

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

FLUIDMASTER, INC.

Petitioner

v.

DANCO, INC.
Patent Owner

Case IPR2024-00634
Patent 9,103,105 B2

PETITION FOR INTER PARTES REVIEW UNDER 37 C.F.R. §42.100

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List of Exhibits

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

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

'105 Patent Claim Elements

Element Designation	Claim Element
1[Pre]	A system, comprising:
1[A]	a toilet fill valve that comprises: a body comprising an extended portion, wherein the extended portion is integrally molded with the body, wherein the extended portion forms a bowl fill outlet port;
1[B]	a water inlet configured to receive water from a water source; and
1[C]	a tank water outlet configured to provide a first portion of the water to a toilet tank during at least a portion of a flush cycle;
1[D1]	a bowl fill restriction configured to attach directly to the extended portion of the body
1[D2]	wherein the bowl fill restriction comprises a protrusion that is configured to insert into a recess in the toilet fill valve to lock the bowl fill restriction to the extended portion of the body
1[D3]	wherein the bowl fill restriction is configured to receive a second portion of the water from the bowl fill outlet port during at least a portion of the flush cycle
1[D4]	wherein the restriction is configured to constrict a flow rate of the second portion of the water that flows through the bowl fill restriction; and
1[E]	a tube that is configured to attach directly to the bowl fill restriction, wherein the tube is configured to direct the second portion of the water from the bowl fill restriction directly to a toilet tank overflow tube.
2	The system of claim 1, wherein the extended portion of the body extends radially from a longitudinal axis of the toilet fill valve.
3	The system of claim 1, wherein a portion of the bowl fill restriction is configured to insert into the extended portion of the body.
4	The system of claim 1, wherein the bowl fill restriction is configured to be clamped to the extended portion of the body.
5	The system of claim 1, wherein the bowl fill restriction is configured to be snapped onto the extended portion of the body.

6[A]	The system of claim 1, wherein the toilet fill valve further comprises: a float; and
6[B]	an actuating arm coupled to the float, wherein the actuating arm extends radially relative to a longitudinal axis of the toilet fill valve, wherein the actuating arm is angularly offset relative to the bowl fill valve, thereby preventing an interference with the bowl fill restriction and a translational stem that extends from the float to a free end of the actuating arm.
7	The system of claim 1, wherein the bowl fill restriction further comprises a nipple that is configured to insert into the tube.
8	The system of claim 1, wherein the bowl fill restriction being attached directly to the extended portion of the body prevents a pressure head from being formed in the tube.
9[Pre]	A method, comprising:
9[A]	receiving, via a water inlet of a toilet fill valve, water from a water supply;
9[B]	providing, via a tank water outlet of the toilet fill valve, a first portion of the water to a toilet tank;
9[C1]	providing, via a bowl fill outlet port of the toilet fill valve, a second portion of the water to a bowl fill restriction, wherein an extended portion of the toilet fill valve forms the bowl fill outlet port,
9[C2]	wherein the extended portion is integrally molded with the toilet fill valve,
9[C3]	wherein the bowl fill restriction is in direct contact with the extended portion of the toilet fill valve,
9[C4]	wherein the bowl fill restriction is constructed as a single piece,
9[C5]	wherein the bowl fill restriction causes a flow of the second portion of the water to be constricted;
9[D]	providing, via the bowl fill restriction, the second portion of the water to a tube that is in direct contact with the bowl fill restriction; and providing, via the tube, the second portion of the water to a toilet tank overflow tube.

10	The method of claim 9, wherein the bowl fill restriction being in direct contact with the extended portion of the toilet fill valve prevents a pressure head from being formed in the tube.
11	The method of claim 9, further comprising terminating, using the toilet fill valve, the flow of the second portion of the water so that a water level in a toilet bowl is at a predefined level.
12	The method of claim 11, wherein the water level is determined at least in part by the bowl fill restriction.
13	The method of claim 9, wherein the extended portion of the toilet fill valve is a portion of a body of the toilet fill valve.
14	The method of claim 9, wherein the extended portion of the toilet fill valve extends radially from a longitudinal axis of the toilet fill valve.
15[Pre]	A method, comprising:
15[A1]	attaching a bowl fill restriction directly to an extended portion of a body of a toilet fill valve, wherein the extended portion is integrally molded with the body,
15[A2]	wherein the extended portion forms a bowl fill outlet port, wherein the bowl fill restriction is configured to constrict a flow rate of water that flows out of the bowl fill outlet port;
15[B]	inserting a protrusion of the bowl fill restriction into a recess in the toilet fill valve to lock the bowl fill restriction to the extended portion of the body; and
15[C]	attaching a tube directly to the bowl fill restriction, wherein the tube is configured to direct the water from the bowl fill restriction directly to a toilet tank overflow tube.
16	The method of claim 15, further comprising preventing the bowl fill restriction from detaching from the extended portion of the body.
17	The method of claim 16, wherein preventing the bowl fill restriction from detaching from the extended portion further comprises clamping the bowl fill restriction to the extended portion.
18	The method of claim 16, wherein preventing the bowl fill restriction from detaching from the extended portion further

	comprises snapping the bowl fill restriction to the extended portion.
19	The method of claim 16, wherein preventing the bowl fill restriction from detaching from the extended portion further comprises rotating the bowl fill restriction with respect to the extended portion.
20	The method of claim 15, wherein attaching a bowl fill restriction directly to the extended portion of the body of the toilet fill valve further comprises inserting a portion of the bowl fill restriction into the extended portion of the body.
21	The system of claim 1, wherein the bowl fill restriction is constructed of a single piece.
22	The method of claim 9, wherein the bowl fill restriction comprises a protrusion that is configured to insert into a recess in the toilet fill valve to lock the bowl fill restriction to the extended portion of the toilet fill valve.
23	The method of claim 15, wherein the bowl fill restriction is constructed of a single piece.
24 [Pre]	A system, comprising:
24 [A]	a toilet fill valve that comprises: a body comprising an extended portion that forms a bowl fill outlet port, wherein the extended portion is integrally molded with the body;
24[B]	a water inlet configured to receive water from a water source; and
24[C]	a tank water outlet configured to provide a first portion of the water to a toilet tank during at least a portion of a flush cycle;
24[D1]	a bowl fill restriction configured to attach directly to the extended portion of the body of the toilet fill valve
24[D2]	wherein the bowl fill restriction comprises means for locking the bowl fill restriction to the extended portion of the body of the toilet fill valve
24[D3]	wherein the bowl fill restriction is configured to receive a second portion of the water from the bowl fill outlet port during at least a portion of the flush cycle
24[D4]	wherein the restriction is configured to constrict a flow rate of the second portion of the water that flows through the bowl fill restriction; and

24[E]	a tube configured to attach directly to the bowl fill restriction, wherein the tube is configured to direct the second portion of the water from the bowl fill restriction to a toilet tank overflow tube.
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I. INTRODUCTION

Petitioner respectfully request *inter partes* review (“IPR”) of claims 1-24 (“Challenged Claims”) of U.S. Patent No. 9,103,105 (the “’105 patent,” EX1001), titled “Toilet Fill Valve.”

