

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

FLUIDMASTER, INC.

Petitioner

v.

DANCO, INC.
Patent Owner

Case No. IPR2024-00633
U.S. Patent No. 9,139,993 B1

**PETITIONER'S REPLY TO PATENT OWNER'S RESPONSE TO
PETITION**

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TABLE OF CONTENTS

I.	Introduction.....	1
II.	Ground 1: Guoxin in View of Ho Renders Obvious All Challenged Claims .	1
A.	PO’s Arguments Regarding the “Overflow Tube” are Untenable.....	1
1.	Claim 1[E] Recites a Tube “Configured To” Connect to an Overflow Tube	1
2.	Guoxin’s Water Supply Line 403 is <i>Configured to</i> Connect to an Overflow Tube	2
3.	Guoxin’s Disclosures Do Not Support a Different Conclusion .	4
B.	PO’s Arguments Regarding the “Integrally Molded” Limitations of Claim 1[A] Are Untenable	6
1.	Guoxin Discloses an “Integrally Molded” Extended Portion.....	7
2.	Ho Discloses an “Integrally Molded” Extended Portion.....	8
C.	Petitioner Articulates a Basis to Reverse Guoxin in View of Ho	12
III.	Ground 2: Petitioner Articulates a Basis to Combine the QCA.....	14
IV.	Grounds 1 and 2 Fully Address the Dependent Claims	15
A.	Claim 5	15
B.	Claims 7 and 9	16
C.	Claims 10–11.....	17
D.	Claim 18	17
E.	Claims 19 and 20.....	18
V.	Ground 3: Brown in View of Ho Renders Obvious All Challenged Claims	19
A.	Petitioner Identifies Motivations to Modify Brown in View of Ho....	19

1.	Brown and Ho are Interchangeable to Obtain Predictable Results	19
2.	Brown and Ho are Interchangeable with Reasonable Expectations of Success	20
B.	Petitioner Consistently Identifies a Single “Water Flow Regulator” ..	21
C.	Brown in View of Ho Discloses the “Integrally Molded” Limitations	22
VI.	Ground 4: Petitioner Articulates a Basis to Combine the QCA	23
VII.	Grounds 3 and 4 Fully Address the Dependent Claims	23
A.	Claim 2	23
B.	Claim 5	24
C.	Claims 7 and 9	24
D.	Claim 13	24
E.	Claim 15	24
F.	Claim 18	24
G.	Claims 19 and 20	24
VIII.	Ground 5: Schuster Anticipates Claims 1–18 of the ’993 Patent	25
A.	PO Has Failed to Show Claims 1–18 of the ’993 Patent are Entitled to a 2004 Priority Date	25
B.	Schuster Anticipates Claims 1–18 of the ’993 Patent	27
C.	Claims 19 and 20	28
IX.	Conclusion	28

TABLE OF AUTHORITIES

	Page(s)
<u>Cases</u>	
<i>Bilstad v. Wakalopulos</i> , 386 F.3d 1116 (Fed. Cir. 2004)	26
<i>In re Curtis</i> , 354 F.3d 1347 (Fed. Cir. 2004)	27
<i>Dow Chem. Co. v. Halliburton Oil Well Cementing Co.</i> , 324 U.S. 320 (1945).....	13
<i>Eko Brands, LLC v. Adrian Rivera Maynez Enterprises, Inc.</i> , 946 F.3d 1367 (Fed. Cir. 2020)	2
<i>Ex Parte Franck Carrel & Laurent Barrelle</i> , No. 2013-006623, 2015 WL 6774483 (PTAB Oct. 23, 2015)	13
<i>Franklin Elec. Co. v. Dover Corp.</i> , No. 2006–1442, 2007 WL 634430 (Fed. Cir. Mar. 1, 2007).....	7
<i>InTouch Techs., Inc. v. VGO Commc'ns, Inc.</i> , 751 F.3d 1327 (Fed. Cir. 2014)	19
<i>KSR Int'l Co. v. Teleflex Inc.</i> , 550 U.S. 398 (2007).....	13, 15, 19, 20
<i>KSR. Unified Patents, LLC v. Voice Tech Corporation</i> , No. IPR2020–01018, 2021 WL 6340174 (PTAB Dec. 13, 2021)	19, 21
<i>Micron Tech., Inc. v. Katana Silicon Techs. LLC</i> , No. IPR2023-00071, 2024 WL 2137717 (PTAB May 13, 2024)	11
<i>Persion Pharm. LLC v. Alvogen Malta Operations LTD.</i> , 945 F.3d 1184 (Fed. Cir. 2019)	16, 18, 19
<i>Regents of the Univ. of California v. Eli Lilly & Co.</i> , 119 F.3d 1559 (Fed. Cir. 1997)	26

<i>Rembrandt Diagnostics, LP v. Alere, Inc.</i> , 76 F.4th 1376 (Fed. Cir. 2023)	11
<i>Samsung Elecs. Co., Ltd. v. Home Semiconductor Corp.</i> , No. IPR2015–00459, 2016 WL 1534753 (PTAB Apr. 14, 2016).....	7
<i>Synthes USA, LLC v. Spinal Kinetics, Inc.</i> , 734 F.3d 1332 (Fed. Cir. 2013)	26
<i>Trend Micro Inc. v. Cupp Computing Assn</i> , No. IPR2019–00767, 2020 WL 5031970 (PTAB Aug. 25, 2020).....	1
<i>Unified Pats. Inc. v. Ideahub, Inc.</i> , No. IPR2020–01338, 2022 WL 443888 (PTAB Feb. 7, 2022).....	13, 14, 15
<i>Unified Pats. v. Oceana Innovations LLC</i> , No. IPR2020–01463, 2022 WL 500391 (PTAB Feb. 14, 2022).....	7

TABLE OF EXHIBITS

Exh. No.	Description of Exhibit
EX1001	U.S. Patent No. 9,139,993 to Schuster et al.
EX1002	Prosecution History of U.S. Patent No. 9,139,993 (Application No. 14/164,424, filed January 27, 2014)
EX1003	Complaint (Dkt. 1) in <i>Danco, Inc. v. Fluidmaster, Inc., et al.</i> , Case No. 8:23-cv-01156 (C.D. Cal.), filed June 28, 2023
EX1004	Expert Declaration of Dr. Kimberly Cameron, Regarding Invalidity of the Challenged Claims of U.S. Patent No. 9,139,993 to Schuster et al.
EX1005	U.S. Patent No. 10,934,698 to Schuster et al.
EX1006	Prosecution History of U.S. Patent No. 10,934,698 to Schuster et al. (Application No. 16/686,328, filed Nov. 8, 2019)
EX1007	U.S. Patent No. 9,103,105 to Schuster et al.
EX1008	Prosecution History of U.S. Patent No. 9,103,105 to Schuster et al. (Application No. 14/457,697, filed August 12, 2014)
EX1009	Prosecution History of U.S. Patent No. 8,650,671 to Schuster et al. (Application No. 13/346,355, filed January 9, 2012)
EX1010	Prosecution History of U.S. Patent No. 8,104,105 to Schuster et al. (Application No. 12/786,904, filed on May 25, 2010)
EX1011	Prosecution History of U.S. Patent No. 7,743,436 to Schuster et al. (Application No. 10/958,797, filed October 5, 2004)
EX1012	Prosecution History of U.S. Patent No. 6,823,889 to Schuster (Application No. 10/798,606, filed on Mar. 11, 2004)
EX1013	Amended Complaint (Dkt. 35) in <i>Danco, Inc. v. Fluidmaster, Inc., et al.</i> , Case No. 8:23-cv-01156 (C.D. Cal.), filed October 2, 2023
EX1014	U.S. Patent No. 6,546,568 B1 to Schuster issued April 15, 2003 from Application No. 09/969,320 filed October 1, 2001, as a continuation of Application No. 09/634,249 filed August 8, 2000 (now U.S. Patent No. 6,295,660)

