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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

PATENT OWNER'S RESPONSE

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<i>Microsoft Corp. v. Biscotti, Inc.</i> , 878 F.3d 1052 (Fed. Cir. 2017).....	77
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RULES

37 C.F.R. § 42.104	15, 18, 47
37 C.F.R. § 42.120	1

OTHER AUTHORITIES

United States Patent and Trademark Office, MANUAL OF PATENT EXAMINING PROCEDURE § 608.02 (6th ed., rev. July 1997)	30
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TABLE OF EXHIBITS

Exhibit	Description
EX2001	Declaration of Eric G. Maurer in Support of Motion for Admission <i>Pro Hac Vice</i>
EX2002	Definition of Pressure Head
EX2003	Definition of Valve
EX2004	Intentionally Left Blank
EX2005	Annotations to U.S. Patent Pub. No. 2024/0026990 A1 (“Cao”) Fig. 6B
EX2006	Annotations to U.S. Patent No. 8,028,719 (“Johnson”) Fig. 1
EX2007	Annotations to Petitioner’s EX1016 (“Guoxin”)
EX2008	Deposition Transcript of Dr. Kimberly Cameron, Dated Nov. 19-20, 2024
EX2009	Flowmatic Valves (https://www.flomatic.com/assets/pdf_files/literature/Flo-Trol-Literature.pdf) (last accessed Dec. 4, 2024)
EX2010	“What is a Flow Restrictor, and How Does It Work?” (https://www.theleeco.com/insights/what-is-a-flow-restrictor-and-how-does-it-work/) (last accessed Dec. 4, 2024).
EX2011	U.S. Patent Pub. No. 2024/0026990 A1 (“Cao”)
EX2012	U.S. Patent No. 8,028,719 (“Johnson”)
EX2013	Declaration of Michael Jobin
EX2014	Curriculum Vitae of Michael Jobin

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 or Patent Owner	Danco, Inc.
Fluidmaster or Petitioner	Fluidmaster, Inc.
Institution Decision	IPR2024-00633 Paper 19
Integrally Molded Limitations	“wherein the extended portion is integrally molded with the body” (Claims 1 and 14) / “wherein the extended portion is integrally molded with the toilet fill valve” (Claim 8)
Parties	Danco and Fluidmaster, Collectively
Petition	IPR2024-00633 Paper 1
POPR	IPR 2024-00633 Paper 12 (Patent Owner Preliminary Response)
POSITA	Person of Ordinary Skill in the Art
USPTO	United States Patent and Trademark Office

I. INTRODUCTION

Pursuant to 37 C.F.R. § 42.120, Danco, Inc. submits this Response to the Petition for *inter partes* review IPR2024-00633 of U.S. Patent No. 9,139,993 filed by Fluidmaster, Inc. Petitioner’s proposed grounds are identified below:

Ground	Claims	Basis	Primary Reference	Secondary Reference(s)
1	1, 2, 5, 7-15, 19, and 20	103	Guoxin	Ho
2	3, 4, 6, and 16-18	103	Guoxin	Ho Bjerke Calmettes Hall Kimber ¹
3	1, 2, 5, 7-15, 19, and 20	103	Brown	Ho
4	3, 4, 6, and 16-18	103	Brown	Ho Bjerke Calmettes Hall Kimber
5	1-20	102	Schuster	None

The Petition must be denied because all five grounds are fatally flawed.

¹ The Petition refers to Bjerke, Calmettes, Hall, and Kimber collectively as the “Quick Connection Art.”

II. BACKGROUND

Excessive water usage in toilets is a significant issue with various implications, both on a micro and macro scale. Traditional toilet fill valves often dispense more water than necessary to refill the toilet bowl after flushing. EX1001, 1:25-28. The '993 Patent describes a toilet fill valve that restricts or regulates the flow of water into the toilet bowl during a flush cycle to prevent any unnecessary wastage. EX1001, 2:34-39; EX2013, ¶¶64-66.

III. OVERVIEW OF THE '993 PATENT

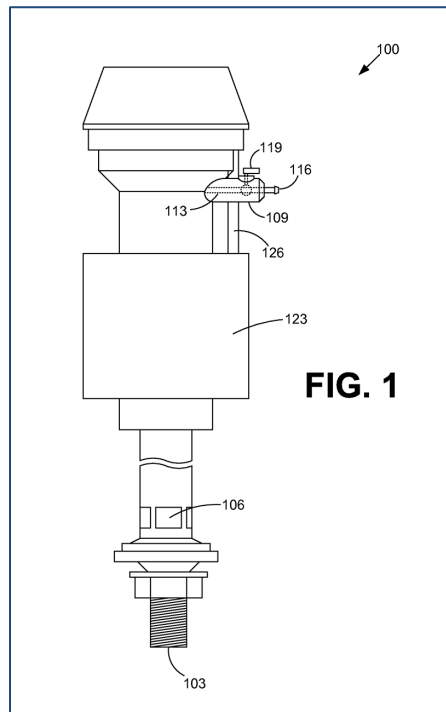
The '993 Patent family is identified below.

Patent App. No.	Filing Date	Status	Patent No.	Priority
10/798,606	03/11/2004	Patented	6,823,889	
10/958,797	10/05/2004	Patented	7,743,436	CIP of '889
12/786,904	05/25/2010	Patented	8,104,105	Continuation of '436
13/346,355	07/09/2012	Patented	8,650,671	Continuation of '105
14/164,424	01/27/2014	Patented	9,139,993	Continuation of '671
14/457,697	08/12/2014	Patented	9,103,105	
14/856,901	09/17/2015	Patented	10,519,639	
16/686,328	11/18/2019	Patented	10,934,698	

The '993 Patent includes three independent claims, including claims 1, 8, and 14, as discussed in more detail below. *Id.*, 9:61-10:20; 10:44-65; 11:12-25.

A. Subject Matter

The '993 Patent is entitled “Toilet Fill Valve,” and describes a toilet fill valve system designed to efficiently manage water flow during the flush cycle of a toilet. *Id.*, 1:21-28; and 2:40-45. The system includes a toilet fill valve with a body that has an extended portion integrally molded with it, forming a bowl fill outlet port. *Id.*, 2:5-26. The valve is equipped with a water inlet to receive water from a supply source and a tank water outlet to provide a portion of the water to the toilet tank. *Id.*, 2:1-16. Additionally, the system features a water flow regulator in the form of a bowl fill valve 109 that attaches directly to the extended portion of the valve body. *Id.*, 2:10-39. This regulator is designed to regulate the flow rate of a second portion of water during the flush cycle. *Id.*



EX1001, Fig. 1

The water flow regulator is a single-piece construction that can be locked onto the integrally molded, extended portion of the toilet fill valve body using a protrusion that inserts into a recess in the valve. *Id.*, 2:17-26. This direct attachment method is intended to prevent the formation of a pressure head. *Id.*, 4:1-9. Such pressure heads can cause a tube, also part of the system, to become loose, disconnect, or leak over time. *Id.*

The toilet fill valve includes a float and an actuating arm coupled to the float. *Id.*, 2:46-55. The actuating arm extends radially relative to the longitudinal axis of the valve and is angularly offset from the bowl fill valve to prevent interference with the water flow regulator and the translational stem that extends from the float to the actuating arm's free end. *Id.*, 3:24-46. The '993 Patent also outlines a method of operation for the toilet fill valve system, which ensures that the water level in the toilet bowl reaches a predefined level at the end of the flush cycle, minimizing water wastage. *Id.*, 2:27-39; *see generally id.*

B. Prosecution History of the '993 Patent

The application for the '993 Patent, as filed, was rejected on January 12, 2015 via a Non-Final Office Action which rejected claims 4 and 7 as allegedly failing to comply with the written description requirement because the “original disclosure fail[ed] to support the limitation ‘the bowl fill restriction is configured to be clamped

to the extended portion of the body’ of [original] claim 4” and “the method of ‘clamping the bowl fill restriction to the extended portion of [original] claim 17,” while alleging these were “considered as new matter.” EX1002, 48, 50-51.

The Office Action indicated that original claims 1-20 were obvious over DeMarco in view of Gish, because while “DeMarco [is] silent as to the extended portion [being] integrally molded with the body of the toilet fill valve,” “Gish ... teaches an analogous toilet fill valve system where the extended portion ... is integrally molded with the toilet fill valve.” *Id.*, 51-52.²

In response, Patent Owner successfully argued that claims 4 and 17 satisfied the written description requirement, were definite, and specifically recited portions of the specification in highlighting the same. *Id.*, 35-37. Patent Owner also amended claims 1, 4-10, 12, and 15-19 to stylistically replace the term “bowl fill restriction” with “water flow regulator,” and Patent Owner successfully argued that the claims, as amended, are patentable over the combination of DeMarco and Gish on the basis

² Claims 1-20 were also rejected for double patenting over U.S. Patent App. No. 14/457,697. *Id.*, 52-53. Patent Owner filed a terminal disclaimer to overcome the rejections. *Id.*, 23-24.

that neither DeMarco or Gish were configured such that a water flow regulator was inserted into or came into contact with the extended portion of the body. *Id.*, 28-43.

A Notice of Allowance issued on May 19, 2015. *Id.*, 7-11.

IV. PERSON OF ORDINARY SKILL IN THE ART

A POSITA in the field to which the '993 Patent is directed would have had at least a Bachelor of Science degree in mechanical engineering or a related field or, as a substitute, at least two years of work or research experience in the design or development of toilet products, parts, and accessories.

For purposes of its Institution Decision, the Board “adopt[ed] Patent Owner’s proposed definition of a POSITA, as it is consistent with the ’993 [P]atent and the asserted prior art.” Paper 19, 13. The Board further explained that it “see[s] no material difference between the level of skill proposed by Patent Owner and that proposed by Dr. Cameron.” *Id.*

V. CLAIM CONSTRUCTION

A. “integrally molded”

Claims 1, 8, and 14 recite the term “integrally molded.” Patent Owner previously urged the Board to construe “integrally molded” to mean “molded as a single complete unit.” Paper 10 (POPR), 16-19.

The Board largely agreed, construing “integrally molded with” to mean “molded together as a single structure.” Paper 19 at 14-15. Specifically, the Board

explained that this construction “exclude[s] items created as separate pieces and attached together later” and that it “is consistent with the plain language of the claims, which requires the extended portion be ‘integrally molded with’ the body and not just the extended portion be integral with the body.” Paper 19 at 14-15.

During her deposition, Petitioner’s expert Dr. Cameron confirmed that she does not intend to offer any opinions that are not consistent with the Board’s construction. EX2008, 160:19-162:7. As such, Patent Owner understands that the construction of “integrally molded with” is undisputed.

B. “water flow regulator”

“By virtue of the ... setting of ... the bowl fill valve 109, the flow of water through the bowl fill valve 109 is regulated. In this manner, the flow of water is regulated so that enough water flows out of the bowl fill valve 109 to fill a toilet bowl without wasting any water down a drain.” EX1001, 2:36-39. Accordingly, to the extent that construction is deemed necessary, the PTAB should construe “water flow regulator” to mean “a device for regulating a flow rate of an amount of water flowing therethrough.”

VI. THE PRIOR ART

A. Guoxin

Guoxin discloses a water supply switching device for one-piece toilets with insufficient water storage capacity. EX1016, p. 004; EX2007, 1:1-5. Unlike the ’993

Patent, which is directed to reducing the amount of water flowing into the toilet bowl, Guoxin aims to *increase the amount* of water flowing to the toilet bowl during the flush cycle to address the issue of *insufficient water* volume for a flush. EX1016, p. 004; EX2007, 1:5-7. The device directs water directly into the toilet, thereby ensuring a thorough flush. *Id.* EX2013, ¶¶82-83.

Guoxin is silent on whether the purported “extended portion” of the water inlet device 1 referenced in the Petition is integrally molded with the body of the water inlet device. Guoxin only states that to one side of the water inlet device, there is a switching mechanism 4 that is equipped with a valve seat with a slot to accommodate a switching valve. EX1016, p. 005; EX2007, 2:17-23. The switching valve has upper and lower annular surrounds with a smaller annular surround therebetween. EX1016, p. 005; EX2007, 2:24-31. When the water in the toilet tank reaches a set level of height, the lower annular surround blocks between the water inlet and outlet, discontinuing the water supply to the toilet through the switching mechanism. EX1016, p. 005; EX2007, 2:31-41; EX2013, ¶84.

B. Ho

Ho describes a toilet flushing device designed to be installed in a water supply tank, featuring a diverter valve that directs high-pressure water to the rim flushing conduit of a toilet bowl during flushing. EX1022, Abstract. Like Guoxin, Ho aims to *increase* the amount of water directed to the toilet bowl, in stark contrast to the

'993 Patent. The diverter valve includes a valve housing and a valve rod that moves in response to changes in water level in a water supply tank. *Id.*, Abstract; EX2013, ¶¶85-86.

The diverter valve has a hollow housing, an inlet pipe, a supply line to the rim flushing conduit, and a float member that moves the valve rod in response to water level changes, ensuring proper water flow during flushing and tank refilling. *Id.*, 3:12-17, 3:53-61. Like Guoxin, Ho is also silent on whether the purported “extended portion” of the water supplying pipe referenced in the Petition is integrally molded with the body of the water supplying pipe. EX2013, ¶87.

C. Brown

Brown is directed to reducing both noise and the amount of water wasted in toilet flush tanks equipped with a conventional ball cock valve assembly. EX1021, 1:9-15; 1-41-49. Brown discloses a series of flexible, elongated members, such as solid rods or hollow tubes, which are inserted into the fill tube to create a more laminar flow and distribute the pressure drop along the tube's length, extending almost its full length and resting on the tank's bottom. *Id.*, 2:52-67; 3:20-44; 4-45-63; EX2013, ¶¶88-89.

To minimize the excess water diverted into the toilet bowl, Brown discloses an externally threaded adaptor tube with a restricted opening or an adjustable metering valve connected to the overflow pipe, which effectively reduces the volume

of water flowing into the toilet bowl during the refill process, thus conserving water. *Id.*, 3:45-72. Brown expressly teaches that adaptor tube (which is threaded or screwed into the flush valve) is *not* integrally molded and therefore does not teach this limitation of the '993 Patent. EX2013, ¶90.

D. Quick Connection Art

Bjerke outlines a detachable bathtub shower system that can be swiftly connected to a bathtub faucet via a screw-threaded fitting. EX1017, 3:23-48. This system incorporates a backflow preventer with a quick connect/disconnect feature, allowing for easy attachment or removal. *Id.*, 3:5-22; EX2013, ¶¶91-92.

Calmettes describes a coupling device designed to securely connect the ends of two coaxial tubes, such as those found in motor vehicle cooling circuits or other industrial applications. EX1018, 1:21; *see also id.*, 10:23; 3-30-47, 3:67-68; 4:1-2; 10:10-20; EX2013, ¶93.

Hall pertains to a hose-coupling device that enables the quick and secure connection of adjacent hose sections without the use of traditional coupling threads. EX1019, 1:8-14, *see also id.*, 1:66-85, 1:86-89, 1:100-112; EX2013, ¶94.

Kimber describes a coupling designed to create a sealed connection between two conduits, such as hoses and radiators in automobiles. EX1020, 1, *see also id.*, 2-3, 8; EX2013, ¶95.

VII. THE CHALLENGED CLAIMS ARE NOT INVALID

A. Grounds 1 and 2: Guoxin in view of Ho, in further view of Bjerke, Calmettes, Hall, and/or Kimber

Petitioner has not met their burden to show that the Challenged Claims are invalid with respect to Grounds 1 and 2.

1. The Petition is deficient with respect to certain limitations of independent claims 1, 8, and 14.

a) “overflow tube” / “overfill tube”

Each independent claim requires a first tube that transfers water from the water flow regulator to a second toilet tank “overflow tube” or “overfill tube.” EX2013, ¶¶98-99.³ Because each of the remaining Challenged Claims depend from Claims 1, 8, or 14, a finding that the prior art does not disclose or otherwise render obvious limitations 1[E], 8[E]-8[F] and 14[B] completely resolves Grounds 1 and 2.