The only discernable difference between the Challenged Claims and the prior art cited during prosecution was the connection between the toilet fill valve and the bowl fill restriction. The claimed connection, however, is a well-known quick connector between fluid flow conduits.

Petitioner presents prior art not considered during prosecution of the ’105 patent that discloses the features that Patent Owner (“PO”) contended were missing from the prior art. Specifically, this art discloses toilet fill valves with integrally formed extended portions configured to directly attach to a bowl fill restriction using a mating arrangement that locks the respective pieces together.

Petitioner also challenges PO’s ability to seek a priority date before January 27, 2014—the filing date of the ’105 patent parent application and when PO first sought to claim a “bowl fill *restriction*” in lieu of a “bowl fill *valve*.” None of the applications in the ’105 patent priority chain prior to January 27, 2014, include the expression “bowl fill restriction.” Rather, they focus solely on valves and their adjustable nature. Yet, PO sought to broaden the scope of its claims in later applications in order to cover non-adjustable restrictions as well as valves. PO

admitted that the expression “bowl fill *restriction*” is broader than a “bowl fill *valve*” a fact that is also confirmed by PO’s broadening of the title of the ’105 patent by deleting the phrase “*with adjustable bowl fill flow.*”

An applicant cannot file later applications recasting the claimed invention in broader terms with claims that encompass the original invention along with broader embodiments. *See, e.g., Tronzo v. Biomet*, 156 F. 3d 1154, 1158-1160 (Fed. Cir. 1998) (parent application that disclosed “*only* conical shaped cups and nothing broader” did not support broad claims covering conical and non-conical shaped cups; therefore, broad claims not entitled to filing date of parent and found invalid as anticipated by intervening prior art) (emphasis in original). PO’s “bowl fill restriction” constitutes new subject matter that is not supported by the earlier filed applications and consequently, the Challenged Claims are entitled to a filing date no earlier than January 27, 2014. As such, Petitioner presents additional anticipatory prior art based on this date.

II. MANDATORY NOTICES UNDER 37 C.F.R. §42.8(a)(1)

The following mandatory notices are provided as part of this Petition.

A. Real Party-In-Interest Under 37 C.F.R. §42.8(b)(1)

Fluidmaster, Inc. is the real party-in-interest for Petitioner.

B. Related Matters Under 37 C.F.R. §42.8(b)(2)

The '105 patent is the subject of a District Court Action captioned *Danco Inc. v. Fluidmaster Inc. et al.*, Case No. 8:23-cv-01156 (CDCA) (hereinafter the “litigation” – complaint at EX1003; amended complaint at EX1013).¹ Filed concurrently herewith are Petitions for *Inter Partes* Review of all claims of two additional patents involved in that litigation: U.S. Patent Nos. 9,139,993 and 10,934,698.

The '105 patent issued from Appl. No. 14/457,697, filed on Aug. 12, 2014, as a continuation of Appl. No. 14/164,424, filed on Jan. 27, 2014, now Pat. No. 9,139,993, which is a continuation of Appl. No. 13/346,355, filed on Jan. 9, 2012, now Pat. No. 8,650,671, which is a continuation of Appl. No. 12/786,904, filed on May 25, 2010, now Pat. No. 8,104,105, which is a continuation of Appl. No. 10/958,797, filed on Oct. 5, 2004, now Pat. No. 7,743,436, which is a continuation-in-part of Appl. No. 10/798,606, filed on Mar. 11, 2004, now Pat. No. 6,823,889. The Patent Center does not identify any Child Data for Appl. No. 14/457,697.

¹ PO served Infringement Contentions on Petitioner in connection with the litigation on February 24, 2024 (“Infringement Contentions”). The Infringement Contentions, including claims charts directed to the '105 patent, are submitted herewith as EX1031.

U.S. Patent No. 10,934,698 issued from Appl. No. 16/686,328, filed on Nov. 18, 2019, as a continuation of Appl. No. 14/856,901, filed on Sep. 17, 2015, now Pat. No. 10,519,639, which is a continuation of Appl. No. 14/164,424, filed on Jan. 27, 2014, now Pat. No. 9,139,993, which is a continuation of Appl. No. 13/346,355, filed on Jan. 9, 2012, now Pat. No. 8,650,671, which is a continuation of Appl. No. 12/786,904, filed on May 25, 2010, now Pat. No. 8,104,105, which is a continuation of Appl. No. 10/958,797, filed on Oct. 5, 2004, now Pat. No. 7,743,436, which is a continuation-in-part of Appl. No. 10/798,606, filed on Mar. 11, 2004, now Pat. No. 6,823,889. The Patent Center does not identify any Child Data for Appl. No. 16/686,328.

C. Lead and Back-Up Counsel Under 37 C.F.R. §42.8(b)(3)

Petitioner provides the following designation of counsel:

Lead Counsel	Back-Up Counsel
Carolyn S. Toto (Reg. No. 56,817) PILLSBURY WINTHROP SHAW PITTMAN LLP <u>Postal and Hand Delivery Address</u> 725 South Figueroa Street, 36th Floor Los Angeles, CA 90017-5406 Telephone: (213) 488-7238 Facsimile: (213) 629-1033 Email: carolyn.toto@pillsburylaw.com	Evan Finkel (Reg. No. 49,059) PILLSBURY WINTHROP SHAW PITTMAN LLP 725 South Figueroa Street, 36th Floor Los Angeles, CA 90017-5406 Telephone: (213) 488-7307 Facsimile: (213) 226-4058 Email: evan.finkel@pillsburylaw.com Ranjini Acharya (Pro Hac Vice Application Forthcoming) PILLSBURY WINTHROP SHAW PITTMAN LLP 2550 Hanover Street Palo Alto, CA 94304-1115 Telephone: (650) 233-4085 Facsimile: (650) 233-4545 Email: ranjini.acharya@pillsburylaw.com

D. Service Information Under 37 C.F.R. §42.8(b)(4)

Service of any documents via hand-delivery may be made at the postal mailing address of the respective lead or back-up counsel designated above with courtesy email copies to the email addresses and docket_ip@pillsburylaw.com. A Power of Attorney pursuant to 37 C.F.R. §42.10(b) is filed concurrently herewith.

III. PAYMENT UNDER 37 C.F.R. §42.103

The Office is authorized to charge Account No. 033975 (027854.0000050) for the fee in 37 C.F.R. §42.15(a) for this Petition and any additional fees in connection with this Petition.

IV. REQUIREMENTS FOR IPR

This Petition complies with all statutory and regulatory requirements and should be accorded the filing date of this Petition pursuant to 37 C.F.R. §42.106.

A. Grounds for Standing (37 C.F.R. §42.104(a))

Petitioner certifies that the '105 patent is available for IPR and that Petitioner is not barred or estopped from requesting IPR of the Challenged Claims on the grounds identified in this Petition.

B. Identification of Challenge (37 C.F.R. §42.104(b))

1. Challenged Claims

Petitioner requests an IPR trial on claims 1-24 of the '105 patent to cancel each claim.