Exh. No.	Description of Exhibit
EX1015	Registered Utility Model Publication Number CN2447417Y to Guoxin published September 12, 2001
EX1016	Certified Translation (together with a statement that the translation is true and accurate) of Registered Utility Model Publication Number CN2447417Y to Guoxin published September 12, 2001
EX1017	U.S. Patent No. 5,926,868 to Bjerke issued July 27, 1999
EX1018	U.S. Patent No. 5,249,830 to Calmettes, et al. issued October 5, 1993
EX1019	U.S. Patent No. 989,251 to Hall issued April 11, 1911
EX1020	Canadian Patent No. 1,320,235 to Kimber granted and published July 13, 1993
EX1021	U.S. Patent No. 3,086,546 to Brown issued April 23, 1963
EX1022	U.S. Patent No. 5,862,538 to Ho issued June 26, 1999
EX1023	U.S. Patent No. 4,980,932 to Stemples issued January 1, 1991
EX1024	U.S. Patent No. 5,708,991 to DeMarco issued January 20, 1998
EX1025	U.S. Patent No. 5,715,860 to Horad issued February 10, 1998
EX1026	U.S. Patent No. 5,134,729 to Shaw issued August 4, 1992
EX1027	U.S. Patent No. 5,855,025 to Williams issued January 5, 1999
EX1028	U.S. Patent No. 6,219,856 to Alles issued April 24, 2001
EX1029	U.S. Patent No. 8,104,105 to Schuster et al. issued January 31, 2012
EX1030	Order Re: Civil Jury/Court Trial I. Schedule II. Trial Preparation III. Conduct Of Attorneys And Parties (Dkt. 45) in <i>Danco, Inc. v. Fluidmaster, Inc., et al.</i> , Case No. 8:23-cv-01156 (C.D. Cal.), entered February 7, 2024
EX1031	Infringement Contentions in <i>Danco, Inc. v. Fluidmaster, Inc., et al.</i> , Case No. 8:23-cv-01156 (C.D. Cal.), served February 24, 2024
EX1032	Order Granting Stipulation Regarding Patent Schedule (Dkt. 47) in <i>Danco, Inc. v. Fluidmaster, Inc., et al.</i> , Case No. 8:23-cv-01156 (C.D. Cal.), entered February 28, 2024

Exh. No.	Description of Exhibit
EX1033	Declaration of Ranjini Acharya in Support of Petitioner's Motion for Admission <i>Pro Hac Vice</i> of Ranjini Acharya
EX1034	Order Granting Defendant's Motion to Stay Case Pending IPR (Dkt. 48) in <i>Danco, Inc. v. Fluidmaster, Inc., et al.</i> , Case No. 8:23-cv-01156 (C.D. Cal.), entered April 3, 2024
EX1035	Comparison of Annotated Figures in Petition (Paper 1) and Expert Declaration (EX1004)
EX1036	Supplemental Expert Declaration of Dr. Kimberly K. Cameron, Ph.D., dated March 19, 2025
EX1037	Transcript of Deposition of Michael Jobin, taken March 11, 2025
EX1038	Demonstrative of Figure 7 of EX1022 (Ho), marked during deposition of Michael Jobin, taken March 11, 2025

GLOSSARY

Abbreviation	Term
'606 Application	U.S. Patent App. No. 10/798,606
'698 Patent	U.S. Patent No. 10,934,698
'904 Application	U.S. Patent App. No. 12/786,904
'993 Patent	U.S. Patent No. 9,139,993
Board	USPTO Patent Trial and Appeal Board
Challenged Claims	Claims 1-20 of the '993 Patent
Danco, Patent Owner, or PO	Danco, Inc.
Fluidmaster or Petitioner	Fluidmaster, Inc.
Institution Decision, or ID	IPR2024-00633 Paper 19
<i>Lampi</i>	<i>Lampi Corp. v. Am. Power Prods.</i> , 228 F.3d 1365 (Fed. Cir. 2000)
Parties	Danco and Fluidmaster, collectively
Petition	IPR2024-00633 Paper 1
POR	IPR 2024-00633 Paper 26 (Patent Owner Response)
POSITA	Person of Ordinary Skill in the Art
QCA	Quick Connection Art
<i>Smythe</i>	<i>In re Smythe</i> , 480 F.2d 1376 (CCPA 1973)
USPTO	United States Patent and Trademark Office

I. Introduction

PO contends all five grounds of the Petition are “fatally flawed.” POR, 1. This does not withstand scrutiny. For the reasons stated in the Petition and below, the claims of the ’993 Patent should be cancelled.

II. Ground 1: Guoxin in View of Ho Renders Obvious All Challenged Claims

In response to Ground 1 (Petition, 26–57), PO counters: the prior art does not satisfy Claim 1[E] (*see* POR, 11–20); the prior art does not satisfy Claim 1[A] (*id.*, 20–33); and there is no motivation to combine Guoxin and Ho. *Id.*, 33–39. Each fails.

A. PO’s Arguments Regarding the “Overflow Tube” are Untenable¹

1. Claim 1[E] Recites a Tube “Configured To” Connect to an Overflow Tube

¹ PO treats Claim 1[E] as representative of Claims 8[E]–[F] and 14[B]. *See, e.g.*, POR, 11, n.3. Where PO addresses only a representative claim, the Board has done the same. *See, e.g., Trend Micro Inc. v. Cupp Computing Assn*, No. IPR2019–00767, 2020 WL 5031970, at *17 (PTAB Aug. 25, 2020). Petitioner agrees that “overflow tube” (Claim 1[E], 14[B]) and “overfill tube” (Claim 8[F]) are “functionally equivalent.” POR, 12, n.3.

PO asserts Petitioner fails to “identify the *separate* toilet tank overflow tube, as *required* by limitation 1[E].” POR, 14.² This mischaracterizes the claim.