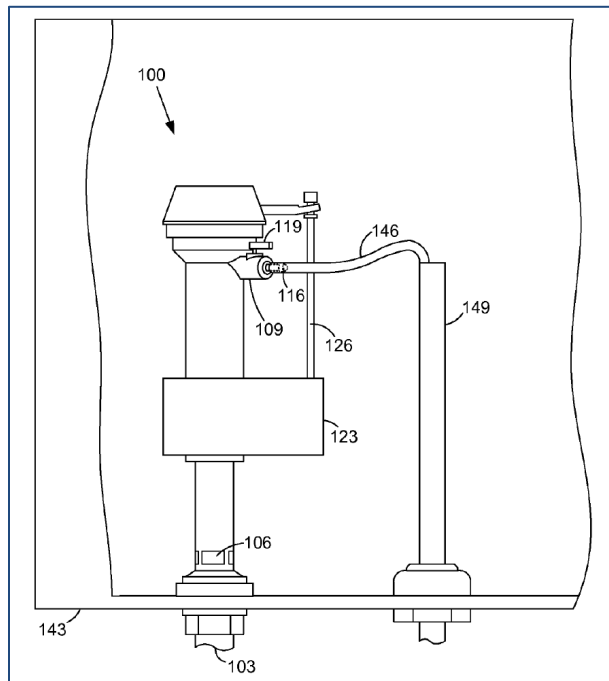
Limitation 1[E] requires a first tube attached directly to the water flow regulator, which in turn is connected to a second, separate toilet tank overflow (or overfill) tube. EX1001, Cl., 1, *see also* 3:60-65. This is consistent with the purpose

³ The following analysis focuses on limitation 1[E]. Pet., 41-42. However, both the Petition and Dr. Cameron merely restate the same argument and evidence with respect to limitations 8[E]-8[F] and 14[B]. As such, Patent Owner incorporates the same rebuttal herein. EX2013, ¶¶119-120.

of the '993 Patent, which is to minimize wasted water. EX1001, 6:33-38. The overflow tube prevents the tank from overflowing in the case of failure of the fill valve in an open state. Meanwhile, the break between the tubes prevents siphoning of the toilet water into the water supply in the case of negative pressure on the water supply line. EX2013, ¶100.

This configuration is depicted (for example) in Figure 3 of the '993 Patent, which depicts tube 146 and overflow tube 149.⁴ EX2013, ¶¶101-102.

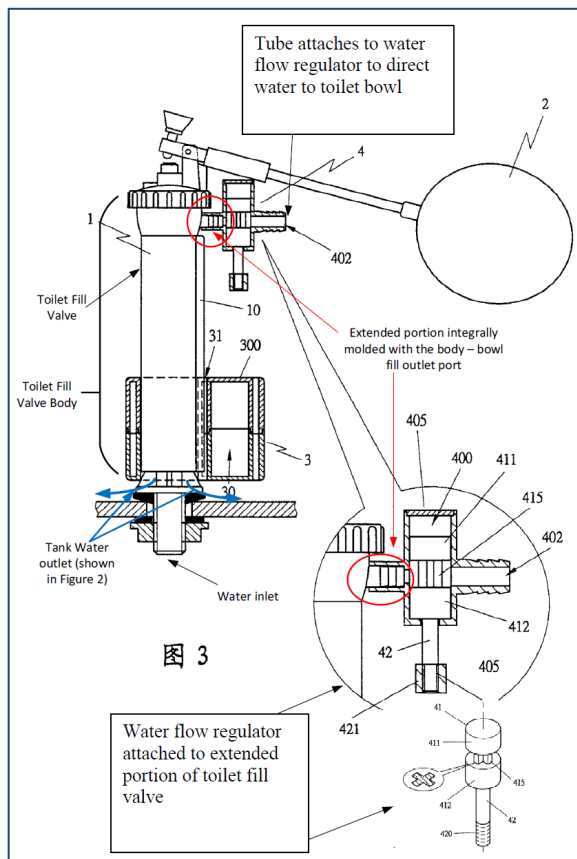
⁴ The '993 Patent refers to numeral 149 as both an “overflow tube” and an “overfill tube.” EX1001, 5:38-46. These terms are functionally equivalent. EX2013, n.3.



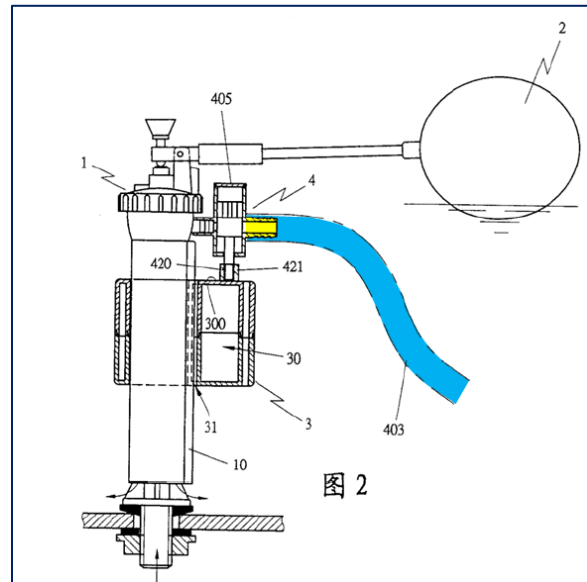
EX1001, Fig. 3

- (1) The Petition does not identify any evidence that Guoxin’s water supply line 403 directs water to the claimed overflow tube.**

The Petition identifies Guoxin’s “water supply line 403” as the claimed tube attached directly to the water flow regulator. Pet., 42 (citing EX1016, 2:17-18; EX1004, ¶149). EX2013, ¶103. The Petition also notes without explanation that the claimed features are “conventional in the art.” Pet., 41 (citing “annotated figure of Guoxin illustrated above regarding claim element 1[Pre] and annotated Fig. 2 below; EX1004, ¶149). Petitioner’s annotated figures are reproduced below.



EX1004, ¶120



Pet., 42.

The Petition does not at any point identify the separate toilet tank overflow tube, as required by limitation 1[E]. A toilet tank overflow tube is not depicted in any of Petitioner’s annotated figures, nor in any uncited figures. In fact, Petitioner’s annotations to Figure 3 explicitly indicate that tube 403 “attaches to water flow regulator to direct water to *toilet bowl*,” not to an overflow tube.⁵ EX2013, ¶104.

⁵ All emphasis is added unless otherwise noted.

Likewise, neither the cited portion (2:17-18) nor uncited portions of Guoxin reference an overflow tube.⁶ *Id.*

(2) The claimed configuration is not “conventional in the art.”

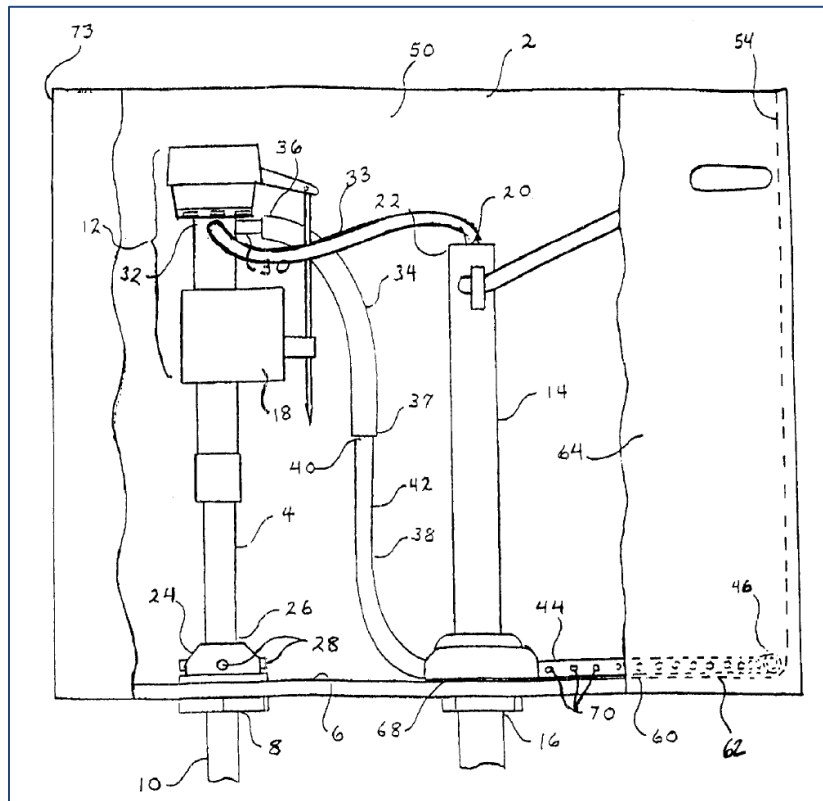
The Petition does not identify an overflow tube or *any* evidence that Guoxin’s water supply line 403 directs water from a water flow regulator to an overflow tube. Instead, Petitioner and Dr. Cameron allege without support that the claimed configuration of regulator, first tube, and second, distinct overflow tube is “conventional in the art.” Not so. EX2013, ¶¶105-107.

When questioned on the operation of a conventional residential toilet, Dr. Cameron testified that she was only aware of two mechanisms by which water enters a toilet bowl: (1) a tube that transfers water directly from the fill valve to the bowl, and (2) water entering the bowl through the flush valve. EX2008, 87:14-21; *see also id.*, 79:19-87:21. Dr. Cameron *did not* reference overflow tubes in any capacity. EX2013, ¶¶108-109.

⁶ The Petition’s citations to Guoxin are inaccurate and fail to “identify specific portions of the evidence that support the challenge. 37 C.F.R. § 42.104(b)(5); *see also* EX2013, n.4 (citing EX2007; EX2008, 193:18-200:19).

Moreover, the claimed configuration—a tube which directs water from a water flow regulator to a separate overflow tube—is not conventional in the art. Water flow regulators perform multiple functions in toilet systems. The specific function impacts where the water exiting the regulator is directed. EX2013, ¶110. Some, like the regulator disclosed and claimed by the '993 Patent, regulate the flow of water from the fill valve to the overflow tube. Others, like Ho's diverter valve direct water from the fill valve to a conduit encircling the rim of the toilet bowl. EX1022, 4:7-9; EX2013, ¶110. Still others, like switching mechanism 4 disclosed by Guoxin, provide a mechanism whereby water "*is directly supplied to the toilet bowl* to compensate for the lack of water in the tank." EX1016, p. 004; EX2007, 1:2-7; *see also* EX2013, ¶111.

Other fill valve configurations also exist. U.S. Patent No. 8,546,568 depicts both a first tube (33) which directs water from the fill valve to an overflow tube, as well as a second tube system (34, 38) which directs water from the fill valve to the bottom surface of the toilet tank in order to prevent sediment buildup. EX1014, Fig. 1. Notably, the second tube system (despite also originating from the fill valve), is not directed to an overflow tube. EX2013, ¶112.



EX1014, Fig. 1

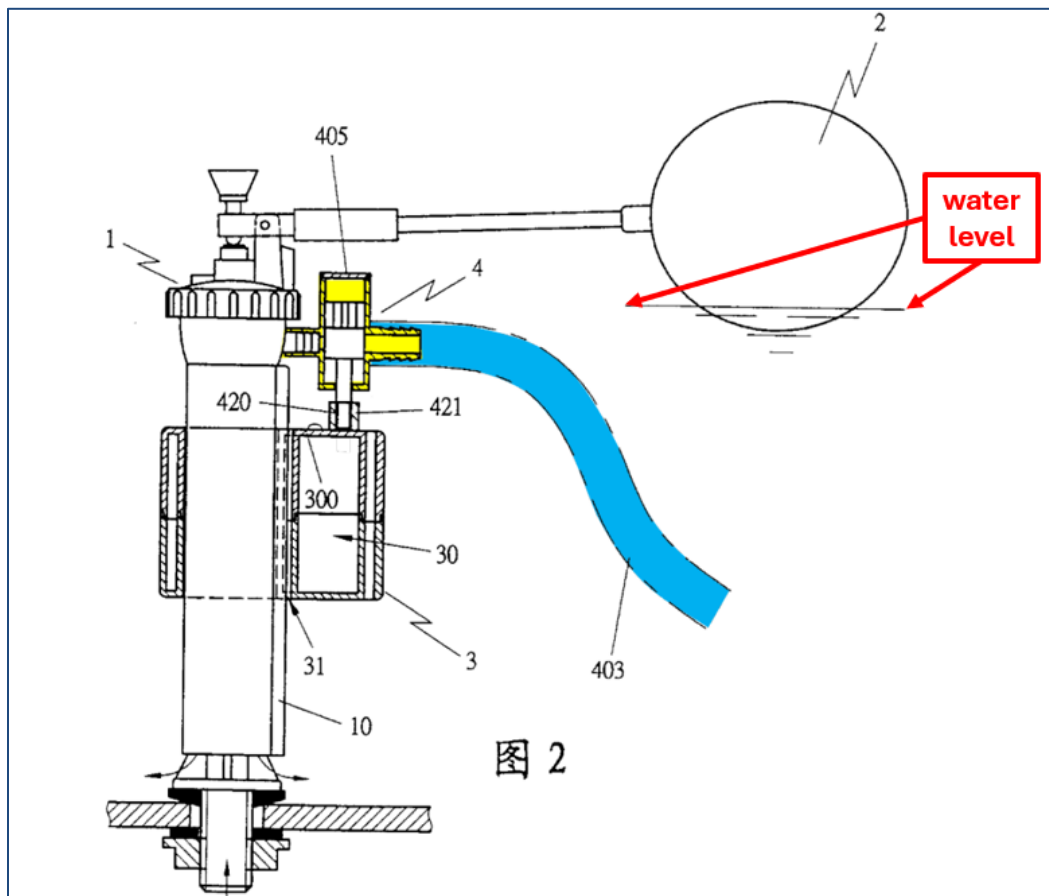
Contrary to Petitioner's unsupported assertions, the claimed configuration is not conventional in the art. Numerous other, different configurations of tubes, water flow regulators, and overflow tubes also exist. Petitioner has not identified any evidence which even suggests that Guoxin discloses the claimed configuration. Likewise, Petitioner has not alleged (or provided any evidence to support) that the claimed configuration is an obvious modification of Guoxin in view of the knowledge of a POSITA. EX2013, ¶113.

- (3) Guoxin's tube 403 does not direct water from a water flow regulator to an overflow tube.**

Petitioner's citations and analysis of Guoxin are deficient, and that alone justifies a finding that the Challenged Claims are not invalid. 37 C.F.R. § 42.104(b)(5) (the Board may exclude evidence "where a party has failed to ... identify specific portions of the evidence that support the challenge.").

However, Guoxin itself confirms that water supply line 403 is not directed to an overflow tube, but instead (1) "is directed to the toilet" and (2) "*directly* provide[s] water supply to the toilet." EX1016, p. 005; EX2007, 2:18-21. Guoxin supplies water directly to the bowl in order to *increase* flush volume. EX2013, ¶¶114-115.

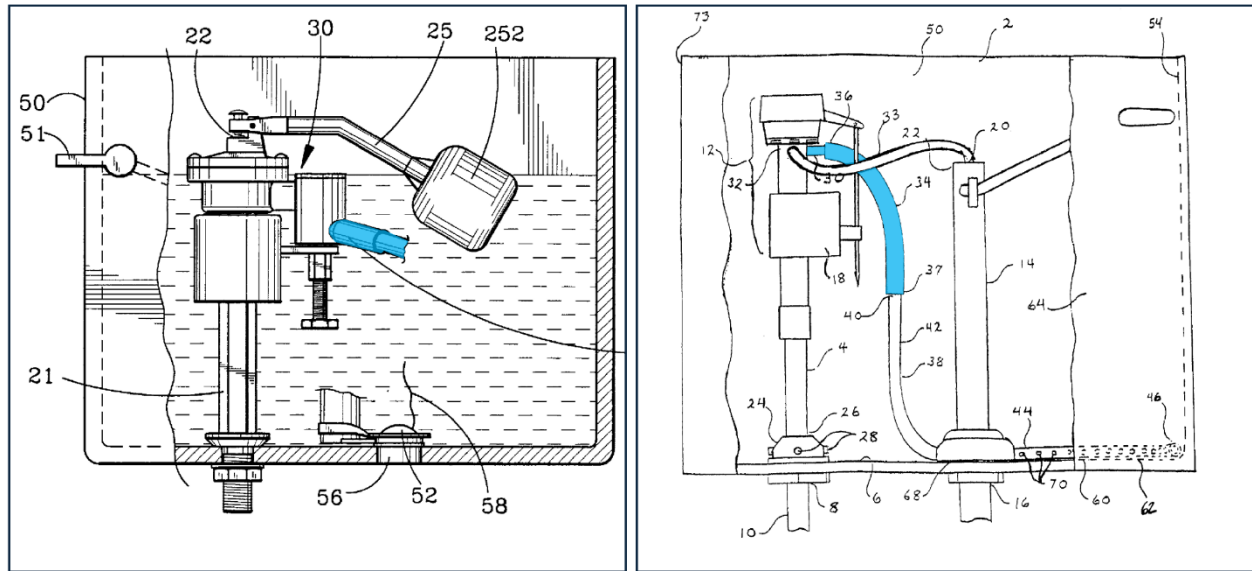
Petitioner's annotations of Figure 2 support this conclusion. Pet., 49; EX1016, p. 005; EX2007, 2:6. Notably, the water level when full is above both the outlet port of switching mechanism 4, and the terminal end of water supply line 403. EX2013, ¶116.