2. The Specific Art and Statutory Grounds on Which the Challenge Is Based

IPR is requested in view of the following references:

- Registered Utility Model Publication Number CN2447417Y to Guoxin published September 12, 2001 (EX1015, Certified Translation at EX1016, “Guoxin”).

- U.S. Patent No. 5,926,868 to Bjerke issued July 27, 1999 (EX1017, “Bjerke”).
- U.S. Patent No. 5,249,830 to Calmettes, et al. issued October 5, 1993 (EX1018, “Calmettes”).
- U.S. Patent No. 989,251 to Hall issued April 11, 1911 (EX1019, “Hall”).
- Canadian Patent No. 1,320,235 to Kimber granted and published July 13, 1993 (EX1020, “Kimber”).
- U.S. Patent No. 3,086,546 to Brown issued April 23, 1963 (EX1021, “Brown”).
- U.S. Patent No. 5,862,538 to Ho issued June 26, 1999 (EX1022, “Ho”).
- U.S. Patent No. 8,104,105 to Schuster et al. issued January 31, 2012 (EX1029, “Schuster”).

Bjerke, Calmettes, Hall, and Kimber are hereafter collectively referred to as the “Quick Connection Art”.

The earliest alleged priority date for the ’105 patent is March 11, 2004 (EX1001, 2).² Guoxin, the Quick Connection Art, Brown, and Ho were published more than one year prior to March 11, 2004, qualifying them as prior art under 35 U.S.C. §102 (pre-AIA and post-AIA). As discussed herein, Petitioner asserts that the

² Petitioner does not concede entitlement to this priority date.

earliest effective filing date for the '105 patent is January 27, 2014. Thus, Schuster published more than one year prior to January 27, 2014, also qualifies as prior art under §102 (pre-AIA and post-AIA).

The following specific grounds of rejection are asserted under §§102 and 103 and are supported by the Declaration of Dr. Kimberly Cameron (EX1004). In this Petition and in Dr. Cameron's declaration, Petitioner has identified the exhibit number of evidence relied upon to support the challenge and has explained the relevance of that evidence to the challenge. *See* Sections VI-VIII below.

Ground	Claims	Statute	Prior art
1	1-3, 6, 8-15, and 20-24	§103	Guoxin in view of Ho
2	4, 5, 7, and 16-19	§103	Guoxin in view of Ho, further in view of Quick Connection Art
3	1-3, 6, 8-15, and 20-24	§103	Brown in view of Ho
4	4, 5, 7, and 16-19	§103	Brown in view of Ho, further in view of Quick Connection Art
5	1-24	§102	Schuster

3. Claim Construction

The Challenged Claims should be construed in accordance with their plain and ordinary meaning, as would be understood by a person of ordinary skill in the

art (“POSITA”) upon review of the ’105 patent and its prosecution history. Here, two terms require construction: “*integrally molded*” and “*bowl fill restriction*.”

While the compound term “integrally molded” is not used in the specification, the term “integral” is defined as a “single structure” that includes forming together as a single piece construction, or snapped or clamped into place, or attached in some other manner. EX1001, 2:17-26. “Integral” therefore is construed as a single structure or multiple structures connected to one another to form a single structure, and the expression “integrally molded” is construed consistent with the definition of integral. EX1004, ¶¶46-47. For the purpose of this Petition, the expression “integrally molded” is construed to mean molded together as a single structure or molded separately and subsequently attached to one another to form a single structure.

The expression “bowl fill restriction” is not used in the specification, other than in the Abstract and claims. *See* EX1002. While “bowl fill valve” is disclosed, a “bowl fill restriction” is not disclosed before January 27, 2014, nor do the terms “restriction” or “constricted” appear in the originally filed specification. *See* EX1002, 124-143. Rather, the first time the term “restriction” appeared was January 27, 2014, the filing date of the application that issued as U.S. Patent No. 9,139,993, (the “993 patent”), the ’105 patent parent. *See* EX1008. In plumbing applications, it is understood that flow restrictors are fixed devices and valves are adjustable

devices. EX1004, ¶50. Furthermore, during prosecution of the '993 patent, PO filed preliminary remarks and stated that the independent claims reciting a “bowl fill restriction” were broader than “a bowl fill valve”—the only device disclosed that can control or adjust the flow through the bowl refill tube. EX1008-085. Thus, this change broadened the claims over the claims in the prior applications/patents that recited a “valve.” Patent Owner also served infringement contentions asserting that the “bowl flow restrictor” of the claims covers (i.e., reads on) two distinct types of devices: adjustable valves and fixed flow restrictors. *See* EX1031, Ex. A at 4, Ex. C at 3. Accordingly, for purposes of this petition, Petitioner adopts Patent Owner’s construction of “bowl flow restrictor” to denote an adjustable or fixed device capable of restricting or constricting the flow of water.³

V. DISCRETIONARY FACTORS

A. Denial is Not Warranted Under 35 U.S.C. §314(a)

This is the only petition challenging the '105 patent and no other parties have petitioned to challenge it. Thus, the Board has not yet considered the '105 patent’s validity and this IPR would be an appropriate use of the Board’s resources.

³ Claim 6 recites “the bowl fill valve”, which lacks antecedent basis in claim 6 or claim 1 from which it depends. For purposes of this Petition, Petitioner assumes “the bowl fill valve” in claim 6 refers to the “bowl fill restriction” of claim 1.

The Board should not exercise its discretion to deny institution based on concurrent litigation. Petitioner stipulates that if IPR is instituted, Petitioner will not pursue in the district court litigation any ground raised or that could have been reasonably raised in the IPR (i.e., any ground raised or that could have been reasonably raised under §§102 or 103 on the basis of prior art patents or printed publications). *Sotera Wireless, Inc. v. Masimo Corp.*, IPR2020-01019, Paper 12 (PTAB Dec. 1, 2020); “Interim Procedure for Discretionary Denials in AIA Post Grant Proceedings with Parallel District Court Litigation” (June 21, 2022). The claim construction hearing is presently set for September 13, 2024. EX1032. Trial is set for June 10, 2025. EX1030. Additionally, Petitioner intends to request a stay upon filing this Petition. Neither the parties nor the court have invested much in the parallel case. Discovery is still in its infancy with PO serving a first set of written interrogatories and request for production of documents on February 27, 2024—no other discovery has been initiated as of the date of this filing. Finally, the Petition challenges all claims of the ’105 patent, whereas the parallel case only involves claims 1-7, 9, 11-18, and 20-24 (see EX1031, Cover Pleading, 2:19-20), making this IPR an efficient use of the Board’s resources.

B. Denial is Not Warranted Under 35 U.S.C. §325(d)

The Board should only deny institution under §325(d) if the same or substantially the same prior art or arguments were presented to the Office. *Advanced*

Bionics, LLC v. Med-El Elektromedizinische Geräte GmbH, IPR2019-01469, Paper 6 at 6–22 (PTAB Feb. 13, 2020). That is not the case here. This Petition raises invalidity challenges based on prior art, none of which was the basis for a rejection by the Examiner/Patent Office. *See* EX1002.⁴ Moreover, as discussed in Sections VII-VIII, the Grounds here are materially different from—and not cumulative of or substantially the same as—the prior art and arguments presented during prosecution. In addition, Sections VII-VIII demonstrate “that the Office erred in a manner material to the patentability of challenged claims.” *Advanced Bionics* at 8; *id.* at 10 (“[I]f the record of the Office’s previous consideration of the art is not well developed or silent, then a petitioner may show the Office erred by overlooking something persuasive under [*Becton Dickinson*] factors (e) and (f).”).