Claim 1[E] is the first (and only) time that an “overflow tube” is mentioned in Claim 1; it is not separately recited earlier. In contrast, the other claimed structures of Claim 1 are separately and affirmatively recited.³ Moreover, Claim 1[E] requires only a tube “*configured to* attach directly to the water flow regulator.” Thus, the overflow tube is not separately claimed; it serves solely as a “reference point” to define the “purpose and structure” of the first tube. *Eko Brands, LLC v. Adrian Rivera Maynez Enterprises, Inc.*, 946 F.3d 1367, 1377 (Fed. Cir. 2020) (where claims recited a beverage brewing device “for use with” a single serve beverage brewer, the latter merely “a ‘reference point’ to define the purpose and structure of the brewing device,” and not an affirmatively claimed structure).

2. Guoxin’s Water Supply Line 403 is *Configured to* Connect to an Overflow Tube

Guoxin discloses a tube that is *configured to* provide water to an overflow tube. See EX1004, ¶120 (*inter alia* annotating Fig. 3 to describe line 403 “attached directly to water flow regulator to direct water to toilet bowl”); ¶¶148–149

² Emphases added unless otherwise noted.

³ For example, “water flow regulator” and “extended portion” are each separately recited earlier (in 1[D1] and 1[A], respectively).

(discussing line 403 as “configured to attach directly to the water flow regulator to direct the second portion of water to a toilet tank overflow tube, as is conventional in the art,” by reference to annotated Fig. 2 of Guoxin).⁴ Thus, Guoxin satisfies Claim 1[E].

A POSITA would understand that Guoxin’s line 403 is conventionally connected to an overflow tube for several reasons.

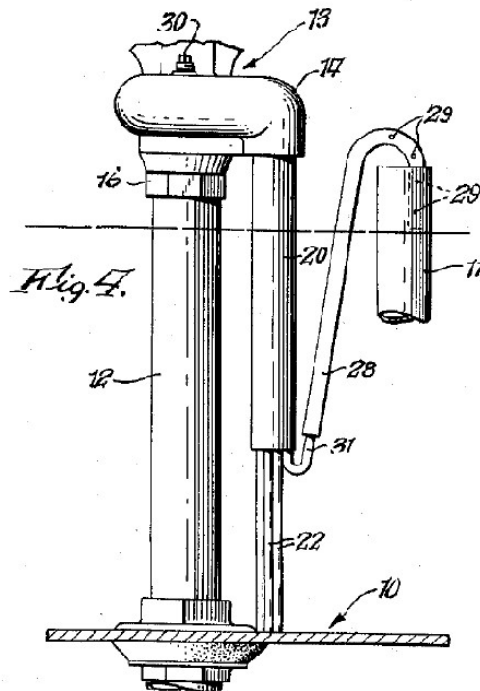
Overflow tubes are undisputedly conventional in toilet design. *See* EX1004, ¶83 (conventionally, water enters “into the bowl through a connection to the toilet’s overflow tube”); ¶¶86–87; ¶307; EX2008, 85:6–13 (“Q. How does [water] go into the bowl? A. ***Through a tube.***”). *See also* EX2013, ¶110 (referencing the “***prevalence*** of overflow tubes among residential toilets[.]”).

Moreover, connecting the first tube to a separate overflow tube is also conventional. *See* EX1004, ¶84 (*citing* Brown (EX1021), 4:20–44):

⁴ Some of Dr. Cameron’s original annotations did not appear in the Petition due to typographical error. This has been addressed by the Board. ID, 6–7.

Referring now to FIG. 4, another embodiment of the water silencing and saving means comprising the invention is illustrated therein. In this embodiment, the opening 21 in main chamber 15 is closed by a plug 30, and the improved water saving means is inserted into the fill tube 20 together with the water silencing rods 21. The preferred form of this water saving means differs from that illustrated in FIG. 1 in that adapter tube 23, and the slotted portion 24 and set screw 26 forming the metering valve are completely eliminated, and replaced by a smaller tube 31 forming the desired restricted opening. This relatively short tube 31 is bent into a substantially U-shape, and one end is inserted into fill tube 20, being held securely in place therein by the water silencing rods 21. The other end of U-shaped tube 31 is inserted into the relatively long flexible tube 28 which is connected to the overflow pipe 11, as in FIG. 1.

As will be apparent, the U-shaped tube 31 provides a restricted opening for the water saving means, which opening is much smaller than that found in the conventional valveless refill tube (not shown), in order to accomplish substantially the same results as the adapter tube 23 and the metering valve formed by slotted portion 24 and set screw 26 of FIG. 1, albeit lacking their feature of adjustability.



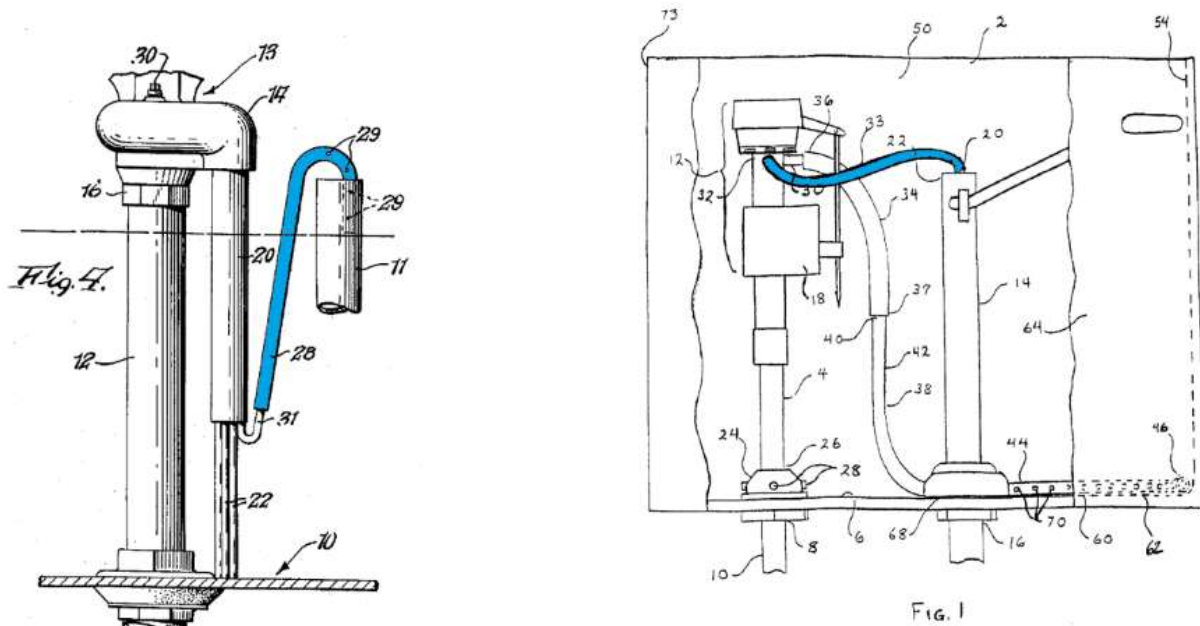
See also ID, 26 (citing EX1021, 3:57–64 and describing tube 23 “connected to overflow pipe 11 by tube 28.”); EX2013, ¶107 (describing conventional flow of water from a fill valve via a tube to the overflow tube).

Accordingly, a POSITA would understand Guoxin discloses a tube (line 403) that is conventionally connected to an overflow tube, thereby satisfying Claim 1[E]. EX1036, ¶¶25–32.