Pet., 42 (citing EX1016, Fig. 2) (annotated)

However, in order to function properly, the opening of an overflow tube must be located *above* the water level. Figure 2 indicates that water supply line 403 *descends* from the point it attaches to switching mechanism 4, which is consistent with its stated purpose of supplying water directly to the bowl in order to increase flush volume. If it were directed to an overflow tube, then it would need to *ascend* from the point of attachment. EX2013, ¶117. This is consistent with both Ho (EX1022, Fig. 2 (below, left)) and the second tube system disclosed by U.S. Patent

No. 6,546,568 (EX1014, Fig. 1 (below, right)), both of which clearly depict a tube that (1) descends below the water line, and (2) is not directed to an overflow tube:



As such, limitation 1[E] is not disclosed or otherwise rendered obvious by Guoxin. EX2013, ¶118.

b) “integrally molded with”

Patent Owner refers to limitations 1[A], 8[C2], and 14[A2] collectively as the “Integrally Molded Limitations.”⁷ Because each of the remaining Challenged Claims depend from Claims 1, 8, or 14, a finding that the prior art does not disclose or

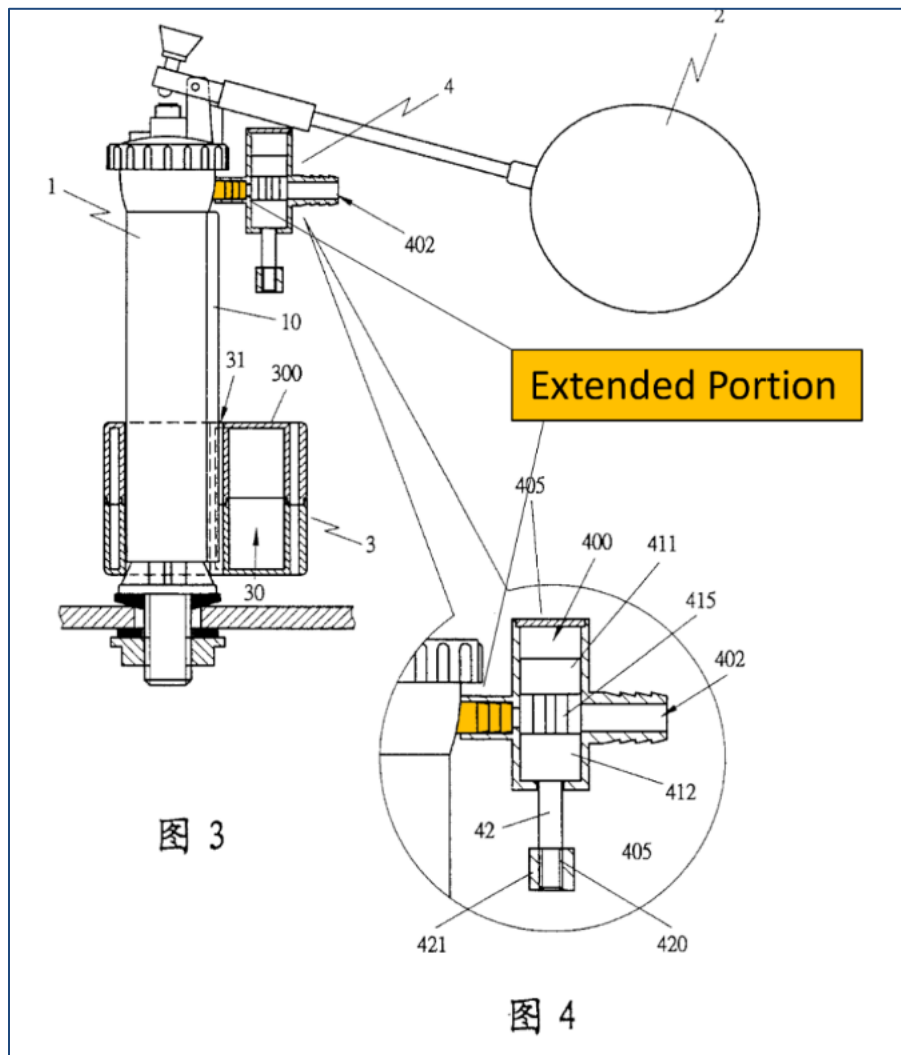
⁷ The following analysis is focused on limitation 1[A]. However, the same analysis applies to limitations 8[C2] and 14[A2]. EX2013, ¶156.

otherwise render obvious limitations 1[A], 8[C2] and 14[A2] completely resolves Grounds 1 and 2.

(1) Guoxin does not disclose the Integrally Molded Limitations.

Guoxin does not disclose that the alleged “extended portion” of the toilet fill valve is integrally molded with the body of the toilet fill valve.

The Petition relies solely on Figures 3 and 4 of Guoxin in support of these limitations. Pet., 32. However, neither figure provides any information regarding the construction of Guoxin’s “water inlet device 1,” much less teaches that the alleged “extended portion” and the body of the water inlet device are “molded together as a single structure.” 37 C.F.R. § 42.104(b)(5); *see also Franklin Elec. Co. v. Dover Corp.*, No. 2006-1442, 2007 U.S. App. LEXIS 5083, at *17 (Fed. Cir. Mar. 1, 2007) (“patent figures are generally not intended to convey such detail.”); EX2013, ¶¶124-125.



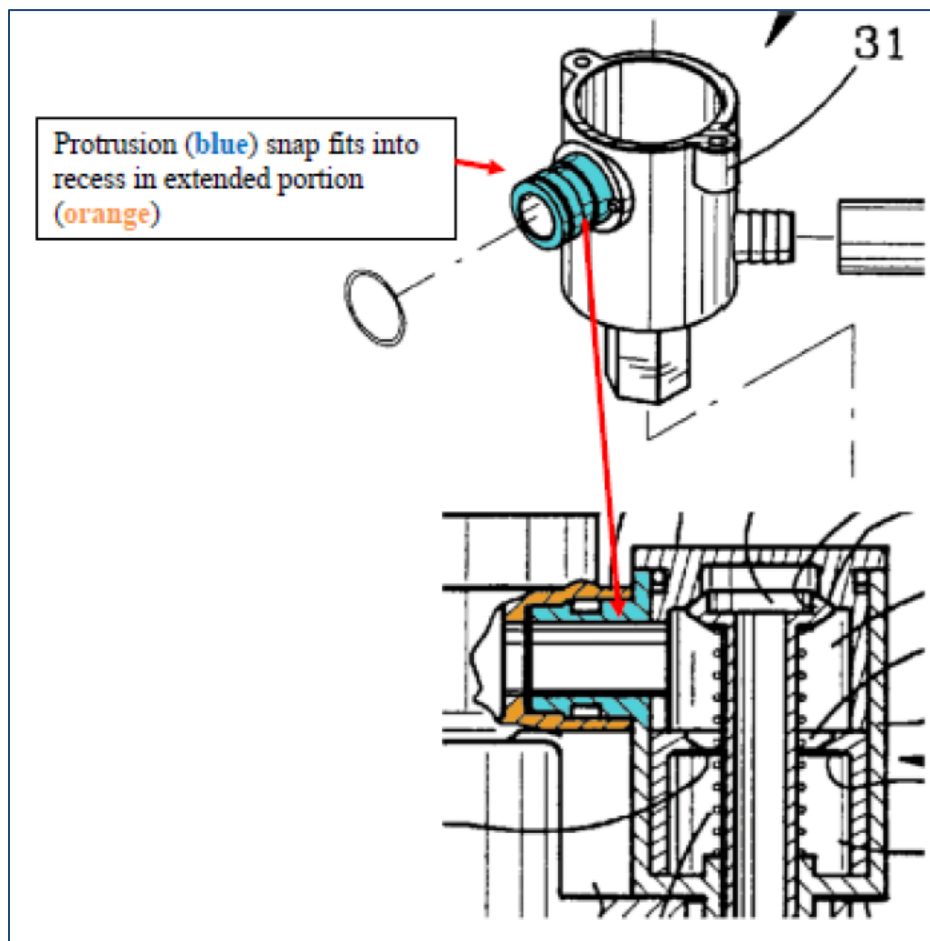
Pet., 32

Moreover, the Petition does not reference Guoxin’s specification, which is also silent regarding the construction of the alleged “extended portion.” Pet., 32 (citing EX1004, ¶123). EX2013, ¶126. Guoxin discloses that valve seat 40 has a water inlet 401 and outlet 402 but provides no disclosure specifying how the alleged “extended portion” is connected to the body of the water inlet device. EX2013, ¶127; EX1016, p. 005; EX2007 (annotated Guoxin), 2:17-23. Thus, Petitioner appears to

concede that the Integrally Molded Limitations are not disclosed in Guoxin. Pet., 26-27.

(2) The Petition does not show that Ho discloses the Integrally Molded Limitations.

Recognizing that Guoxin does not teach the Integrally Molded Limitations, Petitioner instead turns to Ho. Pet., 33 (citing EX1022 (Ho), Figs. 3, 5).



Pet., 33 (citing EX1022 (Ho), Figs. 3, 5)

However, the Petition does not provide *any* analysis of Ho, nor does it make any reference to *any* portion of Ho's disclosure other than Figures 3 and 5. Pet., 33

(citing EX1004, ¶124). Ho’s specification is silent regarding the construction of the fill valve depicted in Figures 3 and 5. EX2013, ¶¶128-129.

Although the Board addressed Ho’s disclosure as part of its Institution Decision (Paper 19, 20 (citing EX1022, Figs. 2-5)), the Petition did not actually argue Ho’s cross-hatching was indicative of integral molding. EX2013, ¶¶130-131. Instead, Petitioner merely referred to the figures themselves without additional analysis and expected the Board and Patent Owner to draw their own conclusions. This is improper. *In re Magnum Oil Tools Int’l, Ltd.*, 829 F.3d 1364, 1381 (Fed. Cir. 2016) (the Board may not “adopt arguments on behalf of petitioners that could have been, but were not, raised by the petitioner during an IPR.”).

Figures 3 and 5 do not teach that the alleged “extended portion” and the body of the toilet flushing device are “molded together as a single structure.” EX2013, ¶132.

(a) The Petition does not show that Ho’s toilet fill valve is a molded plastic structure.

If two structures are “molded together as a single structure,” they must comprise a single molded structure. In the context of the toilet fill valves recited by the Challenged Claims, a POSITA would have understood the term “molded” to refer to plastic structures, which are manufactured through processes such as

injection molding, overmolding, or extrusion molding. EX2008, 35:10-39:12. EX2013, ¶133.

“Molded” does not refer to metal structures, which are typically “cast” or “machined.” EX2013, ¶134; EX2008, 63:21-65:21. Dr. Cameron has failed to show (1) that general reference to a patent figure alone is enough to determine whether a structure is plastic, and (2) that Ho, in particular, discloses a plastic structure. These deficiencies are fatal to the Petition. EX2013, ¶134.

(i) Dr. Cameron does not analyze the composition of Ho’s toilet fill valve.

Neither the Petition nor Dr. Cameron (1) include any analysis that Ho allegedly discloses a “molded” structure, (2) rely on any evidence from the Ho specification, or (3) explain which portion(s) of the cited Ho figure(s) allegedly show integral molding. EX2013, ¶¶135-136. Instead, the Petition merely points to the figure(s) in question and expects Patent Owner and the Board to do their own analysis of the alleged disclosure. Petitioner’s conclusory allegations are improper. *Magnum Oil Tools*, 829 F.3d at 1380.

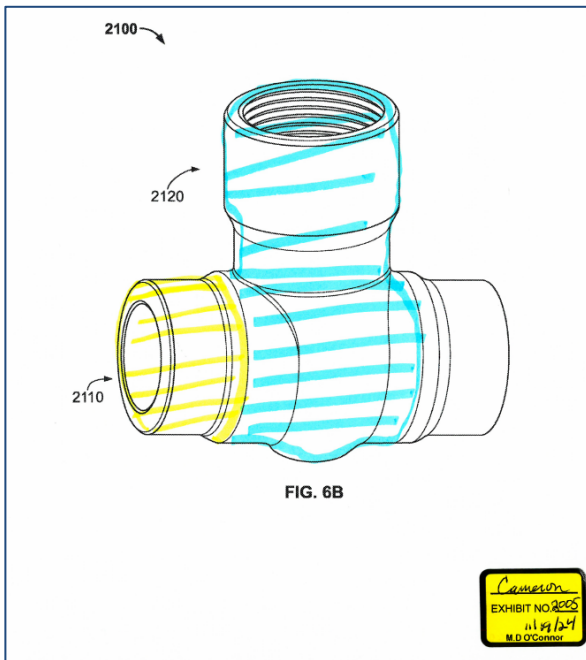
(ii) The evidence casts doubt on a POSITA’s ability to determine the composition of a fill valve from figures alone.

A POSITA would not have been able to conclusively determine whether Ho’s toilet fill valve is made of plastic polymers (and therefore determine whether an

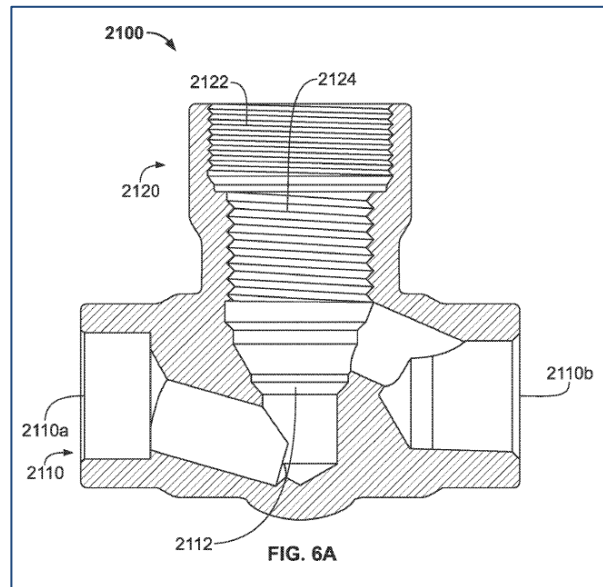
extended portion of the fill valve *could possibly* be integrally molded with the body of the fill valve) based on the cited figures alone. EX2013, ¶¶137-138.

Petitioner’s expert repeatedly confirms that a POSITA would have needed to consider the reference as a whole in order to determine whether a toilet fill valve is metal or plastic. First, when questioned about the makeup of the toilet fill valve depicted in Brown, Dr. Cameron testified that although the Brown does not disclose the composition of the body of the fill valve, she merely “would assume” the body of the fill valve is made of plastic because of her review of the specification. EX2008, 111:3-112:2; *see also id.* 115:12-116:5; EX2013, ¶139.

Second, Dr. Cameron incorrectly testified that portions of a *brass* valve (highlighted in yellow and blue, below left) were integrally molded based on her review of a figure in the absence of additional guidance from the specification. EX2013, ¶¶140-142; *see also* EX2008, 162:8-163:17; EX2005; EX2011 ¶¶[0089]-[0089]. A section cut of the valve in question (below, right) confirms that it is a single structure, but still fails to provide sufficient guidance to show the valve is “integrally molded.”

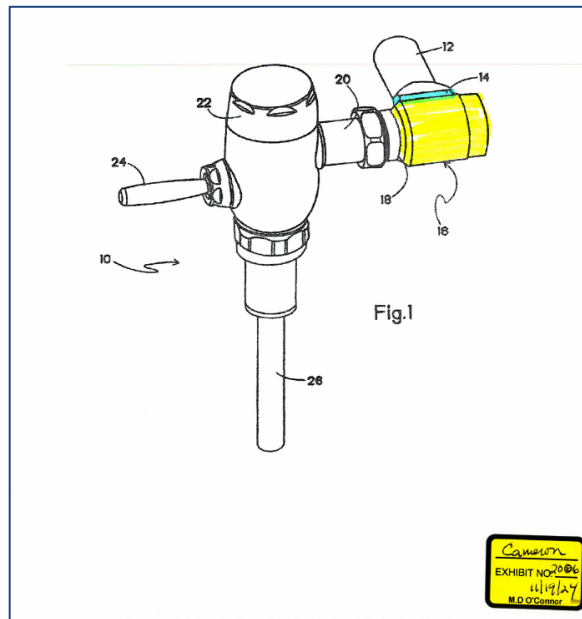


EX2005, Fig. 6B



EX2011, Fig. 6A

Third, when presented with a figure depicting a flush valve, Dr. Cameron was unable to determine whether two portions of the figure (yellow, blue) were integrally molded together based solely on her review of the figure—instead stating that additional information was needed. EX2008, 163:20-167:14; *see also* EX2006. Again, although the structure depicted in EX2006 is composed of brass, not plastic (EX2012, 3:31-40), Dr. Cameron did not consider the composition of the structure when forming her opinion. EX2013, ¶¶143-144.

