left side and is pulled by the suction motor through the filter bag in the cannister:

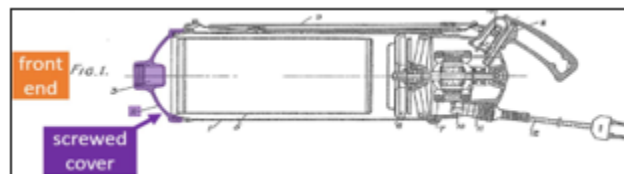


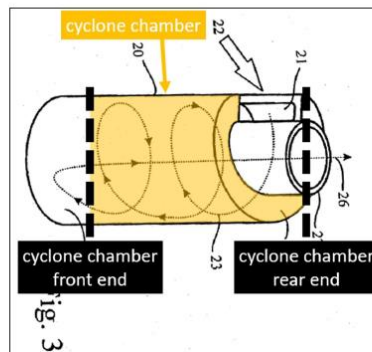
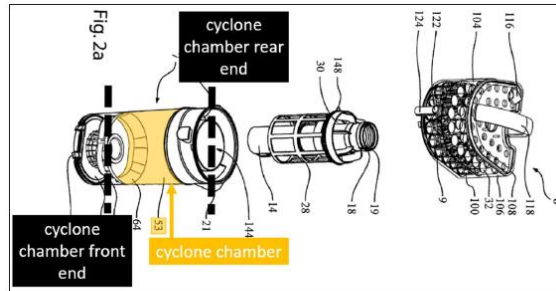
Ex1007, Fig. 1. In Ground 2, Petitioners argue that a POSITA would substitute a cyclone separator from Conrad335 for the dust bag separator in the IPVG vacuum

(element 5 in Fig. 1). Unlike in Ground 1, Petitioners do not present any figures that cobble together portions of each reference into a single embodiment. There is a good reason for this: Petitioners' cyclone separators taken from Conrad335 are not compatible with the IPVG vacuum.

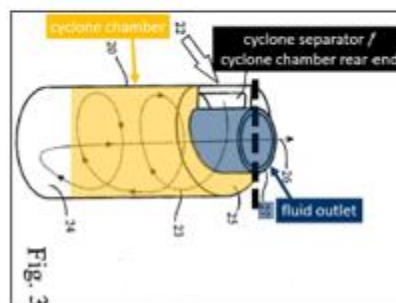
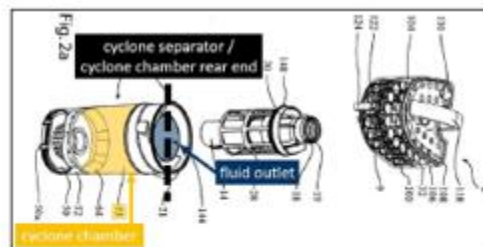
Under Petitioners' theory, the cyclone separators of Conrad335 had a front end and rear end, and Conrad335 then has a dirt collection chamber at the front end of the cyclone separators. Pet., 81–83. Petitioners propose that a POSITA would replace the dust bag of the IPVG vacuum with the cyclone separator of Conrad335, with the front end of the cyclone separators of Conrad335 positioned at the front end of the IPVG vacuum. As explained by Petitioner, with Petitioners' emphasized text and annotated figures:

When Conrad335's "cyclone separator 20," including "**cyclone chamber 53**" is incorporated into IPVG's vacuum, Conrad335's cyclone chamber has a **front end** at IPVG's "**front end**" (near "**screwed cover 2**"), which is at the cleaner front end, and an axially spaced apart **rear end** at the opposite end:





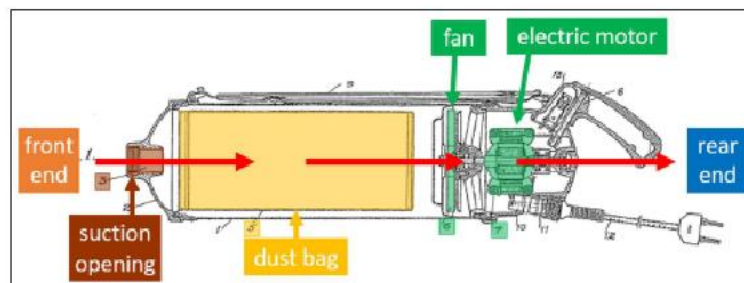
Further, Conrad335's "**fluid outlet 27**" (where air exits the "**cyclone chamber 53**") is located at the **rear end** of the "cyclone separator 20" (cyclone unit) and "**cyclone chamber 53**":