3. Guoxin’s Disclosures Do Not Support a Different Conclusion

PO’s counterarguments misinterpret Guoxin. PO first argues that because Guoxin’s “line 403 *descends* from” the point of attachment, it cannot connect to an overflow tube. POR, 19 (emphasis in original). This is wrong. Guoxin’s line 403 is

only partially depicted in Fig. 2, and both the '993 Patent and the prior art confirms such tubes can ascend, descend, or both, before connecting to the overflow tube:



EX1021, Fig. 4 (annotated); EX1014, Fig. 1 (annotated). PO's expert confirmed the same in deposition. EX1037, 28:17–29:7; 30:18–31:2; 32:9–33:19; 36:12–16. Thus, line 403 could take any number of configurations depending on the physical constraints of the toilet design. EX1036, ¶¶33–34.

Second, PO argues that line 403 must terminate directly at the bowl. POR, 18. But Guoxin does not specify a terminus. PO's relies heavily on the word “directly” in Guoxin's disclosure. *Id.* (citing EX2007, 2:18–21); *see also* EX1037, 49:19–50:8; 50:18–51:1. This is unavailing. Guoxin also teaches “a portion of the water from the inlet device is **directly** supplied to the toilet bowl” (*id.*, 2:5–7); but this does not mean that that inlet device terminates at the bowl. Indeed, Guoxin discloses several

intermediate connections between the inlet device and the bowl. *Cf.* EX1037, 52:1–21. Accordingly, Guoxin’s description of line 403 “directly” supplying water to the bowl does not preclude connecting it to an overflow tube, especially since that is conventional. EX1036, ¶¶35–36.

Third, Guoxin’s goal of increasing flush volume does not conflict with connecting line 403 to an overflow tube, since the latter undisputedly serves a separate purpose of preventing overflow in the event of fill valve failure. POR, 12; EX2013, ¶¶100, 106–107.

In sum, Guoxin discloses a line 403 that is configured to provide water to an overflow tube, and a POSITA would understand that it is connected to an overflow tube, as is conventional. PO’s arguments to the contrary should be rejected.

B. PO’s Arguments Regarding the “Integrally Molded” Limitations of Claim 1[A] Are Untenable⁵

Claim 1[A] requires “a body comprising an extended portion, wherein the extended portion is integrally molded with the body...”. The Board has construed “integrally molded” as “molded together as a single structure.” ID, 14–15. Guoxin and Ho disclose an “integrally molded” extended portion under this construction. EX1036, ¶¶10–11.

⁵ PO treats Claim 1[A] as representative of Claims 8[C2] and 14[A2]. POR, 20, n.7.

1. Guoxin Discloses an “Integrally Molded” Extended Portion

PO asserts Guoxin does not disclose an extended portion “integrally molded with the body”. POR, 21–23. Not so. Guoxin’s Fig. 3 shows “an extended portion integrally molded with the body.” EX1004, ¶120; *id.* ¶123 (annotating Guoxin Figs. 3 and 4 to show extended portion); EX1036, ¶¶37–39. Moreover, Fig. 5 does not include the extended portion, confirming that it is molded as a single structure with the fill valve. EX1004, ¶¶120, 122–123; EX1036, ¶¶40–41; EX1037, 78:19–23.

PO’s reliance on an unpublished Federal Circuit opinion, for the proposition that patent figures are generally not intended to convey such detail, is misplaced. *See* POR, 21. There, the Federal Circuit declined to construe a claim as requiring physical contact between elements, where the figure of a preferred embodiment was *ambiguous* as to whether there was in fact physical contact. *Franklin Elec. Co. v. Dover Corp.*, No. 2006–1442, 2007 WL 634430, *5–7 (Fed. Cir. Mar. 1, 2007). Here, there is no ambiguity, and the question is simply what Guoxin’s figures reasonably disclose to a POSITA, which is an accepted part of a patentability analysis that should not be disregarded. *See Unified Pats. v. Oceana Innovations LLC*, No. IPR2020–01463, 2022 WL 500391, *17 (PTAB Feb. 14, 2022) (“A patentability analysis should consider what the drawings in a reference reasonably disclose and suggest to one skilled in the art[.]”); *Samsung Elecs. Co., Ltd. v. Home Semiconductor Corp.*, No. IPR2015–00459, 2016 WL 1534753, *16 (PTAB Apr.

14, 2016). Dr. Cameron has identified the extended portion in Fig. 3, and explained why a POSITA would understand that it is molded together with the body of the fill valve as a single structure. EX1036, ¶¶40–44. PO’s expert disagrees with Dr. Cameron but offers no affirmative opinion to the contrary. EX1037, 75:22–76:16; 78:8–18. Thus, Guoxin discloses the “integrally molded” extended portion of Claim 1[A].

2. Ho Discloses an “Integrally Molded” Extended Portion

PO argues that “molded” necessarily denotes a molded *plastic* (rather than metal) structure, and that Petitioner has failed to show that Ho’s toilet fill valve is a molded *plastic* structure. POR, 23–30. This is unsupported. Indeed, despite maintaining that “molding means—it means plastic materials,” PO’s expert conceded in deposition that “that word is not used by the Board” in its construction. *See* EX1037, 71:4–72:21.

The ’993 Patent is not directed to the composition or method of manufacture of its claimed structure. The claims and specification are silent as to material composition. EX1037, 16:25–17:13; 18:24–19:10.

PO did not disclaim non-plastic structures during prosecution; in fact, PO did not argue this, when discussing prior art cited by the Patent Office as anticipating this claim, at all. *Compare* EX1002, 52 (citing Gish as teaching “an analogous toilet fill valve system where the extended portion 224 is integrally molded with the toilet

fill valve”), *with* 40 (responding only that Gish did not address the claims as amended to avoid DeMarco). *See also* EX1037, 19:11–16.