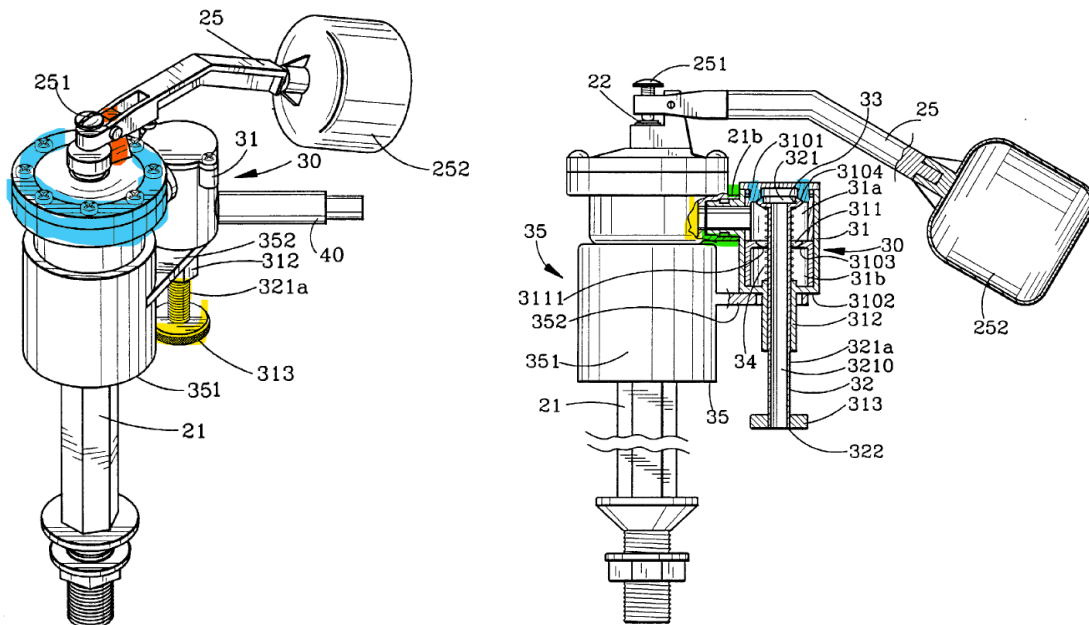


EX2006, Fig. 1

In each instance, Dr. Cameron needed something more than a single patent figure to determine whether a structure was metal or plastic. EX2013, ¶145. Thus, it is unreasonable to conclude that a POSITA can identify whether a figure depicts an integrally molded plastic structure based solely on review of static figures.

(iii) Dr. Cameron has failed to establish that Ho's Figure 3 depicts a "molded" plastic structure.

Ho itself is silent to the construction of the fill valve disclosed therein. EX2013, ¶146. However, several aspects of the cited figures indicate that Ho's fill valve is made of steel, brass, or some other metal:



- The valve body flange highlighted in blue, above left, does not include screw bosses formed as projections from the nominal wall such as seen at 31, above, which would be indicative of injection molded plastic. *Id.*
- The orange feature projecting upwards from the blue valve housing does not have the characteristics of a plastic molded part. Normally, this wall thickness would be cored out to remove material to avoid the thick wall section issue described above. *Id.*
- Nut 313 has a knurled outer diameter which indicates a machined metal part. *Id.*
- The overall construction of housing 31 could potentially be made as either (a) machined brass or (b) sand cast and post machined brass. The thick wall

sections in blue (above right) are not characteristic of a properly designed injection molded part. *Id.*

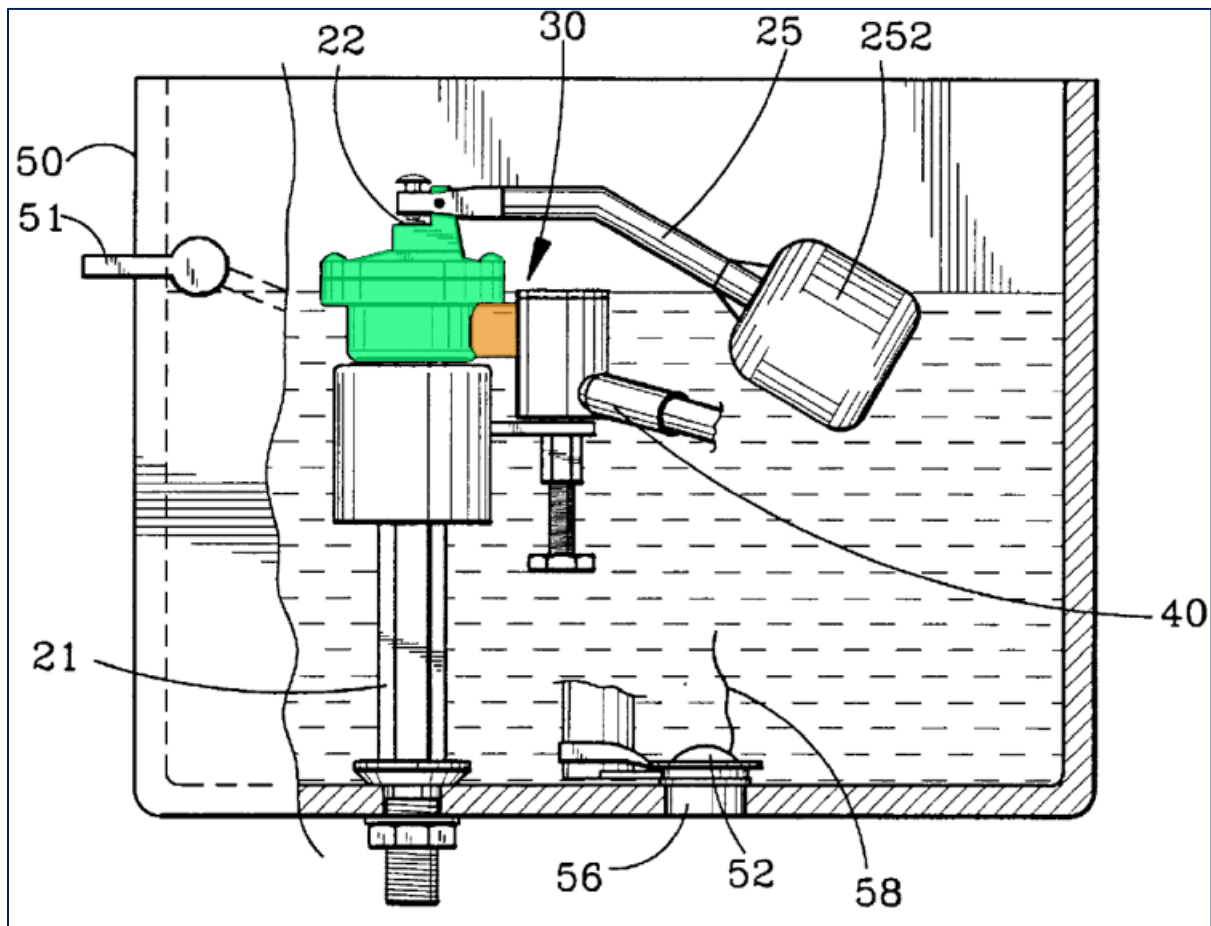
Ultimately, the figures are illustrative drawings which do not disclose the identity of the material in question. EX2013, ¶147. However, to the extent that the cited figures do disclose any materials, under USPTO guidelines the cross-hatching identified by the Board indicates that the alleged “extended portion” is comprised of metal, not plastic. *See, e.g.*, MPEP §608.02 p.76.

Ho’s figures do not provide clear and convincing evidence that the structure in question is either (1) cast or machined metal, or (2) molded plastic. Given that Ho’s figures are ambiguous—and the specification is ultimately silent—a POSITA would not have concluded that the body of Ho’s toilet fill valve is integrally molded with an extended portion of the fill valve. EX2013, ¶147. It is well-settled that where a reference is inconclusive with respect to a claim element, it should be given no weight in the invalidity analysis. *In re Gershon*, 1068, 372 F.2d 535, 537 (C.C.P.A. 1967).

(b) The Petition does not show that Ho discloses or otherwise renders obvious the Integrally Molded Limitations.

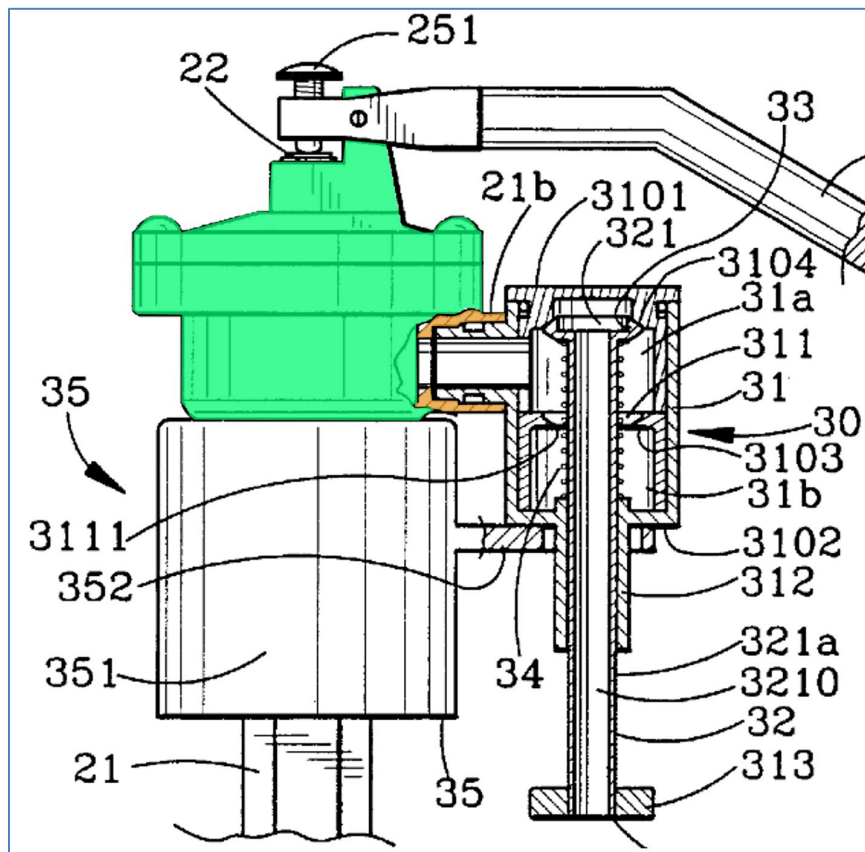
Even if the Board determines Ho discloses a “molded” structure, the Petition still fails to show the body of the toilet fill valve is “integrally molded with” the extended portion of the body. EX2013, ¶148.

Ho's Figure 3 (as cited by Petitioner and the Board) must be viewed in the context of "what a POSITA would have known from Ho as a whole, including Ho's drawings." Paper 19, 20. Figure 2, however, depicts the body of the same toilet fill valve (below, green) and the "extended portion" of the toilet fill valve (below, orange) as separate structures, and provides no indication that the two structures are integrally molded together. EX2013, ¶¶149-150; EX1022 (Ho), Fig. 2 (annotated).



EX1022 (Ho), Fig. 2 (annotated)

Rather than address Figure 2, the Petition instead highlights the connection between the “extended portion” of the toilet fill valve and the *bowl* fill valve. EX2013, ¶151; Pet., 33. That connection, however, is irrelevant. Instead, the pertinent question is whether a POSITA would have understood that Ho’s “extended portion” (orange) is integrally molded with the “toilet fill valve” (green). This analysis, however, is absent from both the Petition and Dr. Cameron’s declaration. EX2013, ¶¶152-153; *see also Magnum Oil Tools*, 829 F.3d at 1380.



EX1022 (Ho), Fig. 3 (annotated)

The Board’s Institution Decision provides analysis not found in the Petition, explaining that “Annotated Figure 3 shows no line or other break in the orange-colored cross-hatching that would indicate separate parts.” Paper 19 (Institution Decision), 20 (citing EX1022, Figs. 2-5). However, as depicted above, the cross-hatching identified by the Board does not extend to the body of the toilet fill valve (green), which indicates that the orange part and the green part *are* separate parts. EX2013, ¶154.

The cross-hatching on the alleged “extended portion” (orange) merely shows that the “extended portion” itself is not composed of separate parts, *not* that the extended portion and the body of the toilet fill valve (highlighted in green, above) are “molded together as a single structure.” Neither the Petition’s conclusory analysis nor the Board’s preliminary findings render the Challenged Claims obvious. EX2013, ¶155; *Magnum Oil Tools*, 829 F.3d at 1380.

2. The Petition does not articulate a motivation to combine the teachings of the prior art.

“A party seeking to invalidate a patent based on obviousness must prove ... that a skilled artisan would have been motivated to combine the teachings of the prior art references to achieve the claimed invention.” *Novartis Pharm. Corp. v. W.-Ward Pharm. Int’l Ltd.*, 923 F.3d 1051, 1059 (Fed. Cir. 2019).

a) The Petition does not articulate a motivation to reverse the configuration of Guoxin’s male and female fluid flow connectors based on the teachings of Ho.

Guoxin discloses a water flow regulator, wherein a portion of the toilet fill valve is configured to insert into the water flow regulator. The Challenged Claims, meanwhile, require the reverse arrangement—namely, a water flow regulator wherein a portion of the water flow regulator is configured to insert into the toilet fill valve. EX2013, ¶157.

The Petition relies on reversing the configuration of Guoxin’s male and female fluid flow connectors—based on the alleged teachings of Ho—for each of limitations 1[D2], 8[C4], and 14[A1]. Pet., 37-39, 48, 51. Because each of the remaining Challenged Claims depend from Claims 1, 8, or 14, a finding that there is no motivation to reverse Guoxin’s male and female fluid flow connectors resolves Grounds 1 and 2. EX2013, ¶158.

(1) The Petition does not identify the alleged “design preferences” which allegedly motivate reversal.

The Petition alleges that male and female fluid flow connectors are interchangeable as a matter of design preference but fails to identify (1) what those design preferences are, or (2) why the unidentified “design preferences” would have motivated a POSITA to reverse the fluid flow connector arrangement. Pet., 28-29

(citing EX1004, ¶¶114-117; EX1017, 7:15-24, Figs. 5-6; EX1006, 80-81); Pet., 29 (citing EX1004, ¶119); *see also* Pet., 38 (citing EX1004, ¶¶137-140); EX2013, ¶159.

This is further emphasized by the Petition’s “summary” section, where Petitioner reiterates that “switching or reversing the mating surfaces” of “fluid conduits is merely a matter of design preference,” before explaining that the Bjerke reference teaches that “male and female connectors *can be reversed* in relation to each other and are thus interchangeable.” Pet., 42-43 (citing EX1004, ¶150; EX1017 (Bjerke), 7:15-24, Figs. 5-6). EX2013, ¶160.

The question of whether a POSITA would have been capable of reversing the fluid flow connector configuration is not in dispute. Indeed, the mere fact that a POSITA *could* have reversed Guoxin’s fluid flow connection does not mean that they *would* have been motivated to do so. Petitioner has failed to meet its burden to show the latter. EX2013, ¶161.

(2) The Petition *ignores* potential design preferences discussed by the prior art.

Petitioner correctly notes that Bjerke discloses multiple configurations of fluid flow connectors. EX2013, ¶¶162-163.

However, the Petition does not acknowledge that uncited portions of Bjerke provide *design preferences* which provide a POSITA with guidance regarding when to use a particular fluid flow connector configuration. EX1017 (Bjerke), 7:24-29;

EX2013, ¶164. Despite having a clear example of how design preferences impact the selected fluid flow connection configuration, the Petition makes no effort to (1) identify any relevant design preference, or (2) explain why the (unidentified) preferences would have motivated the suggested modification. EX2013, ¶165.

(3) The Petition relies on improper hindsight.

The only potential “design preferences” articulated by the Petition are based on the teachings of the ’993 Patent itself, which constitutes impermissible hindsight before the Board. First, Dr. Cameron relies on the prosecution history of “the grandchild ’698 patent” as providing “another example of the interchangeability of male and female connectors, and specifically connectors for toilet fill valves” (U.S. Patent No. 10,934,698). EX1004, ¶116. EX2013, ¶166.

However, the ’698 Patent is (1) a *continuation* of the ’993 Patent, and thus has an identical specification, and (2) was prosecuted *after* the ’993 Patent was granted. Effectively, Dr. Cameron relies entirely on the ’993 Patent specification as support for the proposed modification. As such, Dr. Cameron’s allegation that the ’698 Patent’s specification provides support for “the precise arrangement disclosed by Guoxin” while also teaching that “it is possible that this arrangement may be reversed” is the very definition of speculative hindsight. EX1004, ¶¶116-117; EX2013, ¶167; *see also W.L. Gore & Associates, Inc. v. Garlock, Inc.*, 721 F.2d 1540, 1553 (Fed. Cir. 1983) (“To imbue one of ordinary skill in the art with

knowledge of the invention in suit, when no prior art reference or references of record convey or suggest that knowledge, is to fall victim to the insidious effect of a hindsight syndrome wherein that which only the inventor taught is used against its teacher.”).

Elsewhere, when describing what she deems “an obvious design choice,” Dr. Cameron explains that “[i]t is *clear from the '993 patent specification* and the intrinsic evidence that PO placed no criticality on which portion of the coupling was the male portion and which portion was the female portion.” EX1004, ¶117. However, the mere fact that the specification discloses multiple options for fluid flow connector configurations is irrelevant. The '993 Patent claims a specific configuration, and Dr. Cameron fails to identify any rationale (other than the teachings of the '993 Patent itself) regarding why a POSITA would be motivated to modify Guoxin with that configuration. EX2013, ¶168. *Sci. Plastic Prods. v. Biotage AB*, 766 F.3d 1355, 1359 (Fed. Cir. 2014) (“The pertinence of the reference as a source of solution to the inventor’s problem must be recognizable with the foresight of a person of ordinary skill, not with the hindsight of the inventor's successful achievement.”).