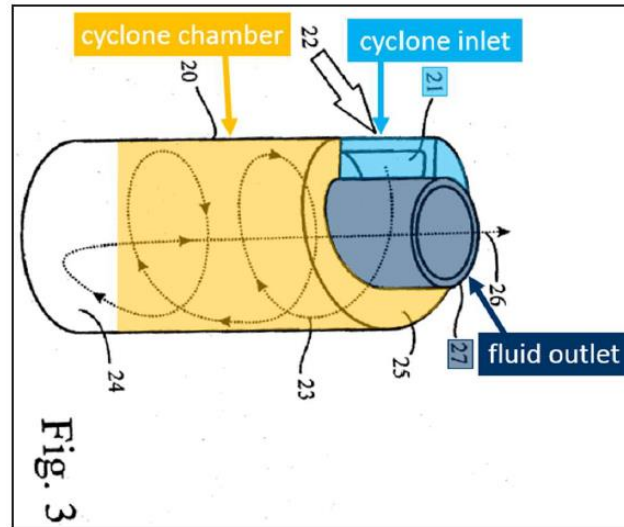
Pet., 102–103 (internal citations omitted). As explained by Petitioner, the front end of a Conrad335 cyclonic separator (where the dirt collection chambers is located)

would have to be aligned with the front end of the IPVG vacuum so that the user could open the front end of the vacuum to access and empty the dirt collection chamber. Pet., 102 (“when Conrad335’s ‘cyclone separator 20,’ including ‘cyclone chamber 53’ is incorporated into IPVG’s vacuum, **Conrad335’s cyclone chamber has a front end at IPVG’s ‘front end’** (near ‘screwed cover 2’), which is at the cleaner front end, and an axially spaced apart rear end at the opposite end”) (emphasis added); *see also*, Ex1002, ¶XX (identical language). Likewise, the rear end of each Conrad335 cyclonic separator would be positioned toward the rear end of the IPVG vacuum so that air exiting the cyclonic separator (fluid outlet 27) would be entering the suction motor. Pet., 103.

Petitioners failed to recognize, however, that all of the cited Conrad335 cyclonic separators have their **clean air inlets on the rear end of the cyclone separator**—opposite the front end of the cyclone separator, which is positioned at the inlet of the IPVG vacuum. Petitioners showed the suction opening at the front end of the IPVG vacuum on page 94:



Pet., 93 (Petitioners' annotated Fig. 1 from Ex1007). And Petitioners showed the cyclone air inlet (element 21) of the cyclone separator on page 102:



Pet., 93 (Petitioners' annotated Fig. 3 from Ex1008). Had Petitioners decided to cobble together a figure showing its proposed combination, it would have looked like the following:

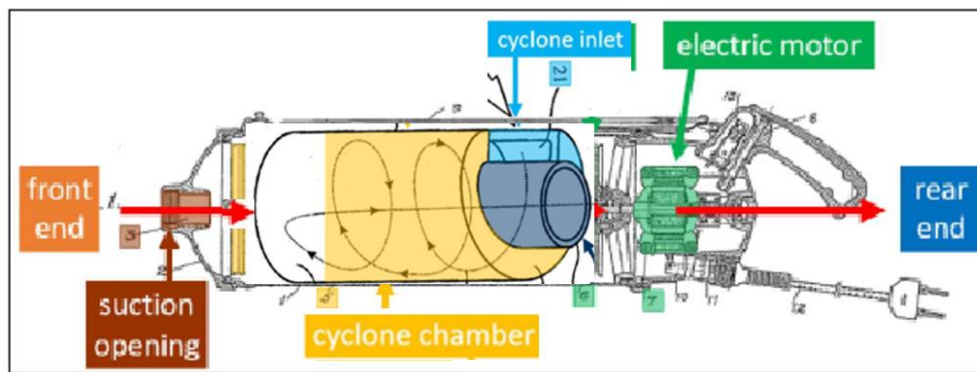
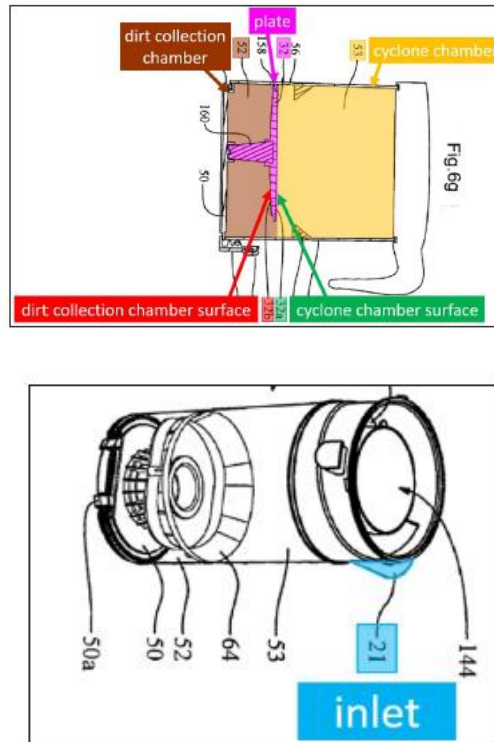


Fig. 1 from Ex1007 modified with Fig. 3 from Ex1008, as annotated by Petitioner. As can be seen, *the cyclone inlet is not located adjacent to or near the air inlet coming in from the suction opening at the front end of the IPVG vacuum.* This

same configuration is present for every view of the cyclonic separator of Conrad335 cited by the Petitioner, where the dirt collection chamber is on the front end, and the cyclone inlet and outlet are at the opposite (rear) end;



Pet., 92, 101 (Petitioners' annotated Figs. 2a, 6g from Ex1008). Conrad335's cyclonic separators are designed to have cyclonic flow proceed in a direction through the chamber, impact the wall, and then reverse back so that the air flow exits at the same end it entered.

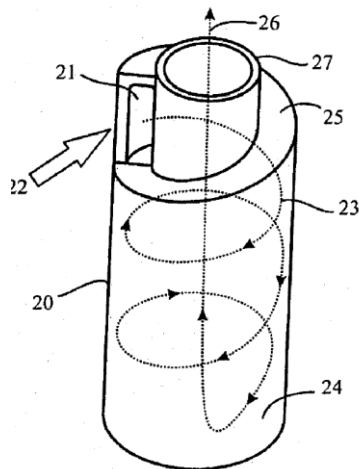
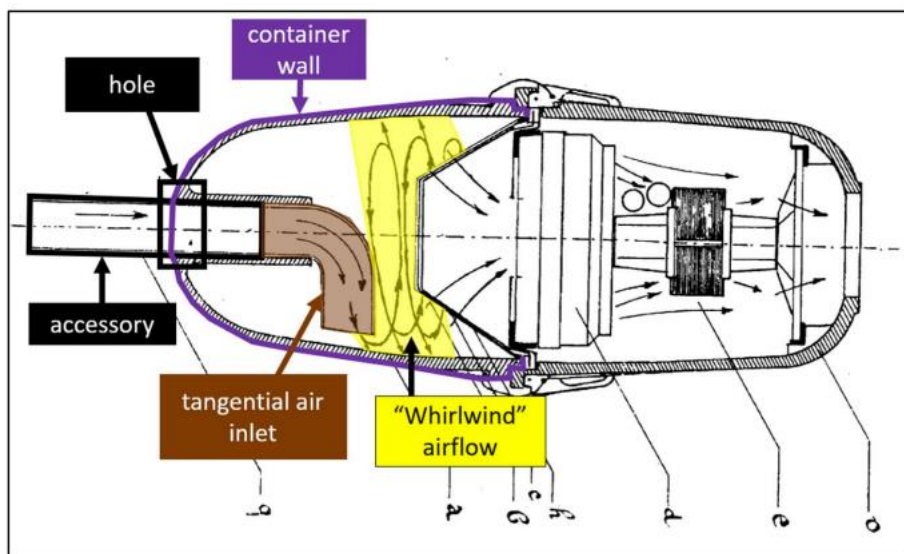