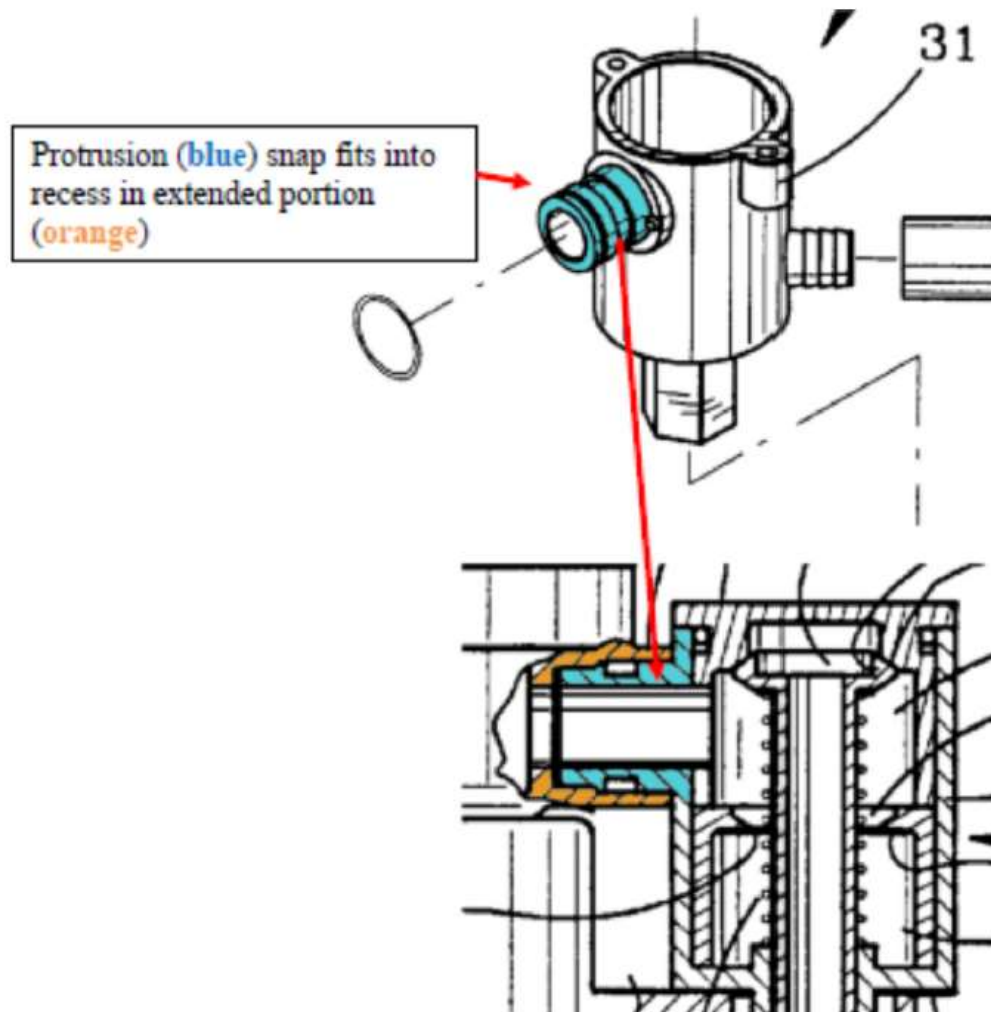
Nor does PO offer any supporting extrinsic evidence. EX1037, 70:1–15. Instead, PO’s expert points *only* to Dr. Cameron’s testimony. EX2013, ¶133 (claiming a POSITA would understand “molded” to “refer to plastic structures,” but citing solely EX2008, 35:10–39:12); ¶134 (claiming metal structures are typically “cast” or machined,” but citing solely EX2008, 63:21–65:21); EX1037, 90:9–91:10. But Dr. Cameron’s testimony does not support PO’s position. *See* EX2008, 39:13–17 (plastic parts can be “molded” *or* “machined”); 45:12–15 (plastic parts can be machined). And she was not asked whether she agreed that “integrally molded” refers *only* to plastic structures. EX1036, ¶¶16–24.

In short, PO’s attempt to narrow the Board’s construction fails. Neither the ’993 Patent nor the Board’s construction requires the use of plastic, metal, or any other material. Tellingly, PO’s expert admitted in deposition that Ho’s supply line 40 is “attached to a piece of plastic that’s coming out of the diverter valve [means 30].” EX1037, 35:16–36:11; 73:14–17.⁶ He also testified that he had *no opinions* as to the materials used in the structures disclosed in Ho. *Id.* 74:11–23. Thus, PO’s

⁶ Mr. Jobin subsequently testified that he did not recall using the word “plastic,” but did not otherwise disavow his earlier concession. EX1037. 74:1–10.

discussion of the composition of Ho (POR, 23–30) is a red herring that the Board should disregard.

PO also claims that Ho does not show an “integrally molded” extended portion. POR, 30–33. But Ho’s disclosures contradict this. *See* EX1004, ¶124 (discussing annotated Figs. 3 and 5, reproduced below; explaining a POSITA would understand that the protrusion (blue) in Fig. 5 slots into the extended portion (orange) of the fill valve, as shown in Fig. 3):



See also ID, 19–20 (“[PO’s] argument does not sufficiently account for what a POSITA would have known from Ho as a whole, including Ho’s drawings”) (*citing* EX1022, Figs. 2–5); EX1036, ¶¶63–67.

Ho’s other drawings also confirm this. Figs. 3, 7–9 show a cross-sectional view of Ho’s valve affixed to the toilet fill valve. EX1036, ¶67.⁷ The cross-hatching for the orange portion is different from the cross-hatching for the blue portion, signifying that these are different structures. *Id.*, ¶¶68–69; EX1037, 38:1–6. Moreover, the cross-hatching and border for the extended portion (orange) extends into the body of the fill valve – confirming that it is a single structure with the fill valve. EX1036, ¶¶69–70; ID, 30. And while Ho separately shows the components that are not integral to the fill valve (*e.g.* Fig. 5), the extended portion is not separately shown—again, confirming it is a single structure with the fill valve. EX1036, ¶71.

⁷ Dr. Cameron provides additional testimony to explain what is disclosed in Ho and rebut PO’s claims. This is permissible. *See Rembrandt Diagnostics, LP v. Alere, Inc.*, 76 F.4th 1376, 1385 (Fed. Cir. 2023); *Micron Tech., Inc. v. Katana Silicon Techs. LLC*, No. IPR2023-00071, 2024 WL 2137717, at *21 (PTAB May 13, 2024).

Again, PO offers no evidence to the contrary, with its expert instead testifying that he had “no way to know for sure.” *See* EX1037, 39:14–41:1; 42:4–14; 44:6–24; EX1038.

Further, PO misinterprets Fig. 2. POR, 31. If the extended portion (unlabeled in Fig. 2) were not integral to the fill valve, a POSITA would expect to see it shown separately, as with Fig. 5. EX1036, ¶72; EX1037, 41:11–19. Moreover, a POSITA would understand that integrally molding the extended portion with the fill valve allows for a single connection between Ho’s valve and the fill valve, whereas attaching it separately later would introduce an unnecessary additional connection EX1036, ¶73. A POSITA would also understand that attaching the extended portion separately would render it superfluous, because Ho’s valve could instead be directly connected to the fill valve via a screw connection. *Id.* Thus, Fig. 2 does not contradict a POSITA’s understanding that the extended portion is integral to the fill valve, contrary to PO’s attorney argument. *Id.*, ¶74.

C. Petitioner Articulates a Basis to Reverse Guoxin in View of Ho

PO next asserts Petitioner has failed to articulate a motivation to combine Guoxin and Ho. POR, 33–39. PO argues it is insufficient to show a POSITA would have known that they *could* reverse the configuration. *Id.*, 35 (emphasis in original).

But it is black letter law that “the mere substitution of equivalents which do substantially the same thing in the same way, even though better results may be

produced, is not such an invention as will sustain a patent.” *Dow Chem. Co. v. Halliburton Oil Well Cementing Co.*, 324 U.S. 320, 330 (1945). That is, if replacing one coupling mechanism with another “as a matter of simple substitution” would “achieve the same locking function and achieve a predictable result,” then that is sufficient to satisfy *KSR*. *Ex Parte Franck Carrel & Laurent Barrelle*, No. 2013-006623, 2015 WL 6774483, at *3 (PTAB Oct. 23, 2015) (*citing KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398 (2007)).