Second, the Petition alleges that “[t]he toilet fill valve connectors here are likewise interchangeable.” Pet., 29 (citing EX1004, ¶118; EX1001, 7:21-33). However, as support for this statement both Dr. Cameron and the Petition rely *only*

on the teachings of the '993 Patent which (according to Dr. Cameron) “confirms the obvious interchangeability of protrusions, ribs, recesses, etc., on the respective couplings. EX1004, ¶118 (citing EX1001, 7:21-33). Again, reliance on the specification of the challenged patent itself to provide the motivation to modify the prior art is the definition of impermissible hindsight. EX2013, ¶169.

Third, the Petition argues that because “the '993 Patent discloses the obvious interchangeability of the protrusions, ribs, recesses, etc., on the respective couplings” and “contemplates the use of any of a variety of well-known snap fit and sealing configurations” that “Guoxin alone, or Guoxin in view of Ho renders obvious independent claim 1.” Pet., 43 (citing EX1001, 7:21-33; EX1004, ¶151). Here yet again, Petitioner improperly relies on the teachings of the '993 Patent itself as justification for why a POSITA would be motivated to reverse Guoxin’s fluid flow connectors. EX2013, ¶170.

Consequently, the Petition fails to identify *any* design preferences which would allegedly motivate a POSITA to reverse the fluid flow connector configuration disclosed by Guoxin. In fact, Petitioner ignores the design considerations plainly disclosed by Bjerke and fails to provide any analysis supporting how those considerations would—or would not—motivate a POSITA to make the suggested changes. The *only* support for the proposed modification is the '993 Patent itself, which consideration is impermissible hindsight. EX2013, ¶171;

see also KSR Int'l Co. v. Teleflex Inc., 550 U.S. 398, 421 (2006) (“A factfinder should be aware, of course, of the distortion caused by hindsight bias and must be cautious of arguments reliant upon ex post reasoning.”).

b) The Petition does not articulate any motivation to combine the Quick Connection Art with Guoxin and/or Ho, nor any reasonable expectation of success in doing so.

The Petition’s motivation to combine analysis is also deficient with respect to the Quick Connection Art. Specifically, Petitioner relies on the conclusory allegation that the art discloses “well-known fluid flow connections.” Pet., 57. But, the mere fact that the fluid flow connections were allegedly well known says nothing about whether a POSITA would have been motivated to combine the known Quick Connection Art with Guoxin and/or Ho. EX2013, ¶172.

Rather than identify a single motivation to combine any particular reference with Guoxin or Ho (or the combination of the two), Petitioner makes the conclusory allegation that “it would have been obvious to a POSITA to use any known method of connecting two fluid channels.” Pet., 57. But, once again, Petitioner fails to identify the specific considerations which would have motivated a POSITA to further modify the fluid flow connections disclosed by Guoxin and/or Ho. Not only did Petitioner fail to explain why a POSITA would have been motivated to make the suggested modification, but Petitioner also ignored evidence against the proffered combination. EX2013, ¶173.

Dr. Cameron testified that a POSITA would have typically used either metal or plastic in a fluid system (but not both), and that certain connection mechanisms are better suited for plastic fluid systems (as opposed to metal systems) because of (1) the pressure inside, and (2) because plastic is more easily deformed. EX2008, 57:14-58:13, 56:2-57:13. However, neither Dr. Cameron nor Petitioner provide any analysis regarding how (or why) each specific connection mechanism disclosed by Bjerke, Calmettes, Hall, or Kimber would have been adapted by a POSITA for molded plastic toilet systems. EX2013, ¶174.

The Petition’s conclusory recitation that certain fluid flow connectors are well known in the art is insufficient to show that a POSITA would have been motivated to make the proposed modifications. *Magnum Oil Tools*, 829 F.3d at 1380. As such, Ground 2 fails to show that the proposed combinations would have been obvious to a POSITA. EX2013, ¶¶175-176.

3. The Petition is deficient with respect to certain dependent claims.

a) Claim 5

A POSITA would have reasonably understood the term “bowl fill valve” in claim 5 to refer to the “water flow regulator” of claim 1. EX1004, ¶188 n. 1; EX2008, 191:15-193:3; EX2013, ¶177.

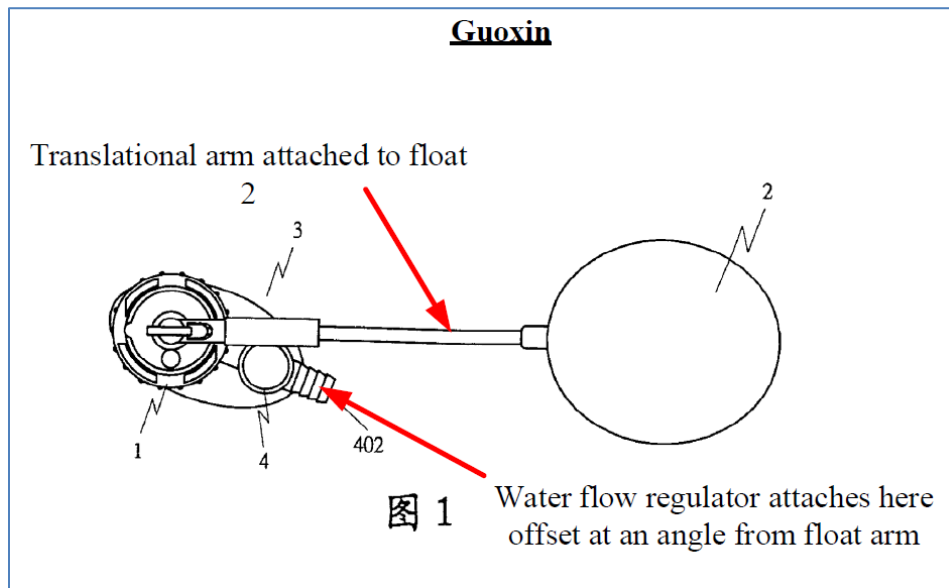
The Petition alleges that Claim 5 “would have been intuitively obvious to a POSITA—who would not seek to design a toilet fill valve with a conventional float attached to a translational arm that was obstructed in some manner from freely translating.” Pet., 53. Despite the Petition’s unsupported conclusions regarding what a POSITA would—or would not—seek to design, neither Guoxin nor Ho disclose this limitation. EX2013, ¶178.⁸

With respect to Guoxin, the Petition merely references Figure 1 but does not provide any analysis of where or how this limitation is allegedly disclosed. Pet., 53-54. For this reason alone, the Petition is deficient. EX2013, ¶179; 37 C.F.R. § 42.104(b)(5).

Moreover, Petitioner does not identify or differentiate between the claimed “actuating arm” and “translational stem.” Instead, Dr. Cameron’s declaration identifies a “[t]ranslational arm attached to float” and an alleged “[w]ater flow

⁸ Although the Petition alleges that “[t]he features recited by claim 5 are disclosed and illustrated in ... Ho,” it does not articulate any motivation to combine Ho’s “actuating arm,” “water flow regulator,” “translation stem,” or “float” with Guoxin’s toilet fill valve, nor does it articulate a reasonable expectation of success in doing so. Pet., 53. EX2013, n.11.

regulator” that attaches “offset at an angle from float arm.” EX1004, ¶188. Petitioner appears to have merged the claimed “actuating arm” and “translation stem” into a single structure, which it calls a “translational arm.” Again, this alone renders the Petition deficient. EX2013, ¶180.

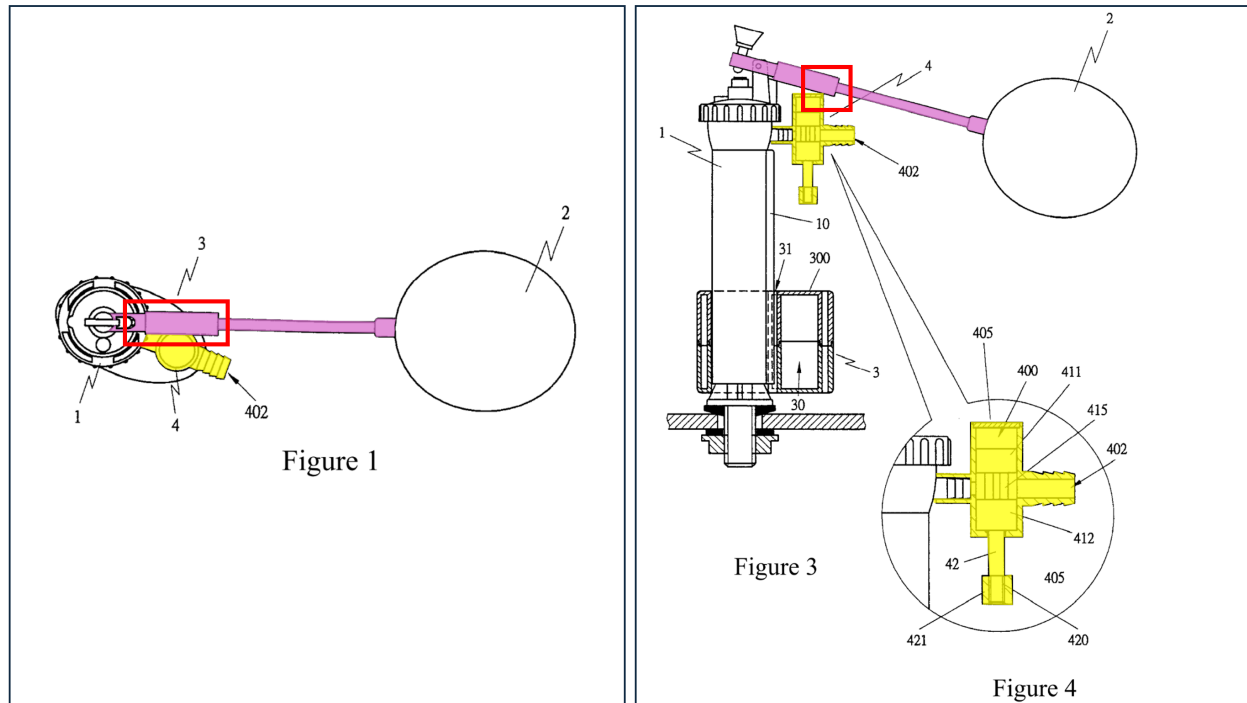


EX1004, ¶188

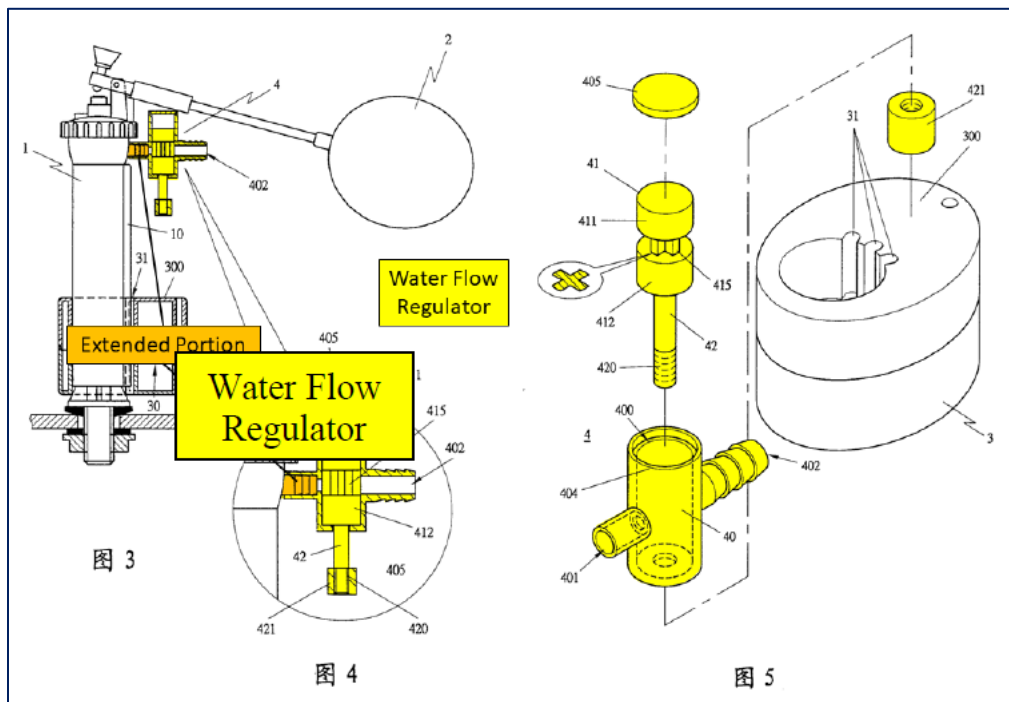
Neither the Petition⁹ nor Dr. Cameron provide any analysis regarding where or how the “actuating arm” is “angularly offset” relative to “the water flow regulator” or how the alleged offset prevents interference between the two. In fact,

⁹ Patent Owner maintains that Petitioner should not be permitted to incorporate by reference any arguments raised in Dr. Cameron’s declaration but not present in the Petition. See Paper 12, p.30 fn.4; Paper 18, §II.

Guoxin clearly *discloses interference* between the structure Petitioner has identified as the claimed “water flow regulator” (yellow) and the identified “translational arm” (pink). This interference is depicted in annotated Figures 1, 3, and 4, below, with red boxes. EX2013, ¶181.

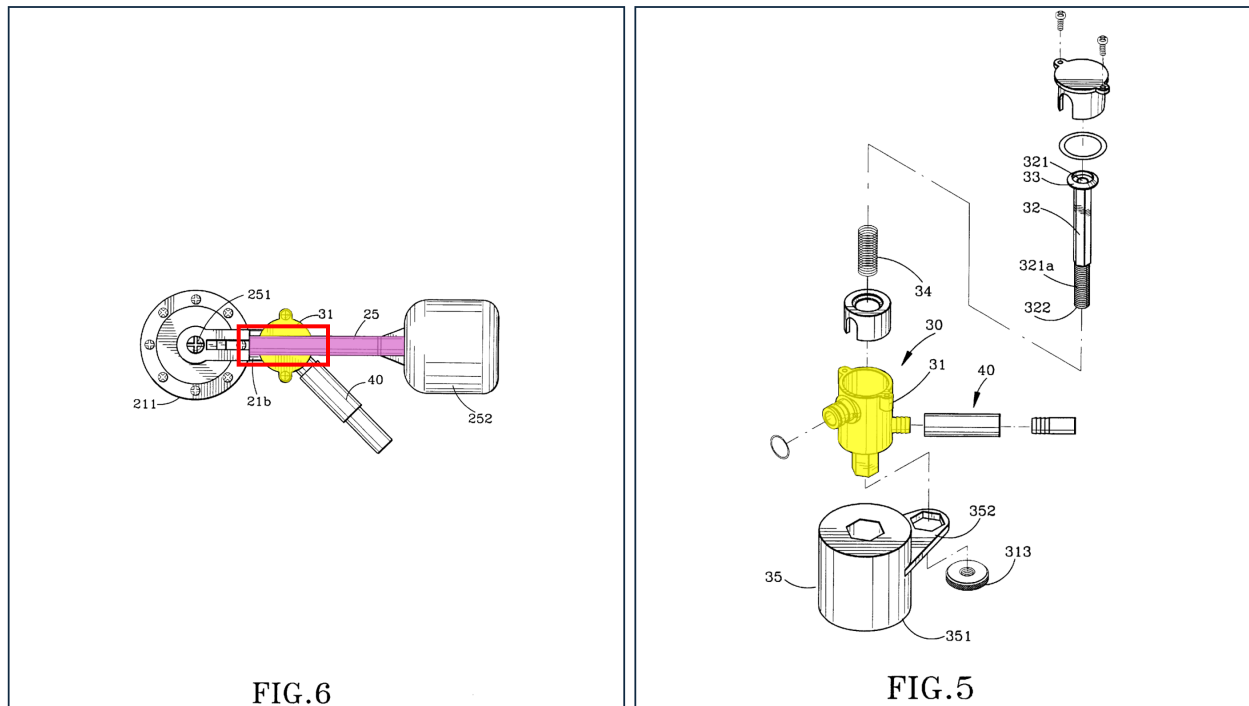


Dr. Cameron attempts to disguise this interference by alleging that the claimed “water flow regulator” *attaches* at point 402 in Figure 1. EX1004, ¶188. This is not so. Petitioner’s prior identification of the claimed “water flow regulator” is consistent with the annotations in Figures 1, 3, and 4, above. Pet., 36; *see also* EX2013, ¶182.



Pet., 36

The Petition’s analysis with respect to Ho is deficient for the same reasons as Guoxin. As depicted below, Ho explicitly discloses both (1) *interference* and (2) *angular alignment* between the structure Petitioner has identified as the claimed “water flow regulator” (yellow) and the identified “translational arm” (pink). Both the interference and angular alignment are depicted in annotated Figures 5-6, below. EX1022, Figs. 5-6. EX2013, ¶183.