Fig. 3

Ex1008, Fig.3. The combinations proposed by Petitioners are therefore unworkable, with no fluid connection between the inlet of the IPVG vacuum and the inlet of the cyclone chambers of Conrad335. Petitioners wrote that their proposed combination “would have involved a simple substitution of known elements for others to obtain predictable results.” Pet., 87. With regard to substituting in the cyclone separation unit for the IPVG dust separation unit, Petitioners’ expert wrote that the “IPVG and Conrad335 are directed to vacuums having a similar orientation of separation unit relative to door, which, in my opinion, would have further motivated a POSITA to make the substitution.” Ex. 1002, ¶ 248. But that statement is not true if one considers the location of the air inlet into the cyclonic separation unit of Conrad335. Petitioners’ insertion of the Conrad335 cyclone chambers into the IPVG vacuum presents no way for the air coming into the IPVG vacuum to reach the inlet of the Conrad335 cyclone chamber and thus the Petition failed to present a working combination. See, e.g., *In re ICON Health & Fitness, Inc.*, 496 F.3d 1374, 1382

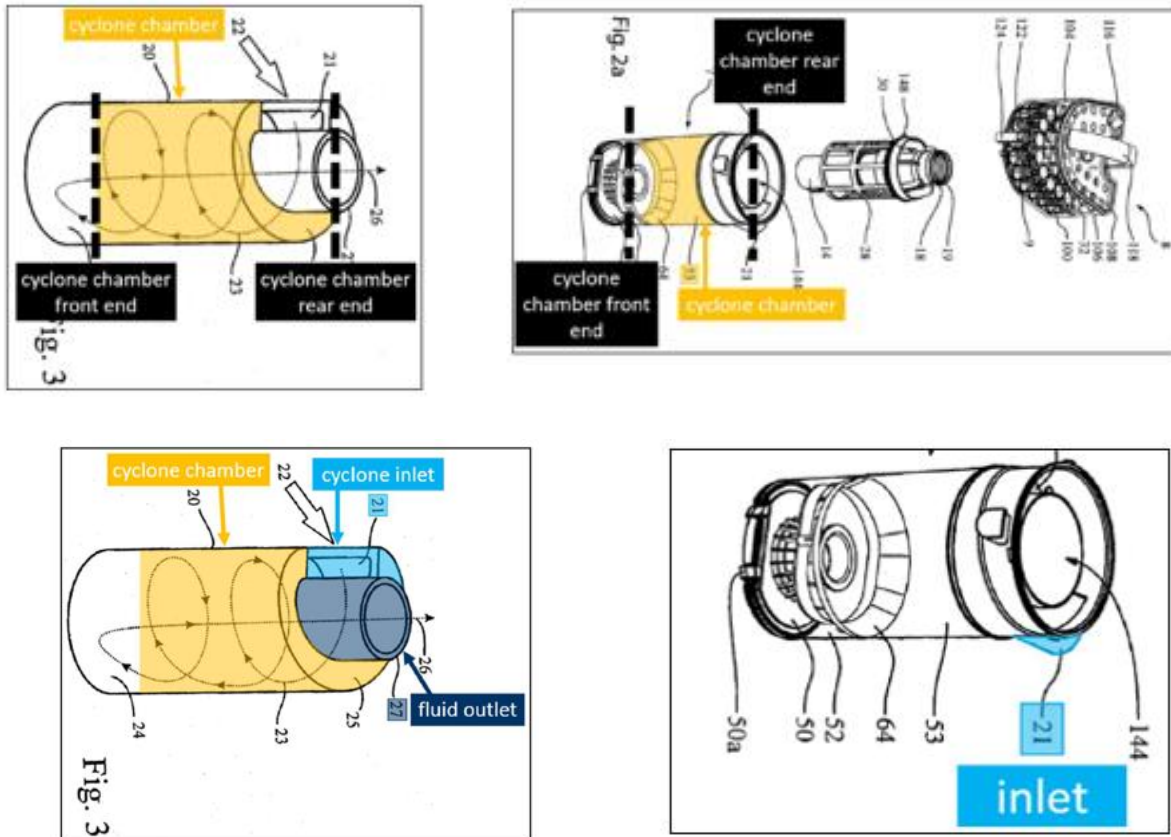
(Fed. Cir. 2007) (“[A] reference teaches away from a combination when using it in that combination would produce an inoperative result.”).