Petitioner has done so. Reversing Guoxin’s configuration based on Ho is a simple substitution of known arrangements to obtain predictable results. EX1004, ¶137. The prior art confirms that various coupling arrangements are conventional (*id.* ¶¶89–94), as is reversing or interchanging these arrangements. *Id.*, ¶¶150–151. PO seemingly agrees. POR, 35 (“[T]he question of whether a POSITA would have been capable of reversing the fluid flow connector configuration *is not in dispute.*”).

Moreover, the prior art confirms that such substitution would have predictable results (EX1004, ¶119) while satisfying the common goal of accurately controlling water flowing into the bowl. *Id.*, ¶114. It would additionally achieve the benefit of improved strength and integrity of connection. ID, 19 (*citing* EX1004, ¶125).

Therefore, Petitioner has met the *KSR* standard. *Unified Pats. Inc. v. Ideahub, Inc.*, No. IPR2020–01338, 2022 WL 443888, *19 (PTAB Feb. 7, 2022) (petitioner satisfied *KSR* where petitioner had, *inter alia*, explained how the substitution was a

predictable variation, and PO's expert submitted testimony that was "substantially consistent" with the same).

PO's "hindsight" arguments do not alter this conclusion. POR, 36–39. Petitioner's references to the '993 Patent and the '698 Patent provided *additional* illustrative examples. EX1004, ¶116 (describing the '698 Patent as "*another* example"). Thus, the reversal of Guoxin's connections "does not result from hindsight reconstruction." *See Unified Pats.*, 2022 WL 443888 at *20 (no hindsight reconstruction where petitioner provided rationales outside the patent).⁸

III. Ground 2: Petitioner Articulates a Basis to Combine the QCA

PO's primary rebuttal for Ground 2 (Petition, 57–64) is that Petitioner fails to allege a motivation to combine the QCA with Guoxin and/or Ho. POR, 39–40. This again fails.

The QCA contemplates multiple different ways of connecting components, to achieve the common goal of transporting and delivering fluid in a controlled manner. EX1004, ¶¶89–94. A POSITA would generally look to these when designing toilet components. *Id.* Moreover, a POSITA would look to "*any* known method of connecting two fluid channels to one another," including those of the QCA, when

⁸ PO's reference to "molded *plastic* toilet systems" (POR, 40) is addressed by Section II.B.2, *supra*.

specifically looking to control the volume of water entering a toilet bowl. *Id.*, ¶207. Thus, the art provides simple substitutions that yield predictable results in controlling water flow into the toilet bowl. Again, that is sufficient to satisfy *KSR*. *See Unified Pats.*, 2022 WL 443888 at *19.

IV. Grounds 1 and 2 Fully Address the Dependent Claims

PO separately challenges the sufficiency of Grounds 1 and 2 with respect to a few dependent claims (Claims 5, 7, 9–11, and 18–20). POR, 40–49. These can be dispensed with in short order.

A. Claim 5

Contrary to PO’s assertions (POR, 40–45), Guoxin discloses an actuating arm coupled to the float, which is angularly offset and does not interfere with the water flow regulator.⁹ *See* EX1004, ¶¶187–188. As shown in Fig. 1, Guoxin’s switching mechanism 4 projects diagonally down from the toilet fill valve, whereas the actuating arm projects directly transverse. EX1004, ¶¶187–188; EX1036, ¶¶45–49. This confirms that there is no interference, as required by Claim 5. *Id.*

Ho does likewise. Ho’s figures show the transverse supply line 40 (which is part of Ho’s diverter valve means 30, as confirmed in Fig. 5) projects diagonally away from the toilet fill valve. EX1036, ¶¶75–79. Thus, Ho also satisfies Claim 5.

⁹ *See* n.4, *supra*.

B. Claims 7 and 9

PO complains Petitioner has failed to show that Claims 7 and 9 are inherently disclosed. POR, 45–46. This is pure attorney argument. *See* EX1037, 87:18–25.

It is also unsupported. Petitioner has shown that Guoxin and Ho each discloses a *direct* connection between the water flow regulator and the extended portion of the toilet fill valve. *See* EX1004, ¶¶120, 124. Petitioner has also shown that the '993 Patent specifically teaches that such a direct connection in fact “prevents the creation of a pressure head[.]”. EX1004, ¶95 (citing EX1001, 4:3–9). PO does not address, much less dispute, any of this evidence. Indeed, its expert confirmed this is the purported invention of the '993 Patent. *See* EX1037, 24:7–24 (“This specification describes a new invention in which that bowl fill restriction or valve is placed into an integrally molded with feature of the valve body *in order to prevent that pressure from being developed in the tube.*”); 82:3–83:3; 84:9–85:17; 86:22–87:5.

Thus, Petitioner *has* shown that the prevention of a pressure head is “the natural result” of the direct connections “explicitly disclosed by the prior art,” because that is what the '993 Patent explicitly teaches. *Persion Pharm. LLC v. Alvogen Malta Operations LTD.*, 945 F.3d 1184, 1191 (Fed. Cir. 2019). Thus, Guoxin and Ho each inherently discloses Claims 7 and 9.

C. Claims 10–11

PO quibbles with Petitioner’s citations. POR, 46–47.¹⁰ This elevates form over substance. Dr. Cameron described Guoxin disclosing “terminating the flow of the second portion of water when the toilet bowl reaches a certain level.” EX1004, ¶195. Guoxin does so. EX2007, 2:28–31. Dr. Cameron described adjusting the T-shaped nut to set that level. EX1004, ¶195. Guoxin discloses this. EX2007, 2:31–36. Dr. Cameron also directly quoted from Guoxin. *Compare* EX1004, ¶195 *with* EX2007, 2:11–13. Although EX1016 and EX2007 use different page/line citation methodologies, the relevant passages have been sufficiently clearly identified.

D. Claim 18

PO claims Petitioner failed to show motivation to modify Guoxin in view of Hall. POR, 47. Hall is one of the QCA references (*see* EX1004, ¶204), and PO’s argument fails for the same reasons described in Section III, *supra*.

¹⁰ *See also, e.g.*, POR, 15, n.6. For the reader’s convenience, Petitioner has herein cited to EX2007.

E. Claims 19 and 20

PO argues Guoxin discloses a mechanism to adjust the volume of water entering the bowl, not the flow rate passing through Guoxin's switching mechanism. POR, 47–49 (citing EX2013, ¶¶196-197).¹¹ This is wrong.