The Petition attempts to obfuscate this issue by pointing to a different structure (40) as the “water flow regulator.” Pet., 54. But again, Patent Owner’s annotations (above, left) are consistent with Petitioner’s prior identification of Ho’s alleged “water flow regulator” (above, right). Pet., 36 (citing EX1022, 3:8-13, Figs. 5, 8-11). EX2013, ¶184.

b) Claims 7 and 9

Neither the Petition nor Dr. Cameron cite *any* evidence (including any references to either Guoxin or Ho) in support of their allegation that these limitations are “inherently” disclosed. Pet., 54-55 (citing EX1004, ¶190). Inherency “is a ‘high standard,’ that is ‘carefully circumscribed in the context of obviousness.’ Inherency ‘may not be established by probabilities or possibilities,’ and ‘[t]he mere fact that a

certain thing may result from a given set of circumstances is not sufficient.’ Rather, inherency renders a claimed limitation obvious *only* if the limitation is ‘*necessarily present*,’ or is ‘the natural result of the combination of elements explicitly disclosed by the prior art.’” *Persion Pharm. LLC v. Alvogen Malta Operations LTD.*, 945 F.3d 1184, 1191 (Fed. Cir. 2019) (internal citations omitted) (emphasis added).

During her deposition, however, Dr. Cameron agreed that a pressure head may form downstream from a water flow regulator. EX1008, 188:4-191:8. Given that the claimed “tube” is downstream from the claimed “water flow regulator,” a water flow regulator which increases the flow rate of fluid passing through the regulator *would not* prevent a pressure head from forming in the downstream tube. As such, this limitation is not “necessarily present” and, therefore, is not obvious by virtue of inherency. *Persion Pharm.*, 945 F.3d at 1191.

c) Claims 10 and 11

Petitioner alleges that “Guoxin discloses terminating the flow of the second portion of water when the toilet bowl reaches a certain level.” Pet., 55 (citing EX1016, 2:25-27; EX1004, ¶195). Not so. EX2013, ¶185.

The sole evidence relied on by Petitioner with respect to these limitations consists of citations to Guoxin’s specification. However, Petitioner’s and Dr. Cameron’s citations are deficient and not informative. The cited portions of Guoxin do not relate to the propositions for which they are cited. EX2013, ¶186. When asked

about an exemplary deficient citation to Guoxin at her deposition, Dr. Cameron explained: “I don’t think it’s that complicated. If you don’t understand that, there is more at the [uncited] end of that paragraph as well, and I likely intended to cite to that whole paragraph.” EX2008, 193:18-200:19. Regardless of (1) what Dr. Cameron intended to cite, or (2) whether or not Dr. Cameron thinks it is “that complicated,” the cited language does not reference “terminating, using the toilet fill valve, the flow of the second portion of the water.” 37 C.F.R. § 42.104(b)(5). As a result, Petitioner has failed to show that Claims 10 and 11 are obvious. EX2013, ¶187.

d) Claim 18

Petitioner alleges that Claim 18 “would have been obvious over Guoxin in view of Hall.” Pet., 63-64. However, the Petition does not disclose any motivation to exchange Guoxin’s fluid flow connector with Hall’s. EX2013, ¶188; *see also* § VII.A.2.b), above. The *only* motivation discussed in the Petition comes from the ’993 Patent itself, which, as established herein, *supra*, constitutes impermissible hindsight. Pet., 64 (citing EX1001, Figs. 6A-6C); EX2013, ¶¶189-190; *see also* KSR, 550 U.S. at 421.

e) Claims 19 and 20

Guoxin (alone or in view of Ho) does not disclose or otherwise render obvious Claims 19 and 20. EX2013, ¶¶191-198.

Claims 19 and 20 require “an adjustable water flow regulator” which “is configured to adjust the flow rate of the [second portion of the] water.” The sole evidence relied on with respect to this limitation consists of citations to Guoxin’s specification. However, Dr. Cameron’s citations are deficient and not informative, and the cited portions of Guoxin do not relate to the propositions for which they are cited. EX2013, ¶¶191-192; *see also* EX2008, 193:18-200:19. Regardless of (1) what Dr. Cameron intended to cite, or (2) whether or not Dr. Cameron thinks it is “that complicated,” the cited language does not reference adjusting the *rate* at which water passes through the water flow regulator. EX2013, ¶193. 37 C.F.R. § 42.104(b)(5).

Moreover, the Petition does not actually allege that the prior art discloses an adjustable flow rate. Instead, Petitioner claims that adjusting Guoxin’s T-shaped nut “in turn alters amount of water that can leave the bowl fill restriction before the float valve stops water from entering the water inlet.” Pet., 57 (citing EX1016, 2:25-33; EX1004, ¶203). Specifically, the Petition explains that the water flow regulator disclosed by Guoxin is adjustable to alter the circumstances under which the water flow regulator terminates the flow of water – not the flow *rate* of the water passing through the regulator. EX2013, ¶194.

This interpretation of the Petition is confirmed by reference to Guoxin, which explains that “when the water in the toilet water tank gradually reaches a set level of height (as shown in Figure 2), the lower annular surround 412 will block between

the water inlet and outlet 401 and 402, thus discontinuing the water supply to the toilet through this switching mechanism.” EX1016, p. 005; EX2007, 2:26-39; *see also* Figs. 2-4, EX2013, ¶195.

Simply put, Guoxin discloses a mechanism to adjust when the flow of water through the switching mechanism is discontinued. Increasing the length of the valve stem (by loosening the T-shaped nut) causes the switching mechanism to close earlier in the tank fill cycle. Although this reduces the total *amount* of water that enters the toilet bowl, it does nothing to impact the flow *rate* of the water passing through the switching valve. EX2013, ¶196.

Conversely, decreasing the length of the valve stem (by tightening the T-shaped nut) causes the switching mechanism to close later in the tank fill cycle. Again, this increases the total *amount* of water which enters the toilet bowl but similarly does not have any impact on the flow *rate* of water passing through the switching valve. EX2013, ¶197.

B. Grounds 3 and 4: Brown in view of Ho, in further view of Bjerke, Calmettes, Hall, and/or Kimber

Petitioner has not met their burden to show that the Challenged Claims are invalid with respect to Grounds 3 and 4.

1. The Petition does not articulate a motivation to combine the teachings of the prior art or a reasonable expectation of success in doing so.

In order to find the Challenged Claims obvious, the Petition must demonstrate that a POSITA would have been motivated to combine the teachings of the prior art references to achieve the claimed invention. *Novartis Pharm.*, 923 F.3d at 1059.

a) The Petition does not articulate a motivation to replace Brown’s set screw 26 with Ho’s diverter valve 30.

The Petition argues that “using the bowl fill restriction of Ho *instead of* the bowl fill restriction shown in Brown, would have been obvious to a POSITA as a matter of design preference.” Pet., 65.¹⁰ Petitioner and Dr. Cameron rely on conclusory allegations regarding replacing Brown’s set screw 26 with Ho’s diverter valve 30, arguing that “a POSITA would understand that the valve disclosed in Ho, with a tube directly attached to the valve *could be adapted* for use with Brown.” Pet., 75-76. EX2013, ¶202.

¹⁰ The Petition does not allege that a new valve (combining features of both Ho’s diverter valve 30 and Brown’s set screw 26) would have been obvious. Regardless, a POSITA would not have been motivated to combine the Ho and Brown valves for the reasons discussed herein. EX2013, n.15.

Although the Petition alleges that a POSITA *could* have replaced Brown’s set screw 26 with Ho’s diverter valve 30, it does not explain that a POSITA *would* have been motivated to do so. *InTouch Techs., Inc. v. VGO Commc’ns, Inc.*, 751 F.3d 1327, 1352 (Fed. Cir. 2014) (“concluding that a party’s expert ‘succumbed to hindsight bias in her obviousness analysis’ where such analysis ‘primarily consisted of conclusory references to her belief that one of ordinary skill in the art could combine these references, not that they would have been motivated to do so.’”). Indeed, Petitioner relies on a single conclusory sentence in support of the alleged motivation to combine, stating that a POSITA would be motivated to make the substitution “in order to simplify the operation of the valve and increase the ease with which the valve can be adjusted.” Pet., 76 (citing EX1004, ¶248); *see also* EX2013, ¶203

However, the Petition does not explain how substituting Brown’s set screw 26 with Ho’s diverter valve 30 would “simplify the operation of the valve and increase the ease with which the valve can be adjusted.” Dr. Cameron alleges, without support, that this modification “accomplishes the same flow control function as the Brown valve with the added advantage that the flow adjustment of the Ho

valve can be accomplished with the tube still connected to the valve.” This is not so.
EX2013, ¶204.¹¹

A POSITA would not have replaced Brown’s set screw 26 with Ho’s diverter valve 30, because (1) they serve different flow control functions, (2) Brown explicitly teaches against employing a valve or flow regulator which does not restrict flow rate, and (3) Ho’s diverter valve 30 serves no purpose in the Brown system.
EX2013, ¶¶205-209.

First, Ho’s diverter valve 30 does not “accomplish[] the same flow control function as the Brown valve.” Brown discloses a toilet fill valve which “provide[s] an improved water saving means ... for reducing the amount of water flowing through the overflow pipe into the toilet bowl and thereby eliminate waste of such water.” EX1021, 1:63-70; *see also id.*, 3:64-72. Simply put, Brown accomplishes this by allowing a user to adjust the *rate* at which water flows through set screw 26. EX2013, ¶205. Ho, meanwhile, discloses “a diverter valve unit for directing water from the water supplying pipe to the rim flushing conduit of a toilet bowl.” EX1022,

¹¹ Brown already discloses a toilet fill valve whereby “the metering valve is eliminated,” thus obviating the need for the valve to be adjusted. *See*, EX1021, Fig. 4 and accompanying disclosure.

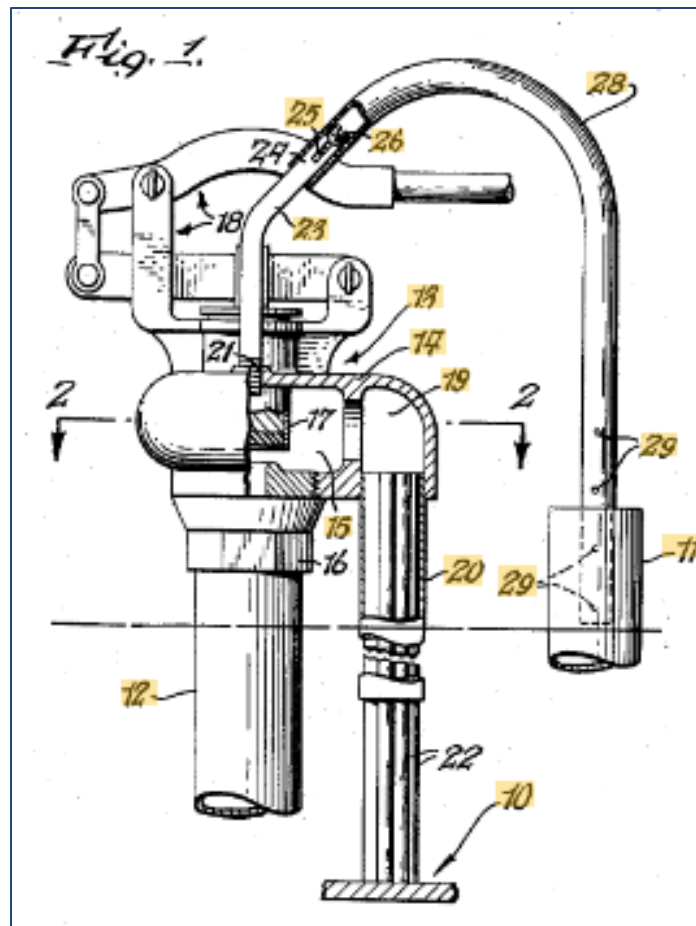
1:6-9. Ho accomplishes this by allowing a user to adjust the *point in time* at which the diverter valve activates, not the *rate* at which water passes through the diverter valve. EX1022, Abstract, 4:24-34; EX2013, ¶206.

Second, Brown explicitly teaches that its water silencing means should not be employed without its flow rate restriction (which is not present in Ho), because such a configuration would “caus[e] further waste of such water, as well as additional noise offsetting the silencing action in the assembly.” EX2013, ¶207; EX1021, 5:18-25.

Third, Brown’s fill valve fills the toilet tank directly. Set screw 26 is not implicated in the process. Ho, conversely, discloses filling the toilet tank via diverter valve 30. Ho’s diverter valve serves to direct water to one of two locations—either the rim of the toilet bowl (not an option in Brown’s system) or the toilet tank (already accomplished in Brown’s system)—but does not impact the rate at which water flows through the overall system. *See, e.g.*, §VII.A.3.e). As such, there is no benefit to substituting Ho’s diverter valve 30 in Brown’s system. If Brown’s set screw 26 were to be replaced with Ho’s diverter valve 30, extra water would enter the toilet tank. This in turn would cause the potential for overfilling and/or wasted water, without providing any appreciable benefit. EX2013, ¶208.

b) The Petition does not articulate a reasonable expectation of success in replacing Brown's set screw 26 with Ho's diverter valve 30.

The Petition also fails to articulate a reasonable expectation of success. EX2013, ¶¶210-211. Brown’s set screw 26 is located between “adapter tube 23” and “flexible tube 28.” Importantly, adapter tube 23 extends vertically from the top of the toilet fill valve. EX1021, Fig. 1; EX2013, ¶212.



EX1021, Fig. 1

According to Brown, this configuration is (in part) to prevent the “substantial amount of turbulence and noise [that] is created because of the irregular internal

surfaces of the assembly, the variations in cross-sectional area through which the water flows, and the *required reversal of direction of flow*.” EX1021, 3:6-19; EX2008, 120:4-122:16; EX2013, ¶213.

Ho’s diverter valve 30, however, extends horizontally from the side of the toilet fill valve, and functions based on gravity. EX1022, 4:10-16. Replacing Brown’s set screw 26 with Ho’s diverter valve 30 in a horizontal configuration would defeat Brown’s stated goals of reducing turbulence and noise caused by reversal of direction of flow. EX2013, ¶214. As such, a POSITA would not have been motivated to make this modification. If, however, Ho’s diverter valve was *substituted* in place of Brown’s set screw 26 without altering the configuration, the diverter valve would not function properly due to not being properly oriented with respect to gravity. EX2013, ¶215.

Importantly, Brown’s set screw 26 is not limited by gravity in the same manner. The Petition is entirely silent regarding each of these fundamental considerations and provides no guidance as to how the proposed combination is intended to operate. Because Ho’s diverter valve 30 will not properly function without the downward force exerted by gravity, a POSITA would not have had a reasonable expectation that Petitioner’s proposed modification would have been successful. EX2013, ¶216.

Additionally, for the reasons discussed in §VII.B.1.a), *supra*, a POSITA would not have had a reasonable expectation of success because Brown explicitly discloses that implementing a water flow regulator that does not mitigate the *rate* at which water flows through the system would not work. EX2013, ¶217.

c) The Petition does not articulate any motivation to combine the Quick Connection Art with Guoxin and/or Ho.

The Petition’s motivation to combine analysis is also deficient with respect to the Quick Connection Art, for the same reasons discussed in Section VII.A.2.b), *supra*. Pet., 86; *see also* EX2013, ¶¶218-219.

d) The Petition does not articulate a motivation to integrally mold the extended portion of Brown’s toilet fill valve with the body of the toilet fill valve as allegedly taught by Ho.

Petitioner and Dr. Cameron make conclusory allegations that a POSITA *could* have integrally molded the extended portion of Brown’s toilet fill valve (as allegedly taught by Ho), but nowhere do they allege that a POSITA *would* have been motivated to do so. Pet., 64-65 (citing EX1004, ¶¶220-223) (“this connection in Ho *can be used* in the system of Brown”); EX2013, ¶220. Petitioner’s analysis is deficient. *InTouch Techs.*, 751 F.3d at 1352.

Later, Petitioner suggests that “more recently developed molding techniques that were not readily available in 1959 when Brown was filed” would lead a POSITA to integrally mold Brown’s extended portion. Pet., 68 (citing EX1004, ¶230).

However, the Petition does not (1) identify what the new molding techniques are, (2) provide any evidence that these techniques were not available in 1959, (3) identify any benefits to the allegedly new molding techniques over those available in 1959, (4) identify any deficiencies in the molding techniques used in 1959, or (5) provide any evidence or analysis at all in support of the conclusory allegation that a POSITA would have been motivated to use Ho's (unidentified) molding techniques to modify Brown's toilet fill valve. EX2013, ¶221; *see also Magnum Oil Tools*, 829 F.3d at 1380.

In fact, Ho does not include any disclosure whatsoever regarding molding techniques. Instead, Ho merely includes a figure that Petitioner alleges discloses the claimed integral molding. In short, the Petition relies solely on conclusory allegations in support of the alleged motivation to combine. Petitioner has failed to provide a single motivation to integrally mold the extended portion of Brown's toilet fill valve with the body of the toilet fill valve as allegedly taught by Ho. EX2013, ¶222.