VI. TECHNOLOGICAL BACKGROUND

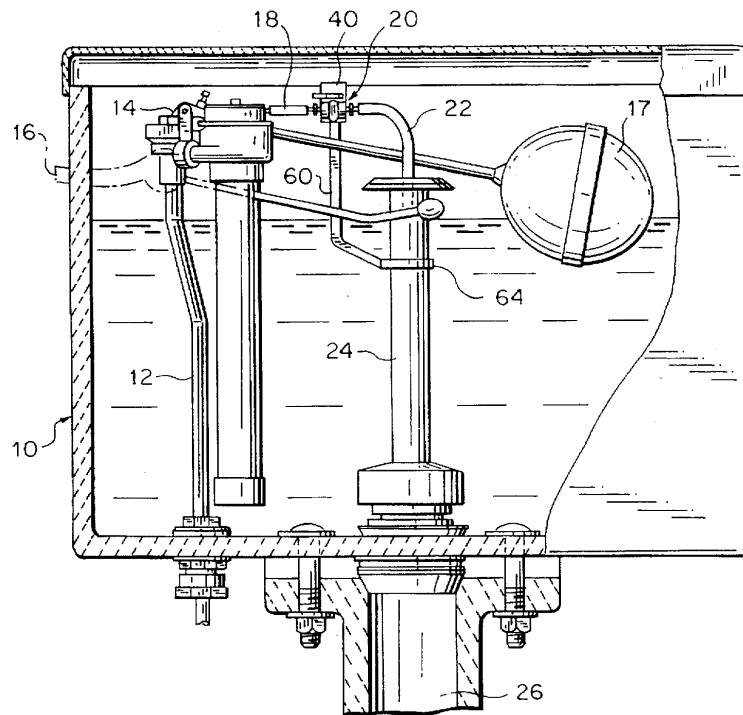
The ’105 patent is directed to a purported improvement to a toilet fill valve for a flush toilet. *See* EX1001, Abstract. Toilet fill valves are not new. EX1004, ¶81; *see, e.g.*, EX1021 (Brown, filed March 6, 1959). Rather, toilet fill valves with various mechanisms to control the flow of water to the toilet bowl during a flush cycle were well known in the art. EX1004, ¶81. After a toilet is flushed, the toilet fill valve is responsible for refilling the water stored in the toilet’s tank and in the

⁴ Brown is listed on the face of the ’105 patent, but was not cited to reject the claims.

toilet's bowl. *Id.* The toilet fill valve is connected to the water supply line for the toilet and allows water to flow (1) into the tank and (2) into the bowl through a connection to the toilet's overflow tube. *Id.* The toilet fill valve controls the amount of water used to refill the tank and the bowl and closes the valve once the flush cycle is complete. *Id.* Without any mechanism to control the flow of water to the toilet bowl, which has a lower volume than the tank, the bowl would over-fill and excess water would be wasted. *See* EX1021, 1:36-40, 63-70.

A. Toilet Fill Vales with Bowl Fill Valves Were Well-Known

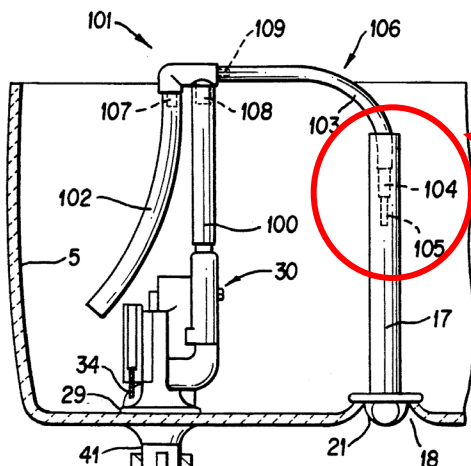
The Examiner cited conventional toilet fill valves that included a bowl fill valve to control and adjust the flow of water to the bowl fill tube during prosecution of the '105 patent and related patents. EX1002, 65-66; EX1009-124–EX1009-125. Stemples (EX1023) and DeMarco (EX1024) each discloses handle-activated bowl fill valves. Brown (EX1021) discloses a metering screw that can be tightened or loosened to adjust the flow of water. Horad (EX1025) also discloses a bowl fill valve (20) connected in-line with the bowl fill tube (22), to adjustably control the flow of water to the overflow tube (24) and into the bowl. *Id.*, Fig. 1 (below), 2:5-46.



B. Fluid Flow Restrictors or Diverters Were Well-Known

In addition to valves, other mechanisms for controlling water flow were also well-known. Brown also discloses a reduced diameter tube to restrict flow into the toilet bowl. EX1021, 4:20-44; EX1004, ¶82. As shown in the examples below and as known in the art, once a bowl fill restrictor is inserted and in place, it is no longer adjustable. EX1004, ¶83.

Shaw, U.S. Patent No. 5,134,729 (EX1026) discloses flow restrictors (104, 105) having varied decreased diameters.

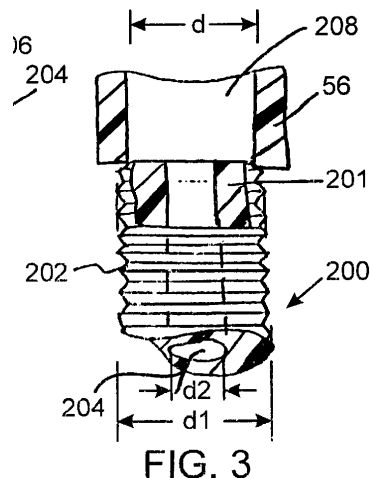
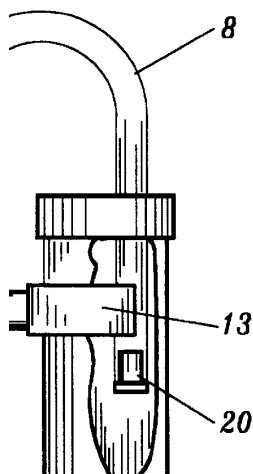


The free end of bowl fill assembly 106 is inserted in overflow tube 17. Bowl fill assembly 106 comprises bowl fill tube 103 and optional flow control inserts 104 and 105.

Tubes 100 and 102 are plastic tubes having an interior diameter of approximately one half inch. Bowl fill tube 103 has an interior diameter of three-eighths of an inch and flow control inserts 104 and 105 have interior diameters of one-quarter inch and three-sixteenths inches, respectively. Flow control inserts 104 and 105 are retained in bowl fill tube assembly 106, when used, by frictional contact between their outer surface and the inner surface of the tube in which they are inserted.

See, e.g., EX1026, 8:8-20, Fig. 3 annotated.