It is undisputed that flow rate is generally understood as the volume of water through a conduit over a period of time. EX1036, ¶¶ 15, 53; EX1037, 69:4–6. Thus, flow rate in Claims 19 and 20 refers to the amount of water that leaves the water flow regulator during refill divided by the time it takes for the tank to refill. *Id.*, ¶54. This is consistent with the specification of the '993 Patent. *Id.*, ¶55–56.¹²

This is obvious in light of Guoxin. EX1036, ¶58–61. Adjustment of Guoxin's T-shaped nut reduces and then eliminates water flow out of the switching mechanism, and changes the amount of water that exits the switching mechanism. *Id.* This in turn alters the flow rate (the volume of water exiting the switching

¹¹ In deposition, testified that adjusting Guoxin's T-shaped nut does not impact the volume delivered. EX1037, 54:25–56:25. That is wrong, and contradicts both PO's position and his earlier opinions. EX1036, ¶62.

¹² This does not mean the flow through the water flow regulator cannot change during the fill cycle. EX1036, ¶57.

mechanism during the tank refill) and thereby increases or decreases the water delivered to the bowl. *Id.* Thus, Guoxin satisfies Claims 19 and 20.

V. Ground 3: Brown in View of Ho Renders Obvious All Challenged Claims

In response to Ground 3, (Petition, 64–86), PO argues Petitioner has failed to: articulate a motivation to combine Brown and Ho, or a reasonable expectation of success for doing so (*see* POR, 49–57); identify a single “water flow regulator” in Brown (*id.*, 57–62); and identify the “integrally molded” limitations in Brown and Ho. *Id.*, 62. These arguments also fail.

A. Petitioner Identifies Motivations to Modify Brown in View of Ho

1. Brown and Ho are Interchangeable to Obtain Predictable Results

PO complains Petitioner has not shown a POSITA *would* have been motivated to replace Brown’s set screw with Ho’s diverter valve. POR, 50–53, 56–57 (citing *InTouch Techs., Inc. v. VGO Commc'ns, Inc.*, 751 F.3d 1327 (Fed. Cir. 2014)). That decision is inapposite. Indeed, the Board has distinguished *InTouch* where, as here, combining two prior art references amounts to “applying known techniques to improve a similar device in the same way,” as “expressly endorsed” in *KSR. Unified Patents, LLC v. Voice Tech Corporation*, No. IPR2020–01018, 2021 WL 6340174, at *10 (PTAB Dec. 13, 2021) (*citing KSR*, 550 U.S. at 417). That reasoning applies here: Brown and Ho share a common function, “to accurately control the amount of water that flows from the toilet fill valve into the toilet bowl.” EX1004, ¶221. The

connectors in Brown and Ho are interchangeable (*id.*, ¶222) and can be substituted for one another to obtain predictable results. *Id.* ¶223. The benefit is to “simplify the operation of the valve and increase the ease with which the valve can be adjusted.” *Id.*, ¶248; *see also* EX1036, ¶¶80–82. Thus, Petitioner has satisfied *KSR*, and PO’s arguments to the contrary are unavailing.

Any difference in *how* Brown and Ho achieve their common goal (POR, 52–53, discussing flow rate in Brown versus flow time in Ho) is immaterial, because both flow rate and flow time ultimately impact flow volume and so both achieve the same outcome. EX1036, ¶85.

Brown’s discussion of its water silencing means also does not preclude the use of Ho’s valve. POR, 53. Brown aims to eliminate water wastage by controlling water flow, as does Ho. *See* EX1004, ¶221. A POSITA would maintain that goal even when modifying Brown in view of Ho. EX1036, ¶86.

Finally, PO’s conclusion that using the Ho valve in Brown’s system would result in potential overfilling (POR, 53) is speculative and wrong. Both Brown and Ho disclose conventional floats to shut-off water flow to *prevent* this. EX1036, ¶87.

2. Brown and Ho are Interchangeable with Reasonable Expectations of Success

PO claims Petitioner fails to articulate a reasonable expectation of success. POR, 54–56. Not so. In fact, Petitioner has shown that substituting Ho maintains the

same flow control function of Brown, but with “the *advantage*” that adjustments can be made “with the tube still connected to the valve,” which “increase[s] the ease with which the valve can be adjusted.” *See* EX1004, ¶248.

PO’s focus on how such a modification would be configured (POR, 55) is again speculative and wrong as it ignores that a POSITA would understand that toilet components must be sized and oriented appropriately to account generally for toilet designs. *See* EX1004, ¶415; EX1036, ¶¶83–84. There are a finite number of known techniques to achieve that result, meaning a POSITA could modify Brown in light of Ho with a reasonable expectation of success. *Id.*

B. Petitioner Consistently Identifies a Single “Water Flow Regulator”¹³

PO wrongly argues Petitioner inconsistently identifies the “water flow regulator” of Brown. POR, 57–62. This misunderstands the evidence. Brown’s water flow regulator is the *combination* of the slotted portion of adaptor tube 23 *and* set screw 26. *See* EX1004, ¶245. Thus, Brown alone discloses Claim 1[D].

¹³ Any construction of “water flow regulator” requires that such a device can be fixed or adjustable. *See* Section VIII.A, *infra*. Petitioner accordingly proposes the following construction: “a *fixed or adjustable* device for regulating a flow rate of an amount of water flowing therethrough.” EX1036, ¶¶13–14. *Cf.* POR, 7.

Moreover, tube 28 is attached directly to “the slotted portion 24 of the adaptor tube 23 that forms the metering valve and houses set screw 26.” EX1004, ¶247. Thus, Brown discloses a tube that attaches directly to slotted portion of adaptor tube 23 (which, *together* with set screw 26, forms the water flow regulator), satisfying Claim 1[E]. There is no inconsistency.

C. Brown in View of Ho Discloses the “Integrally Molded” Limitations

While Brown does not explicitly disclose an extended portion that is molded as a single structure with the body of the toilet fill valve, PO’s claim that Brown therefore does not disclose the “integrally molded” limitation is a step too far. POR, 62. Contrary to PO’s claims (POR, 56–57), it would have been obvious to a POSITA to integrally mold Brown’s extended portion because of developments in molding techniques that took place after 1959 (when Brown was filed) and in view of Ho’s disclosure. *See* EX1004, ¶230.¹⁴ Dr. Cameron explained this during her deposition. EX2008, 42:5–16; 42:21–45:11. Moreover, a POSITA would understand that the components within a toilet tank must be sized and oriented appropriately to work in conventional toilet designs, which means that there are a finite number of known techniques for connecting the components with predictable results. EX1036, ¶¶83–84. Thus, a POSITA would take advantage of Ho’s design, made possible due to

¹⁴ As to Ho, *see* Section II.B.2, *supra*.

advancements in molding techniques and to allow for a more compact and robust design overall, to integrally mold the extended portion of Brown. *Id.*

VI. Ground 4: Petitioner Articulates a Basis to Combine the QCA

Contrary to PO's assertion (POR, 56), Petitioner has fully addressed the motivation to combine the QCA with Ho in Ground 4. *See* Section III, *supra*.

VII. Grounds 3 and 4 Fully Address the Dependent Claims

PO raises narrow disputes on a handful of the dependent claims addressed by Grounds 3 and 4 of the Petition (*i.e.* Claims 2, 5, 7, 9, 13, 15, and 18–20). POR, 63–67. Each fails.