2. The Petition is internally inconsistent and fails to identify a single “water flow regulator” which discloses each limitation.

The '993 Patent contains several limitations that are directed to or otherwise reference the claimed “water flow regulator.” The Petition, however, inconsistently

refers to both Brown’s “set screw 26” and Ho’s “diverter valve 30” as the claimed water flow regulator. EX2013, ¶223.

a) Limitation 1[D4]

With respect to limitation 1[D4], the Petition relies *solely* on Brown’s “set screw 26” as disclosing the claimed water flow regulator. Pet., 73-74. EX2013, ¶224.¹²

b) Limitation 1[E]

Conversely, with respect to limitation 1[E], the Petition alleges that “[t]o the extent it is argued that tube 28 is not directly attached to the water flow regulator of Brown, then Ho discloses a diverter valve 30 (water flow regulator) with a supply line 40 (tube) attached directly to the valve in order to direct a portion of water from the valve to the toilet tank overflow tube.” Pet., 75; EX2013, ¶225.

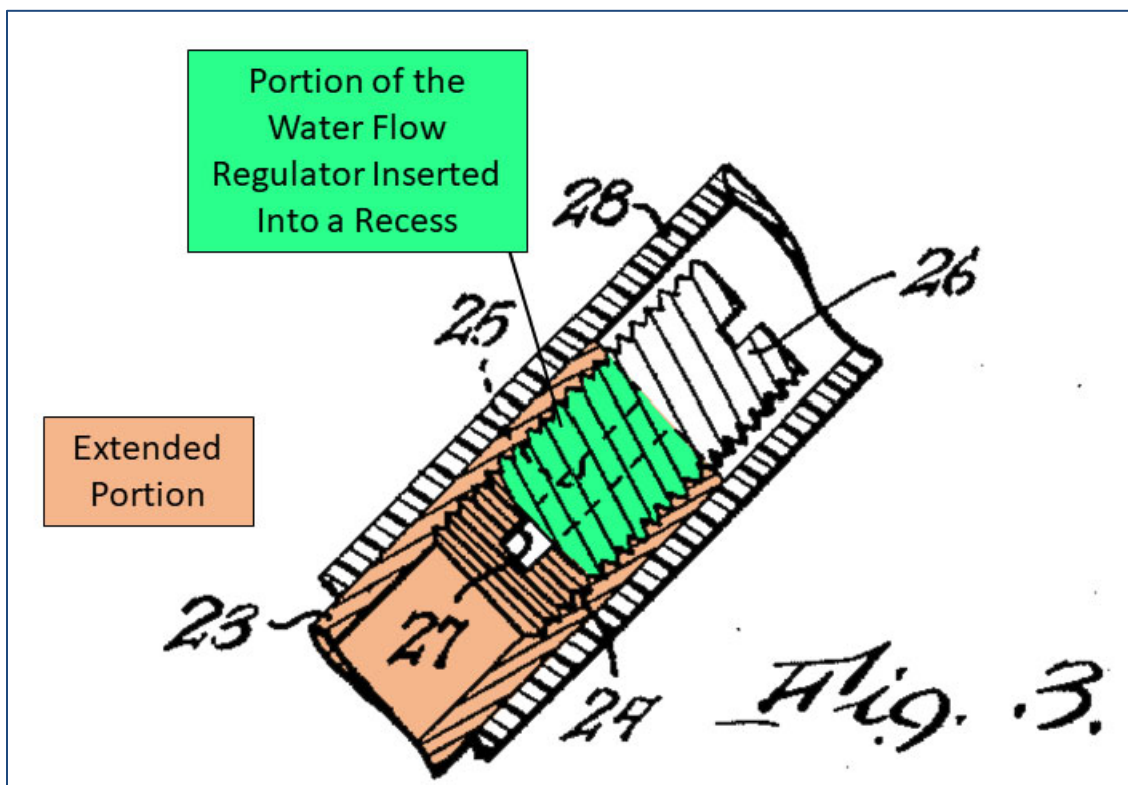
Brown does not disclose limitation 1[E]. As such, the only structure that allegedly renders limitation 1[E] obvious is Ho’s diverter valve 30. EX2013, ¶226.

(1) Brown does not disclose “a tube that is configured to attach directly to the water flow regulator.”

¹² The Petition also relies solely on Brown’s “set screw 26” as disclosing the claimed water flow regulator with respect to limitations 1[D1] and 1[D2]. Pet., 70-72.

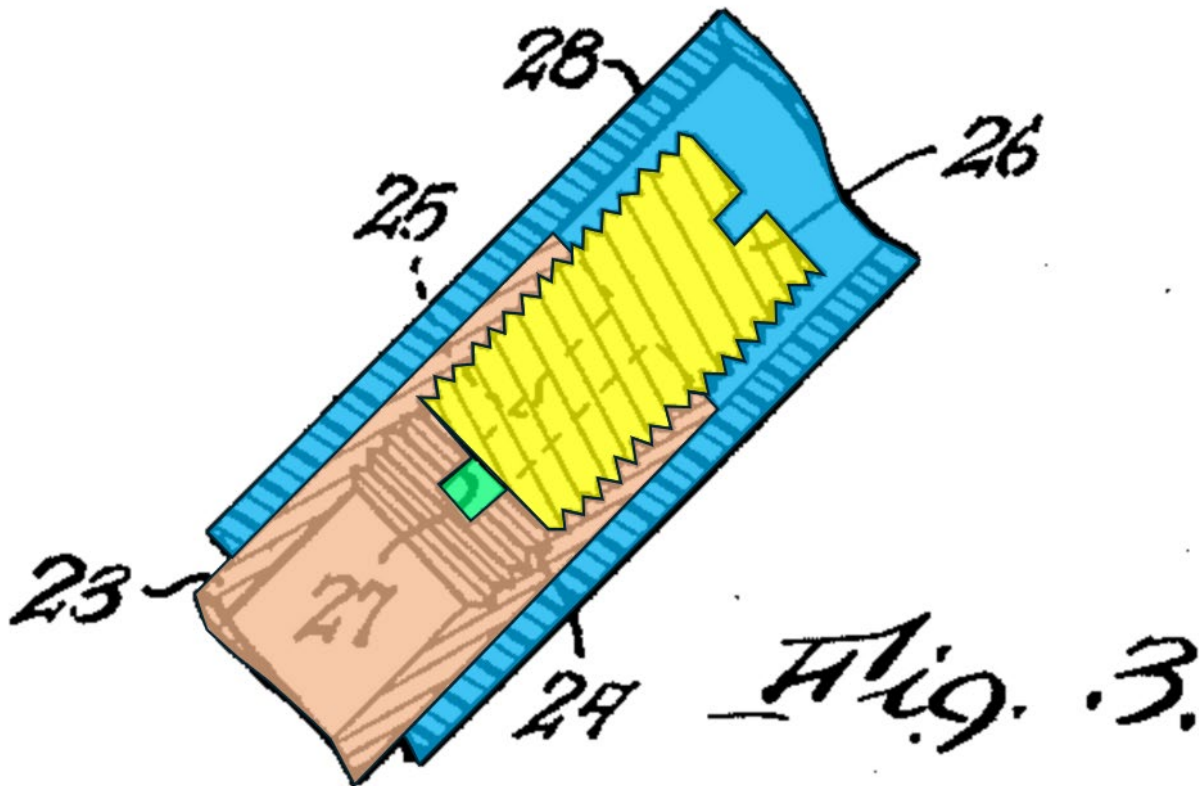
The Petition alleges that Brown discloses “a tube attached directly to the water flow regulator to the portion of the adaptor tube 23 that forms the metering valve and houses set screw 26.” Pet., 74. This is incorrect. EX2013, ¶227.

The Petition and Dr. Cameron clearly identify the claimed “water flow regulator” as Brown’s “set screw 26” and the claimed “extended portion” of the toilet fill valve as Brown’s “adapter tube 23.” Pet., 71-72; EX1004, ¶¶238-240; *see also* EX1008, 200:20-201:22. EX2013, ¶¶228-229.



Pet., 72-72

The alleged water flow regulator (set screw 26, yellow), extended portion (adaptor tube 23, brown), and “tube that is configured to attach directly to the water flow regulator” (tube 28, blue) are reproduced below.



As is apparent from the annotated figure, tube 28 *does not* attach directly to the water flow regulator (set screw 26). Instead, it attaches directly to the alleged extended portion (adaptor tube 23). EX2013, ¶¶230-231. Brown does not disclose or otherwise render obvious limitation 1[E].

- (2) The Petition advocates replacing Brown’s set screw 26 with Ho’s diverter valve 30.

Apparently (and correctly) recognizing that Brown does not disclose limitation 1[E], the Petition alternatively argues that “a POSITA would understand that the valve disclosed in Ho, with a tube directly attached to the valve could be adapted for use with Brown. A POSITA would be motivated to use the Ho valve, in order to simplify the operation of the valve and increase the ease with which the valve can be adjusted.” Pet., 75-76 (citing EX1022, 3:6-11, Fig. 2). Similarly, the Petition argues that “using the bowl fill restriction of Ho *instead of* the bowl fill restriction shown in Brown, would have been obvious to a POSITA as a matter of design preference.” Pet., 65. In short, the Petition relies on *replacing* Brown’s set screw 26 with Ho’s diverter valve 30 in order to render limitation 1[E] obvious. EX2013, ¶¶232-234.

c) Replacing Brown’s set screw 26 with Ho’s diverter valve 30 renders the Petition’s analysis with respect to at least limitations 1[D1], 1[D2], and 1[D4] deficient.

The Petition does not provide any analysis regarding how limitations 1[D1], 1[D2], and 1[D4] are allegedly disclosed or otherwise rendered obvious by Ho’s diverter valve 30. As such, the Petition is deficient because it relies on one structure (Brown’s set screw 26) to disclose the “water flow regulator” claimed by limitations 1[D1], 1[D2], and 1[D4], and an entirely different structure (Ho’s diverter valve 30)

to disclose *the same* “water flow regulator” claimed by limitation 1[E]. EX2013, ¶235.¹³

3. The Petition does not disclose the Integrally Molded Limitations.

Neither Brown nor Ho (individually or in combination) disclose the Integrally Molded Limitations as construed by the Board. Paper 19 at 14-15; EX2013, ¶¶241-243.¹⁴ First, Petitioner, Dr. Cameron, and the Board agree that Brown does not disclose these limitations under the construction adopted by the Board. Pet., 68; Paper 19, 28 n. 13; EX2008, 160:19-162:7. EX2013, ¶244. Second, for the reasons set forth in Section VII.A.1.b)(2), above, the Petition fails to allege that Ho discloses the Integrally Molded Limitations. EX2013, ¶245.

¹³ The Petition also improperly relies on both Brown’s “set screw 26” and Ho’s “diverter valve 30” as the claimed “water flow regulator” with respect to separate limitations of both Claims 8 and 14. Therefore, Petitioner’s analysis is deficient. EX2013, ¶¶236-240.

¹⁴ The following analysis is focused on limitation 1[A]. Pet., 68 (citing EX1004, ¶¶229-231). However, the same analysis applies to limitations 8[C2] (Pet., 78 (citing EX1004, ¶258)) and 14[A2] (Pet., 80 (citing EX1004, ¶275)). EX2013, ¶246.

4. The Petition is deficient with respect to certain dependent claims.

a) Claim 2

Neither Brown alone, nor Brown in view of Ho, discloses or otherwise renders obvious “wherein the extended portion of the body extends radially from a longitudinal axis of the toilet fill valve.” EX2013, ¶¶247-248.

The Petition concedes that Brown does not disclose Claim 2. Pet., 81 (“Brown does not disclose its extended portion extending radially”). Recognizing this, the Petition argues “that feature is disclosed clearly by Ho” because “a POSITA would have readily molded the extended portion to extend radially from the longitudinal axis of the toilet fill valve to more readily facilitate the connection with the water flow regulator.” Pet., 81-82 (citing EX1004, ¶284). EX2013, ¶¶249-250.

Petitioner also argues that “such an arrangement ... allows for flexibility in order to create a more compact toilet fill valve.” Pet., 81-82 (citing EX1004, ¶284). Paragraph 284 of Dr. Cameron’s declaration repeats these allegations nearly verbatim. But, as discussed in Section VII.B.1.a), above, a POSITA would not have been motivated to make the proposed modification, nor does the Petition include any analysis regarding why a POSITA would be motivated to move from a vertical extended portion to a radial extended portion. Indeed, a radial extended portion is directly counter to the stated goals of Brown (*e.g.*, reducing noise caused by

turbulence), at least insofar as it introduces another sudden directional change into the fluid flow system. EX2013, ¶251.

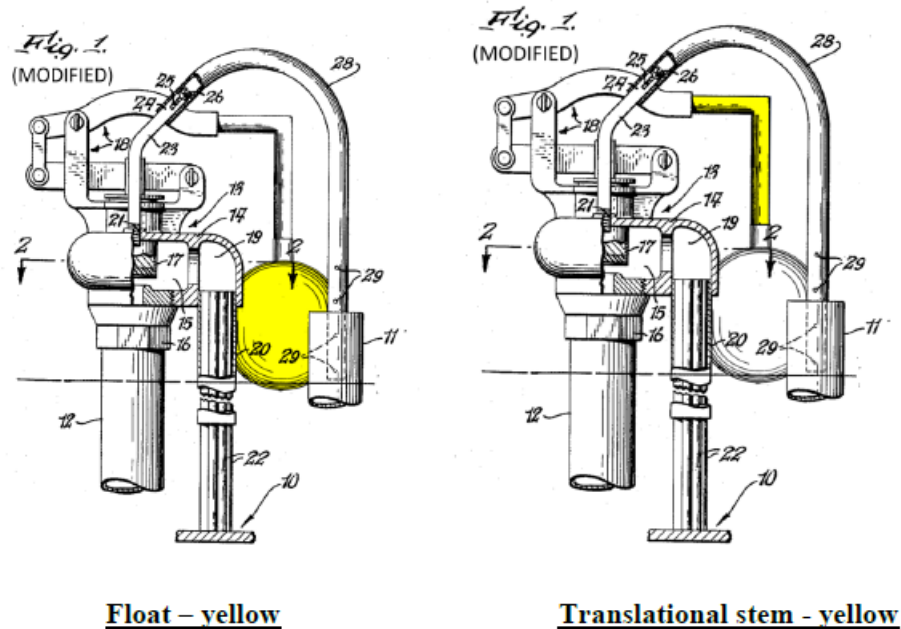
b) Claim 5

A POSITA would have reasonably understood the term “bowl fill valve” in claim 5 to refer to the “water flow regulator” of claim 1. EX1004, ¶188 n. 1; EX2008, 191:15-193:3; EX2013, ¶252.

The Petition alleges that Claim 5 “would have been intuitively obvious to a POSITA” who “would not seek to design a toilet fill valve with a conventional float attached to a translational arm that was obstructed in some manner from freely translating.” Pet., 82-83. Despite the Petition’s unsupported conclusions regarding what a POSITA would—or would not—seek to design, neither Brown nor Ho disclose this limitation. EX2013, ¶253.¹⁵

¹⁵ Although the Petition alleges that “[t]he features recited by claim 5 are disclosed and illustrated in ... Ho,” it does not articulate a sufficient motivation to combine Ho’s “actuating arm,” “water flow regulator,” “translation stem,” or “float” with Brown’s toilet fill valve, nor does it articulate a reasonable expectation of success in doing so. Pet., 82. EX2013, n.19.

With respect to Brown, the Petition merely refers to Figures 1 and 2 but does not provide any analysis of where or how this limitation is allegedly disclosed. For this reason alone, the Petition is deficient. Pet., 82-83. EX2013, ¶254. Petitioner's annotated Figure 1 is reproduced below:



Pet., 82

Importantly, neither the Petition nor Dr. Cameron's declaration identify Brown's claimed "actuating arm" and "translational stem." Moreover, neither the Petition nor Dr. Cameron provide any analysis whatsoever regarding where or how the "actuating arm" is "angularly offset relative to the bowl fill valve." In fact, Brown's set screw 26 extends vertically from the toilet fill valve, and therefore is not "angularly offset" relative to an unidentified actuating arm. EX2013, ¶255.

Finally, analysis of interference (or lack thereof) between Brown’s alleged “actuating arm” and “set screw 26” is irrelevant because the Petition replaced “set screw 26” with Ho’s diverter valve 30 in limitation 1[E]. EX2013, ¶256.