Williams, U.S. Patent No. 5,855,025 (EX1027), discloses a bowl refill restrictor (20) to divert a lower amount of water to the bowl than to the tank; and Alles, U.S. Patent No. 6,219,856 (EX1028), discloses a similar bowl refill restrictor (200) to reduce the flow of water into the bowl.

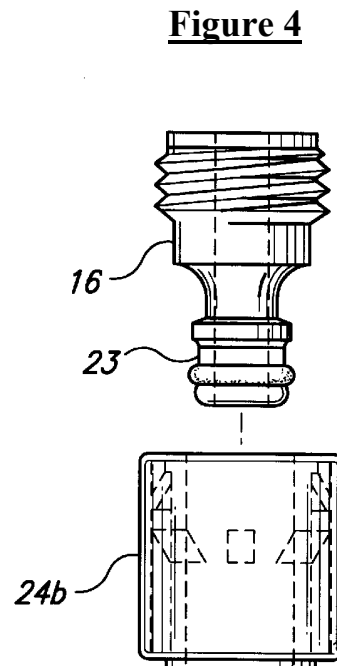
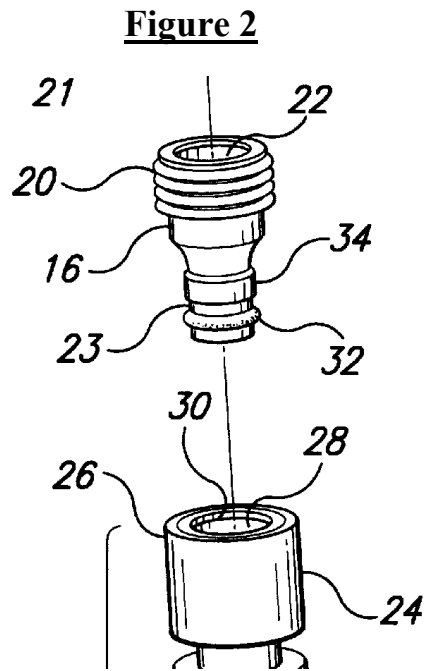


See EX1027 (Williams), 3:8-17, Fig. 1.

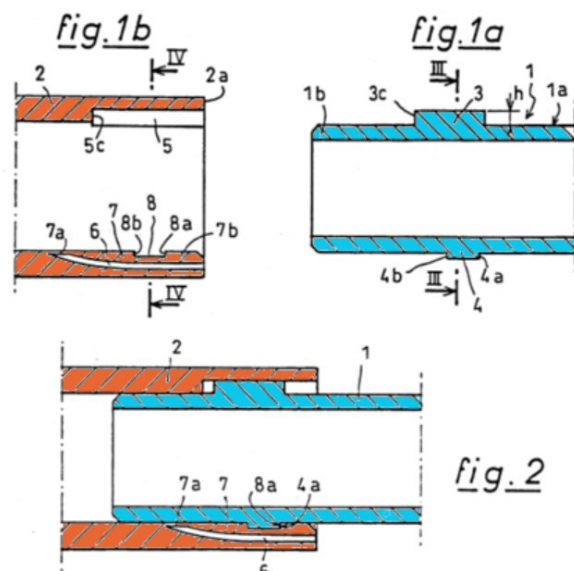
See EX1028 (Alles), 3:6-36, Fig. 3.

C. Fluid Flow Couplings Were Well-Known

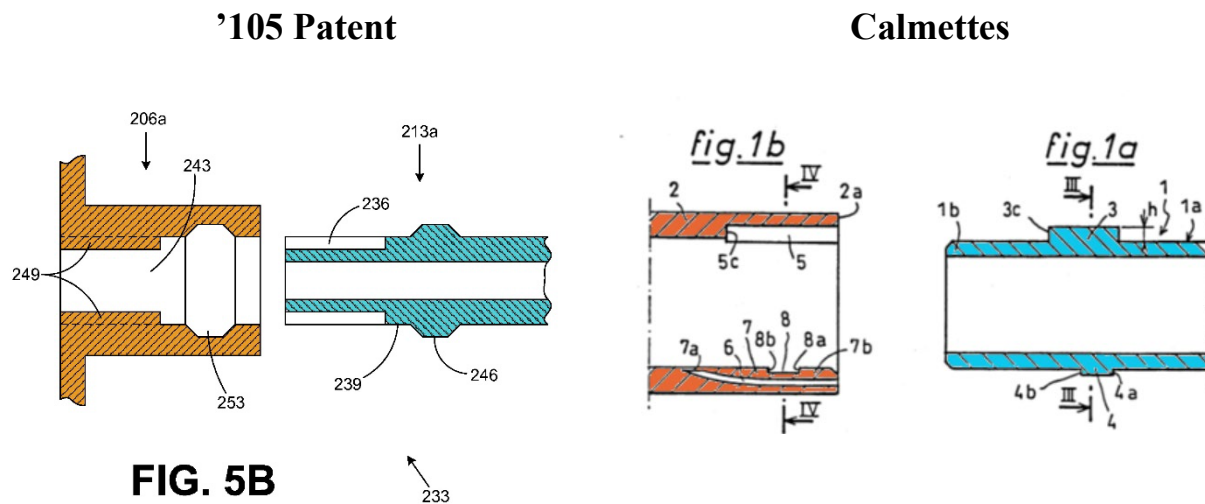
While the '105 patent is directed to a toilet component, the underlying technology generally consists of techniques, mechanisms, and apparatuses (e.g., pipes, valves, connectors, fixtures, etc.) to deliver and transport fluid in a controlled manner. EX1004, ¶87. Thus, a POSITA would look generally to fluid flow components, such as the Quick Connection Art, in the design of toilet components. *Id.* As an example, during prosecution of the grand-child application of the '105 patent, now U.S. 10,934,698 (the “'698 patent”), the Examiner cited Bjerke (EX1017) as disclosing a conventional quick-connect coupling for a water flow system. *See* EX1006-064–EX1006-065. Bjerke’s quick connector, adapted for use in a bathtub shower system, is shown in Figs. 2 and 4 below.



Similarly, Calmettes (EX1018) discloses a coupling device to lock snap-fit and lock two coaxial fluid flow tubes. See annotated Figures 1a, 1b, and 2:

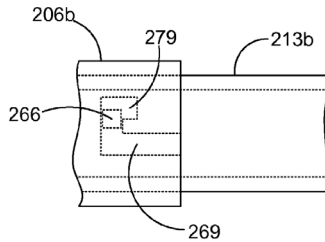


Notably, Calmettes' snap fit connection is the same type of connection illustrated in Figures 5A and 5B of the '105 patent. See EX1004, ¶90, EX1018, Figure 5B (reproduced below).