A. Claim 2

PO's arguments regarding Claim 2 (POR, 63–64) are addressed by Section V.C., *infra*. Moreover, because Brown and Ho are intended to work with conventional toilet components (EX1021, 1:9–15; EX1022, 2:51–66), a POSITA would modify Brown in view of Ho to allow for a more compact design, including by molding the extended portion to extend radially from the longitudinal axis of the fill valve. *See* EX1004, ¶284; EX1036, ¶84.

B. Claim 5

PO's arguments (POR, 64–66) ignore Brown's disclosure of the float and actuating arm as *conventional*. EX1021, 1:16–21, Fig. 1; EX1004, ¶316.¹⁵ Accordingly, its arguments as to Claim 5 fail.

C. Claims 7 and 9

See Section IV.B., *supra*.

D. Claim 13

See Section VII.A., *supra*.

E. Claim 15

PO incorrectly asserts that Petitioner relied on Ho's valve. POR, 66–67. This is wrong. *See* EX1004, ¶¶298 (citing *Brown* (EX1021), 3:45–71). Brown and Ho each discloses this limitation. *Id.*; ¶¶136, 298.

F. Claim 18

See Sections II.C and III, *supra*.

G. Claims 19 and 20

Petitioner did not replace Brown's set screw 26 with Ho's diverter valve 30 (*see* Section V.B, *supra*), and has shown that Ho discloses a water flow regulator configured to adjust flow rate. *See* Section IV.E, *supra*. PO's assertion to the contrary (POR, 67) is wrong.

¹⁵ As to Ho, *see* Section IV.A, *supra*.

VIII. Ground 5: Schuster Anticipates Claims 1–18 of the '993 Patent

A. PO Has Failed to Show Claims 1–18 of the '993 Patent are Entitled to a 2004 Priority Date

PO maintains that “water flow regulator” is a genus, supported by the prior disclosure of a particular species (*i.e.*, “bowl fill valve”). *See* POR, 68–75. This fails for three reasons.

First, PO claims that regulators, restrictors, and valves were all “well known in the art, the time of the invention,” (POR, 70–71) but offers no evidence that the *inventors specifically* possessed an invention that included both fixed flow restrictors (the genus “bowl fill restriction”) as well as adjustable flow valves (the species “bowl fill valve”).¹⁶

Although the '606 Application mentions numerous types of valves that existed in the prior art (EX1012, 48, ¶12), the specification repeatedly identifies only *adjustability* as an inventive feature of the claimed “bowl fill valve.” *See* EX1012, 47, ¶9; *id.*, 49, ¶16. Indeed, PO’s expert confirmed in his deposition that—contrary to PO’s claim that once installed, “the ‘valve’ is not adjusted further,” (POR, 74)—the claimed “bowl fill valve” *can* be adjusted after installed. EX1037, 22:12–21.

¹⁶ PO’s expert testified that he was provided EX2009 and EX2010 by counsel; that he did not know the date, author, or provenance of EX2009; and that he did not independently verify the date or source of EX2010. EX1037, 58:20–62:13.

Moreover, during the prosecution of the '993 Patent, in which PO first claimed a “bowl fill restriction” in the place of a “bowl fill valve,” PO unequivocally stated that “bowl fill restriction” was “**broader** than” the “bowl fill valve”. EX1002, 133.¹⁷

Taken together, the evidence fails to show the inventors had possession of, and were claiming, the genus as well as the species. *Regents of the Univ. of California v. Eli Lilly & Co.*, 119 F.3d 1559, 1568 (Fed. Cir. 1997).

Second, PO mischaracterizes *Bilstad*. POR, 71–72 (suggesting *Bilstad* establishes that “a single species is adequate support for a genus claim” when directed to the “mechanical world,” citing *Bilstad v. Wakalopulos*, 386 F.3d 1116 (Fed. Cir. 2004)). The Federal Circuit has specifically cautioned against this broad-strokes reading. *Synthes USA, LLC v. Spinal Kinetics, Inc.*, 734 F.3d 1332, 1345 (Fed. Cir. 2013) (“[In *Bilstad*,] we did *not* hold that *all* inventions that may be characterized as ‘mechanical’ allow claiming a genus based on disclosure of a single species.”) (emphases in original).

Third, PO’s reliance on *Smythe* and *Lampi* is also misplaced. See POR, 72 (citing *Smythe*) and 72–73 (citing *Lampi*). *Smythe* “discusses *circumstances* in which a species *may be* representative” of genus claims, but “disclosure of a species does

¹⁷ PO characterizes its subsequent use of “water flow regulator” as a “stylistic[] replace[ment].” See POR, 5.

not always suffice to describe broadly claimed subject matter.” *In re Curtis*, 354 F.3d 1347, 1356 (Fed. Cir. 2004) (emphases in original). Thus, if the specification explicitly attributes “unique properties” to the claimed species that are “different from the properties of other members of the genus,” that is insufficient. *Id.* at 1357 (distinguishing *Smythe*). Here, like *Curtis* and unlike *Smythe*, the specification attributes adjustability as unique to the claimed species, and so is insufficient to claim the genus. And *Lampi* described a preferred embodiment as one of identical half-shells, but the specification referred to both “half-shells” and “identical half-shells,” leading the Court to narrowly conclude that a claim need not be limited to a preferred embodiment. *Lampi*, 228 F.3d, 1378. By contrast here, the bowl fill valve is only described as adjustable, never fixed.

B. Schuster Anticipates Claims 1–18 of the ’993 Patent

PO raises only two substantive arguments against Schuster. POR, 76–78. Both fail.

First, PO complains that Petitioner cited to Fig. 1 for Claim 1[B] but Fig. 4 for 1[A]. POR, 73–77. But Schuster discloses that the relevant features present in Fig. 1 are also present in Fig. 4, mooted this complaint. EX1029, 4:49–52; EX1036, ¶¶88–89.

Second, contrary to PO’s claim, Schuster does disclose an extended portion 206 in Fig. 4, which is “integrally molded” with the fill valve. *See* EX1004, ¶336; EX1029, 6:1–10; EX1036, ¶91. PO’s expert confirmed this. EX1037, 47:4–23.

C. Claims 19 and 20

Petitioner agrees that these claims recite “an adjustable water flow regulator.” POR, 76. They are nevertheless unpatentable for the separate reasons set forth in Grounds 1 & 3 in the Petition and herein.

IX. Conclusion

Petitioner accordingly seeks cancellation of all claims of the ’993 Patent.

Dated: March 19, 2025

Respectfully submitted,

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CERTIFICATE OF SERVICE

The undersigned hereby certifies that on March 19, 2025, a true copy of the foregoing **PETITIONER’S REPLY TO PATENT OWNER’S RESPONSE** and all exhibits/attachments thereto were served in their entirety via electronic mail on the following attorneys of record:

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CERTIFICATE OF COMPLIANCE

Pursuant to 37 C.F.R. §42.24(d), the undersigned certifies that the foregoing Reply to Patent Owner's Response complies with the type-volume limitation of 37 C.F.R. §42.24(a) and, excluding the portions exempted by 37 C.F.R. §42.24(b), contains 5598 words according to the word processing program used to prepare this document.

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