The Petition’s conclusory analysis with respect to Ho is deficient for the same reasons set forth in Ground 1, *supra*. EX2013, ¶¶257-259; *see also* EX1022, Figs. 5-6; Section VII.A.3.a).

c) Claims 7 and 9

Claims 7 and 9 are not obvious for the same reasons as set forth in Ground 1. Pet., 83-84 (citing EX1004, ¶¶288-290); *see also* Section VII.A.3.b), *supra*.

d) Claim 13

The Petition alleges that “Dependent claims 12 and 13 are obvious over Brown alone or Brown in view of Ho for the same reasons discussed above with respect to elements 1[A] and 8[C2] and claim 2 above.” Pet., 85. Petitioner’s position is wrong for the reasons set forth in Section VII.B.4.a), *supra*. EX2013, ¶260.

e) Claim 15

The Petition alleges that Brown’s “set screw 26” discloses this limitation. Pet., 85. However, Petitioner previously argued that “a POSITA would understand that the valve disclosed in Ho, with a tube directly attached to the valve could be adapted for use with Brown. A POSITA would be motivated to use the Ho valve, in order to simplify the operation of the valve and increase the ease with which the valve can

be adjusted.” Pet., 75-76; *see also* EX2013, ¶¶261-263. Because the Petition, in fact, *replaced* Brown’s “set screw 26” with Ho’s “diverter valve 30” in order to (allegedly) render limitation 14[B] obvious, it cannot now point to Brown’s “set screw 26” as disclosing Claim 15. EX2013, ¶264.

f) Claim 18

Petitioner alleges that Claim 18 “would have been obvious over Brown in view of Hall.” Pet., 88. However, the Petition does not disclose any motivation to exchange Brown’s fluid flow connector with Hall’s. Section VII.B.1.c). In fact, the *only* motivation discussed in the Petition comes from the ’993 Patent itself, which exercises constitute impermissible hindsight. Pet., 88; *see also KSR*, 550 U.S. at 421. EX2013, ¶¶265-267.

g) Claims 19 and 20

First, as discussed above, the Petition *replaced* Brown’s “set screw 26” with Ho’s “diverter valve 30.” Section VII.B.2.b)(2). As such, Petitioner cannot now point to Brown’s “set screw 26” as disclosing Claims 19 and 20. EX2013, ¶¶268-270.

Second, as discussed in Section VII.A.3.e), *supra*, Ho does not disclose the claimed adjustable water flow regulator that is configured to adjust the flow rate of the second portion of the water.

C. Ground 5: Schuster

Alternatively, Petitioner alleges the '993 Patent is not entitled to its earliest priority date and, as a result, a parent application of the '993 Patent (Schuster) is allegedly anticipatory prior art. Pet., 89. Specifically, Petitioner alleges that “water flow regulator” is unsupported by the earliest application to which the '993 Patent claims priority. *Id.* Petitioner’s argument is unsupported by the facts and contrary to controlling authority.

Patent Owner’s priority claim satisfies the requirements for a proper claim, namely, co-pendency and a disclosure that supports the claims. Petitioner does not challenge the co-pendency requirement. Rather, Petitioner attempts to challenge the disclosure requirement by obscuring the law—only citing cases referencing very limited (and inapplicable) exceptions to a general rule.

1. The Challenged Claims are entitled to a priority date of March 11, 2004.

The Challenged Claims were fully supported as of the filing date of at least the '606 Application that matured into the '889 Patent on March 11, 2004.

To satisfy the written description requirement, an application must describe the claimed invention in sufficient detail such that one skilled in the art can reasonably conclude that the inventor had possession of the claimed invention at the time of filing. *Reiffin v. Microsoft Corp.*, 214 F.3d 1342, 1345 (Fed. Cir. 2000). “The

function of the written description requirement is to ensure that the inventor had possession of the specific subject matter later claimed as of the filing date of the application relied on; how the specification accomplishes this is not material.” *In re Herschler*, 591 F.2d 693, 700 (CCPA 1979).

With respect to the term “water flow regulator,” the ’606 Application discloses a “bowl fill valve” with a “bowl fill valve inlet 113” that is “operatively coupled to the water inlet 103.” EX1001, 2:10-16; EX1012, p. 047, ¶[0008]. “In this respect, when the toilet fill valve 100 is open and water flows from the water inlet 103 to the water outlets 106 and into a toilet tank, an amount of water is also supplied to the bowl fill valve inlet 113 that flows through the bowl fill valve 109 and out the bowl fill valve outlet 116.” EX1001, 2:28-39; EX1012, p. 047, ¶[0008]. The ’606 Application continues, “the *flow* of *water* through the bowl fill valve 109 is *regulated*. In this manner, the flow of water is *regulated so that enough water flows out of the bowl fill valve 109 to fill a toilet bowl without wasting any water down a drain*.” EX1001, 2:28-39; EX1012, p. 047, ¶[0008]. Thus, the ’606 Application clearly discloses *regulating* an amount of water supplied to a toilet bowl using a valve to avoid water loss or, in other words, a water flow regulator that regulates the flow of water such that “enough water flows out of the bowl fill valve 109 to fill a toilet bowl.” *Id.*; EX2013, ¶288.

Petitioner overlooks the “general rule that disclosure of a species provides sufficient written description support for a later filed claim directed to the genus.” *Bilstad v. Wakalopulos*, 386 F.3d 1116, 1125 (Fed. Cir. 2004). Indeed, “[t]here is no categorical rule that a species cannot suffice to claim the genus.” *Hynix Semiconductor Inc. v. Rambus Inc.*, 645 F.3d 1336, 1352 (Fed. Cir. 2011). The court in *Bilstad* explicitly identified at least two of Petitioner’s cases as *exceptions* to that rule and explained their *limited* applicability. *Bilstad*, 386 F.3d at 1125.

Here, the claimed genus (“water flow regulator”) is supported by the disclosure of a particular species (*i.e.*, numerous examples of “bowl fill valves”). Patent Owner noted, in the prosecution history, that “the bowl fill valve 109 may be molded as a portion of the toilet fill valve 100... Thus, at least this portion of the specification describes a toilet fill valve, which is one example (among others) of a water flow regulator, as being clamped into place.” EX1002, 36. Notably, the Examiner came to this same conclusion during prosecution of the ’424 Application, ultimately agreeing that claims 4 and 17, both of which included the term “water flow regulator” were sufficiently disclosed in the ’424 Application.

a) A POSITA would have understood that the patentee was in possession of a “water flow regulator” as of the filing of the ’606 Application.

Petitioner contends that a “POSITA would not have understood the ’904 application inventors to have had possession at the time of its filing, of a fluid flow

restriction mechanism other than the disclosed valves.” Paper 1 at 91.¹⁶ The record shows, however, that the members of the genus (water flow regulators) are predictable as both restrictors and valves were known. “In the mechanical world—a fairly predictable field—it is wholly conceivable” that disclosure of a species “may convey to one skilled in the art” that the inventors had possession of the genus. *Bilstad*, 386 F.3d at 1126 (internal citation omitted). Even Petitioner and its expert acknowledge that regulators, restrictors, and valves were well known in the art at the time of the invention. EX1004, 24 (“toilet fill valves with various mechanisms to control the flow of water to the toilet bowl during a flush cycle were well known in the art.”).

In this regard, “unpredictability in the particular field may warrant closer scrutiny of whether disclosure of a species is sufficient to describe a genus.” *Bilstad*, 386 F.3d. at 1125. According to *Bilstad*, it is important to consider “[i]f the

¹⁶ At various points, Petitioner and Dr. Cameron refer to the disclosure of the ’904 Application. However, the ’993 Patent is entitled to its earliest priority date (March 11, 2004). To that end, Patent Owner refers to the disclosure of the ’606 Application. The referenced disclosure is also present in each intervening application.

difference between members of the group is such that the person skilled in the art would not readily discern that other members of the genus would perform similarly to the disclosed members, i.e., if the art is unpredictable, then disclosure of more species is necessary to adequately show possession of the entire genus.” *Id.*

Here, the ’993 Patent is in the predictable “mechanical world” like the claims at issue in *Bilstad*. Petitioner admits that “fluid flow restrictors or diverters were well-known.” Paper 1, 19. Given the known regulators, restrictions, and valves at the time of the ’606 Application which similarly regulate an amount/flow of water, the reasonable conclusion is that a single species is adequate support for a genus claim. EX2013, ¶¶280-287.

In re Smythe, 480 F.2d 1376, 1383 (C.C.P.A. 1973), held that a disclosure of an invention involving air was sufficient written description support for a claim requiring a fluid, even though various fluids can have properties very different from air. The Court determined that, in context of the invention, fluids and air accomplished a common function. Similarly, here, the disclosure of a “bowl fill valve” is sufficient written description support for a broader “water flow regulator” as they accomplish a common function, and both were known in the art.

In *Lampi Corp. v. Am. Power Prods.*, 228 F.3d 1365 (Fed. Cir. 2000), the court held that it was significant that species disclosure was “only a preferred embodiment” and referred to the “familiar principle of patent law that a claim need

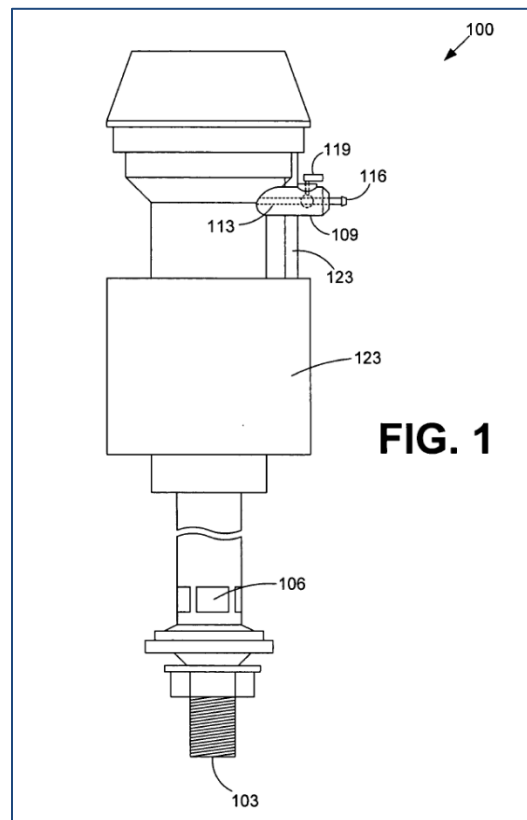
not be limited to a preferred embodiment” when finding that the broader claims were adequately supported. *Lampi Corp.*, 228 F.3d at 1378. In the ’993 Patent, the “bowl fill valve” is described as merely one embodiment and, as such, *Lampi* counsels in favor of a similar conclusion here that Patent Owner’s applications are not limited to a bowl fill valve and only a bowl fill valve.

Like the cases described above, the water flow regulator genus of the challenged claims was adequately supported by the written description of each of the priority documents showing a bowl fill valve for regulating a flow rate of water, which was understandable and predictable based on those disclosures in view of the state of the art showing various types of regulators, valves, and restrictions, and was possessed by the inventors at the time of the priority filing dates that encompass the water flow regulator at issue. EX2013, ¶¶280-287.

Additionally, the ’606 Application identifies numerous types of “valves” which would have been considered by a POSITA. EX1012, p. 048, ¶[0012]. EX2013, ¶289. One example of a “valve” which would have been “appreciated by those with ordinary skill in the art” is a flow control valve. EX2009. Despite being commonly considered a “valve,” flow control valves are static (i.e., non-adjustable) devices which restrict the flow rate through the device. *Id.* As such, a POSITA would have understood the ’606 Application to disclose both adjustable and non-adjustable flow control structures. EX2013, ¶290.

The specification makes clear that the patentee had possession of a non-adjustable flow control device (such as a restrictor) at the time of filing, explaining that any “adjustment” of the fill valve occurs during the installation process. EX1012, [0017]; EX1001, 4:10-29. Once the correct flow rate is determined, the “valve” is not adjusted further. A POSITA would have understood that a fixed restrictor would have performed the same function once the appropriate size restrictor was determined. EX2008, 144:13-146:10; EX2013, ¶¶291-292. Thus, while the adjustable valves claimed by ’606 Application provide a benefit (making it easier to determine the correct flow rate), a POSITA reading the ’606 Application would have understood the patentee to also be in possession of non-adjustable flow control devices such as restrictors.

This position is confirmed by reference to the figures filed with the ’606 Application. Importantly, both bowl fill valve inlet 113 and bowl fill valve outlet 116 depict fixed restrictors, at least to the extent that they comprise devices with a reduced diameter relative to water inlet 103. As such, both bowl fill valve inlet 113 and bowl fill valve outlet 116 reduce the flow rate of any water passing through them. EX2013, ¶293.



EX1012, p. 056

Indeed, Brown itself (which was cited during the prosecution history of the '606 Application; EX1012, p. 035), discloses that use of a fixed restrictor as an alternative for an adjustable valve would have been known to both a POSITA. EX1021, 4:26-34. Petitioner likewise agrees that “[i]n addition to valves, other mechanisms for controlling water flow [such as restrictors or diverters] were also well-known.” Pet., 19. EX2013, ¶294.

As demonstrated above, the '993 Patent is entitled to its earliest priority date of March 11, 2004. As a result, Schuster—published on January 31, 2012—is not prior art to the '993 Patent.

b) Claims 19 and 20 of the '993 Patent are separately entitled to a 2004 priority date.

Priority is established on a claim-by-claim basis. *In re Downing*, 754 F. App'x 988, 994 (Fed. Cir. 2018) (“*each claim limitation* must be supported by the originally filed specification”). Both Claims 19 and 20 recite “an adjustable water flow regulator,” not any sort of fixed restriction. EX1001, Cls. 19, 20. The Petition concedes that the '904 Application provides written description support for an adjustable water flow regulator (*i.e.*, a bowl fill valve). Pet., 91 (“Indeed, the '904 application specification makes it clear that the adjustability of the bowl fill valve is a desirable and essential feature of the invention”); Likewise, the '606 Application also provides written description support for an adjustable water flow regulator. EX1012, p. 048, ¶[0013]; EX2013, ¶¶295-296.

As such, there is no dispute that a POSITA would have understood both the '606 and '904 Applications to provide written description support for Claims 19 and 20. Claims 19 and 20 are entitled to a priority date of March 11, 2004. Under the correct priority date, Schuster is not prior art to Claims 19 and 20. EX2013, ¶297.

2. Petitioner's anticipation arguments are deficient.

a) Petitioner improperly combines multiple embodiments.

“In order to anticipate the claimed invention, a prior art reference must disclose all elements of the claim within the four corners of the document, and it

must disclose those elements arranged as in the claim.” *Microsoft Corp. v. Biscotti, Inc.*, 878 F.3d 1052, 1068 (Fed. Cir. 2017) (cleaned up).

The Petition cites lines 1:63-65 of Schuster as allegedly anticipating limitation 1[B]. EX1029, 1:62-67 (referring to “toilet fill valve 100 according to *an embodiment* of the present invention”); EX2013, ¶298. The Petition also alleges that limitation 1[A] is disclosed by Figure 4. Pet., 94; *see also* EX1029, 4:49-50 (referring to Figure 4 as disclosing “toilet fill valve 200 according to *another embodiment* of the present invention.”). Petitioner combines two distinct embodiments (i.e., the Figure 1 and Figure 4 embodiments) which respectively refer to two distinct toilet fill valves (i.e., toilet fill valve 100 and toilet fill valve 200). EX2013, ¶¶299-300. As such, the cited portions of Schuster does not “disclose those elements arranged as in the claim.” *Microsoft Corp.*, 878 F.3d at 1068.

Moreover, the Petition fails to provide any indication that a POSITA, reading the reference, would at once envisage the claimed arrangement or combination. *Id.* As such, the Petition fails to allege anticipation by Schuster.

b) The cited portions of Schuster do not disclose “wherein the extended portion is integrally molded with the body” (Claims 1 and 14) / “wherein the extended portion is integrally molded with the toilet fill valve” (Claim 8).

Petitioner’s sole allegation that Schuster discloses limitation 1[A] is a single conclusory sentence: “Schuster discloses a toilet fill valve having an extended

portion 206 that is integrally molded with the water toilet fill valve, as shown in Figure 4 above. Schuster thus satisfies this element.” Pet., 94 (citing EX1004, ¶336). Dr. Cameron’s declaration merely recites this statement verbatim without additional analysis. Neither the Petition nor Dr. Cameron’s declaration include any annotations of Figure 4.

Figure 4, however, does not include any indication regarding whether bowl fill outlet port 206 is, or is not, integrally molded with body 209 of toilet fill valve 200. EX2013, ¶¶301-304. Importantly, Figure 4 merely discloses different components, without indicating how those components are connected. The Petition does not reference the corresponding specification, which is likewise silent as to relationship between bowl fill outlet port 206 and body 209. *Id.*

The Petition does not add any additional detail with respect to limitations 8[C2] or 14[A2]. Pet., 97-98.

VIII. CONCLUSION

For at least the reasons discussed above, the Petition fails to establish that the Challenged Claims are invalid.

Dated: December 4, 2024

Respectfully submitted,

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CERTIFICATE OF SERVICE

In accordance with 37 C.F.R. § 42.6(e), the undersigned certifies that on December 4, 2024, a complete and entire copy of the foregoing Patent Owner's Response, including the exhibits relied upon, was served on counsel of record for Petitioners, as follows:

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CERTIFICATE OF WORD COUNT

Pursuant to 37 C.F.R. § 42.24(d), the undersigned certifies that the foregoing Patent Owner's Preliminary Response, excluding the portions exempted under 37 C.F.R. § 42.24(b), contains 13,952 words according to Microsoft Word's word count feature.

Dated: December 4, 2024

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