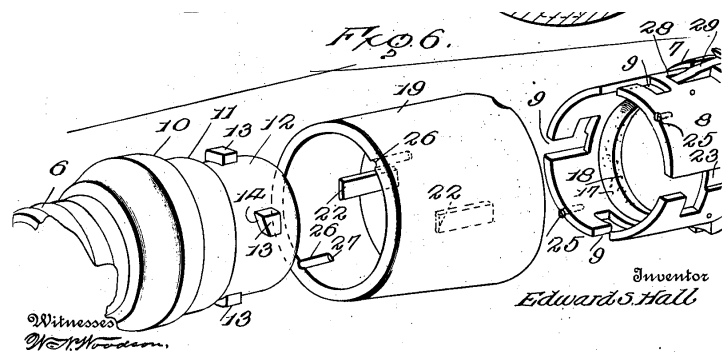


Hall (EX1019) discloses a fluid flow coupler in which axial protrusions 13 (lugs) on the male portion mate with grooves 9 (bayonet slots) formed in the female portion, and can be rotated to lock in place. See EX1018, Fig. 5B compared to Fig. 6 (each reproduced below).

'105 Patent

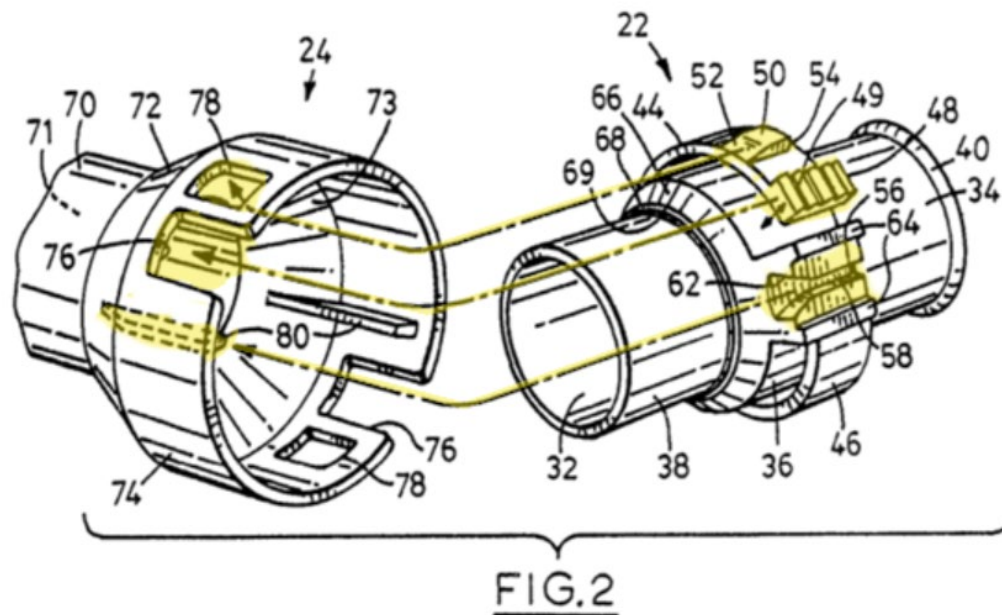


Hall



Notably, Hall's coupling is the same as that shown in Figures 6A-6C of the '105 patent. EX1004, ¶91.

Kimber (EX1020) discloses a pipe coupling that comprises a male fitting and a tubular female fitting. Figure 2 illustrates the coupling arrangement between male fitting 22 and tubular female fitting 24 where tabs can snap into apertures and axial grooves mate with ribs to prevent axial movement (*see* EX1004, ¶92):



VII. SUMMARY OF THE '105 PATENT

A. Description of the Alleged Invention of the '105 Patent

The purported invention recited by the Challenged Claims concerns a toilet fill valve that dispenses water in two portions. EX1001, Abstract. A first portion exits the fill valve via a tank water outlet situated at its lower portion to refill the tank. *Id.* A second portion exits through an extended part of the toilet fill valve, which is attached to an adjustable bowl fill valve to adjust the flow of water to refill the bowl. *Id.* Because the adjustable valve could create a pressure head in a hose connecting it to the toilet fill valve, the '105 patent eliminates the hose and directly connects the bowl fill valve to the toilet valve. PO argued this direct connection and preventing a pressure head as a feature distinguishing the claims from the cited art. EX1001, 3:64-4:3; EX1009, 72-73.

B. Summary of the Prosecution History of the '105 Patent

U.S. Application No. 14/457,697 (the “'697 application”) was filed on August 12, 2014, and issued on August 11, 2015, as the '105 patent. EX1001, 1. The '697 application claims priority as a continuation of application No. 14/164,424, filed on January 27, 2014, which claims priority through a series of continuations and one continuation-in-part to U.S. Application No. 10/798,606, filed on March 11, 2004, now U.S. Patent No. 6,823,889. *Id.*

The '697 application claims were rejected for, *inter alia*, obviousness based on U.S. Patent Nos. 5,708,991 (“DeMarco”) and 6,047,725 (“Gish”). EX1002, 62–70. The Examiner stated that while DeMarco taught nearly all aspects of the claims, it was silent on its extended portion being integrally molded with the toilet fill valve body. *Id.*, 65–66. However, an extended portion being integrally molded with the toilet fill valve body was disclosed by Gish and it would have been obvious to use that in the DeMarco device as a cost-effective method of manufacturing. *Id.*, 66.

PO responded by amending various claims, introducing new claims 21–24, and providing additional remarks. *Id.*, 32–53. PO traversed the Examiner's obviousness rejections by amending the claims to recite “a protrusion [on the bowl fill valve] configured to insert into a recess in a toilet fill valve,” a feature PO alleged was not disclosed in DeMarco. PO stated that DeMarco lacked such a protrusion or recess and did not “lock” in place. *Id.*, 45–47. PO further alleged that Gish did not provide this missing information. *Id.*, 47.

PO later filed a terminal disclaimer, which was approved, and the Examiner allowed all claims. *Id.*, 19–23, 7–11. No reasons for allowance were given.

C. Prosecution Histories of Related Patents

The '105 patent claims priority to a number of issued patents, and PO has obtained later patents claiming priority to the same family of applications. Petitioner refers to all patents issued from applications in the same family tree as “related

patents.” The prosecution histories of the related patents are provided at EX1006, EX1008-EX1012.