Petitioners’ expert further argued that a POSITA would have a reasonable expectation of success because “in my opinion, it was well-known that front located air inlets (such as IPVG’s) create cyclonic separation by using a tangential opening.” Ex1002, ¶ 248. The expert asserted that “**front-located** tangential air inlets have been used for cyclonic cleaners since well before the ’546 Patent.” *Id.*, ¶ 251 (emphasis added). The expert then presented a figure from a 1955 French patent to show as an example of a front-located tangential air inlet into a cyclonic separation unit:

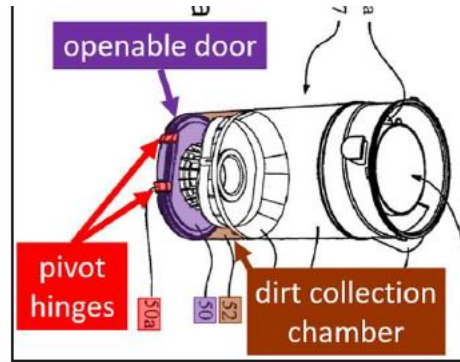


Ex1002, ¶ 248 (Ex1013, Fig. 1 (Petitioners’ markup)). But the combination put forth by Petitioners in Ground 2 does not use a cyclonic separation unit with a front-located air inlet. Instead, the cited Conrad335 cyclonic separation units have their

air inlets on the rear-end, as can be seen again and again in Petitioners' annotated images of the Conrad335 cyclone separation units:



Figures from Pet., 92, 102, 103 (Figs from Ex1008, annotated by Petitioner). Nor would it be simple to convert the Conrad335 cyclone separation units into cyclone separators having a front-located air inlet. The cited Conrad335 cyclone separation units have the dirt collection chamber and openable door at the front end, as relied upon by Petitioners to meet Claim Elements 1a.3/10b. Pet., 110–112.



Pet., 111 (section of Ex1008, Fig. 2a, annotated by Petitioner). Converting the cited Conrad335 cyclone separation unit to employ a front-located air inlet would require designing a system where a tangential air inlet could be arranged to pass through the door and dirt collection chamber into the cyclone chamber, while still allowing the door to open. The Petition offers no evidence regarding how such a change would be made, and in fact does not even acknowledge that such a change would be necessary.

Thus, Petitioners failed to demonstrate that the IPVG and Conrad335 combination teaches every element of each Challenged Claim, and Ground 2 fails for this reason.

VI. CONCLUSION

For the foregoing reasons, Petitioners failed to meet their burden of showing a reasonable likelihood that at least one of the Challenged Claims is unpatentable, and institution of *inter partes* review should be denied.

DATED: October 30, 2024

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CERTIFICATION UNDER 37 C.F.R. § 42.24(d)

Under the provisions of 37 C.F.R. § 42.24(d), the undersigned attorney hereby certifies that this document complies with the type-volume limitations of 37 C.F.R. § 42.24(b). The word count of the foregoing Patent Owner's Preliminary Response is 5285, according to the word count tool in Microsoft Word.

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CERTIFICATE OF SERVICE

The undersigned certifies service pursuant to 37 C.F.R. § 42.120 of a copy of this Patent Owner's Preliminary Response and supporting materials upon Petitioners by email on October 30, 2024, to the following email addresses of record:

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