VIII. GROUNDS OF UNPATENTABILITY

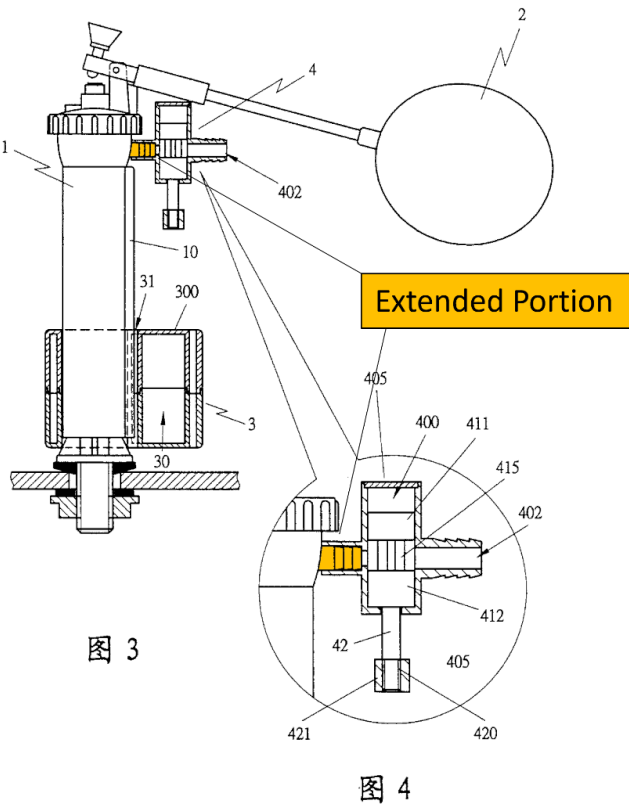
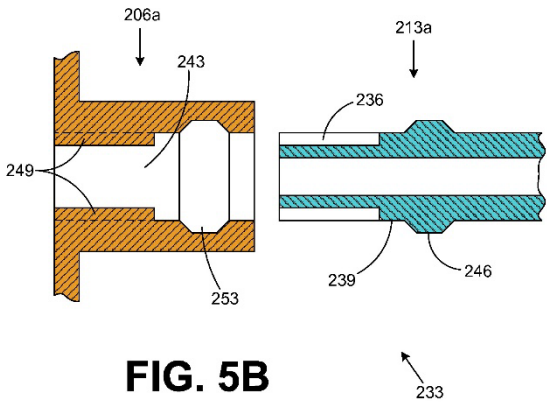
The discussion below refers to the claim elements using the designations provided in the table at the beginning of this Petition.

A. Claims 1-3, 6, 8-15, and 20-24 are Obvious Under 35 U.S.C. §103 Over Guoxin in View of Ho

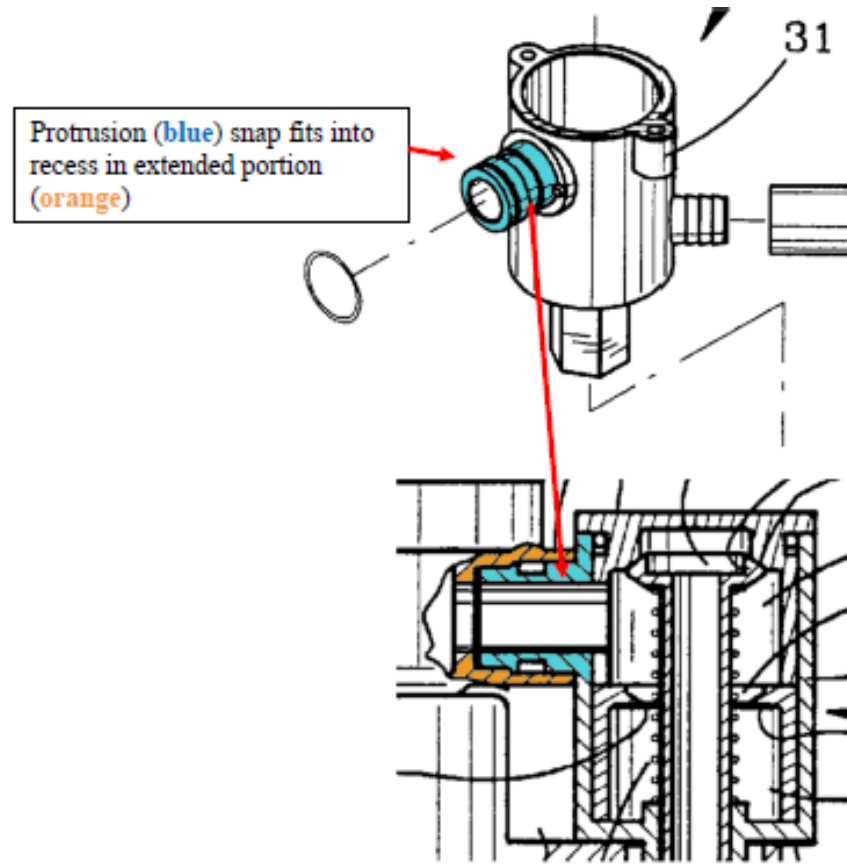
Guoxin (EX1015-EX1016) was not considered during prosecution of the ’105 patent and is more material than the prior art considered. EX1004, ¶109. The only discernible difference between claims 1-3, 6, 8-15, and 20-24 of the ’105 patent and Guoxin is that Guoxin discloses the reverse coupling arrangement between the bowl fill restriction and the toilet fill valve (i.e., the bowl fill restriction has a recess, and the extended portion of the toilet fill valve has a protrusion). *See* EX1001, annotated Fig. 5B; EX1016, annotated Figure 4.

'105 Patent

Guoxin



However, Ho discloses an integrally molded extended portion on a toilet fill valve with a recess into which a bowl fill restriction device with a protrusion is inserted and locked into place. *See* EX1022, annotated Figs. 3 and 5 below.



Ho was not considered during prosecution of the '105 patent and is more material than the art considered. EX1004, ¶112.

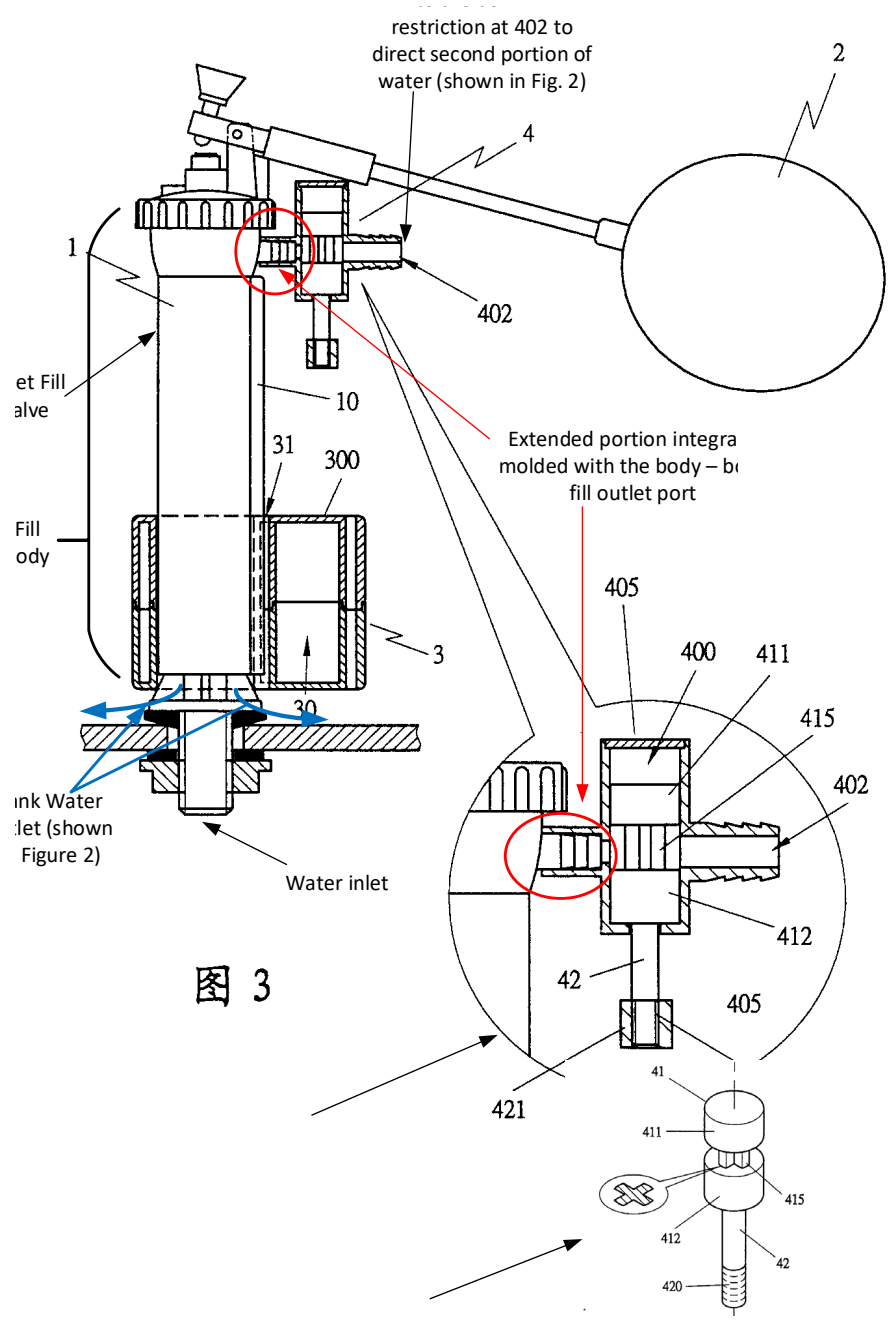
Both Guoxin and Ho are directed to toilet valve systems that utilize and describe bowl fill restrictions that attach directly to the toilet fill valve to accurately control the amount of water that flows from the toilet fill valve into the toilet bowl. *See, e.g.*, EX1016, 2, 5:1-2; EX1022, 1, 1:6-9, Figs. 1-5; EX1004, ¶113. A POSITA would understand that male and female fluid flow connectors are generally interchangeable and the selection of which is which is a matter of design preference. *See* EX1004, ¶114; EX1017, 7:15-24, Figs. 5- 6 (Bjerke showing interchangeability

of male and female connectors); EX1006, 80-81 (male and female connector arrangements can be reversed); EX1004, ¶¶115-116. The toilet fill valve connectors here are likewise interchangeable. EX1004, ¶117; EX1001, 7:21-3 (acknowledging the interchangeability of protrusions, ribs, recesses, etc., on the respective couplings).

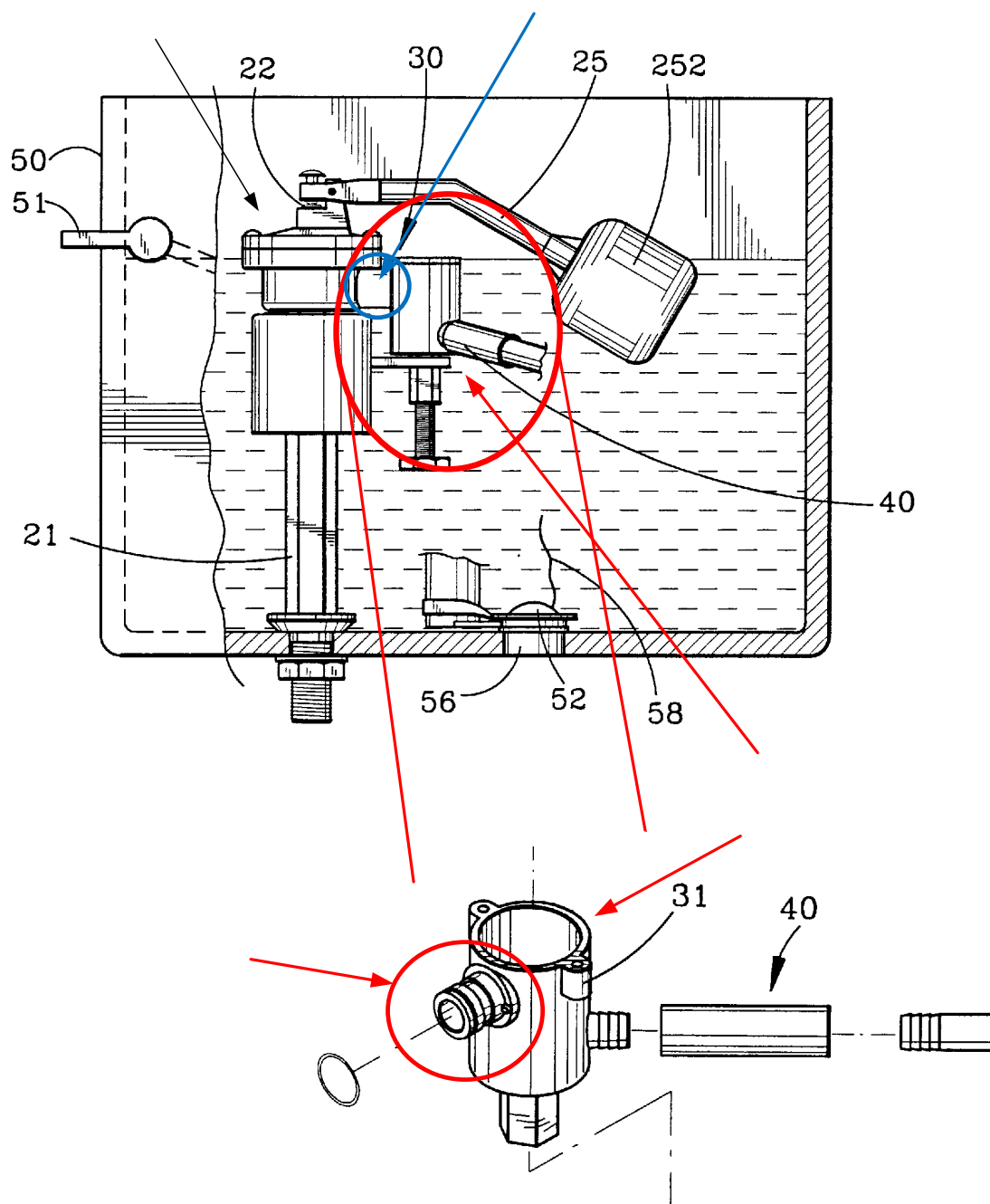
In view of the foregoing, using a male connector on the bowl fill restriction, such as the one shown in Ho, instead of the female connector, such as the one shown in Guoxin, would have been obvious to a POSITA as a matter of design preference. EX1004, ¶118; *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 416 (2007). They are well-known substitute structures for performing the same function in their known and expected manner and would require only a simple substitution of one known coupling arrangement for another to obtain predictable results. *Id.*

1. Independent claims 1 and 24 are obvious over Guoxin in view of Ho

In this Section, Petitioner will be referring to the annotated figures from Guoxin and Ho provided below, and additional annotated figures introduced later.



EX1016 (Guoxin), 2:8-20, Figs. 2-5, Annotated Figs. 3 and 5 above.



EX1022 (Ho), annotated Figs. 2 and 5 above.

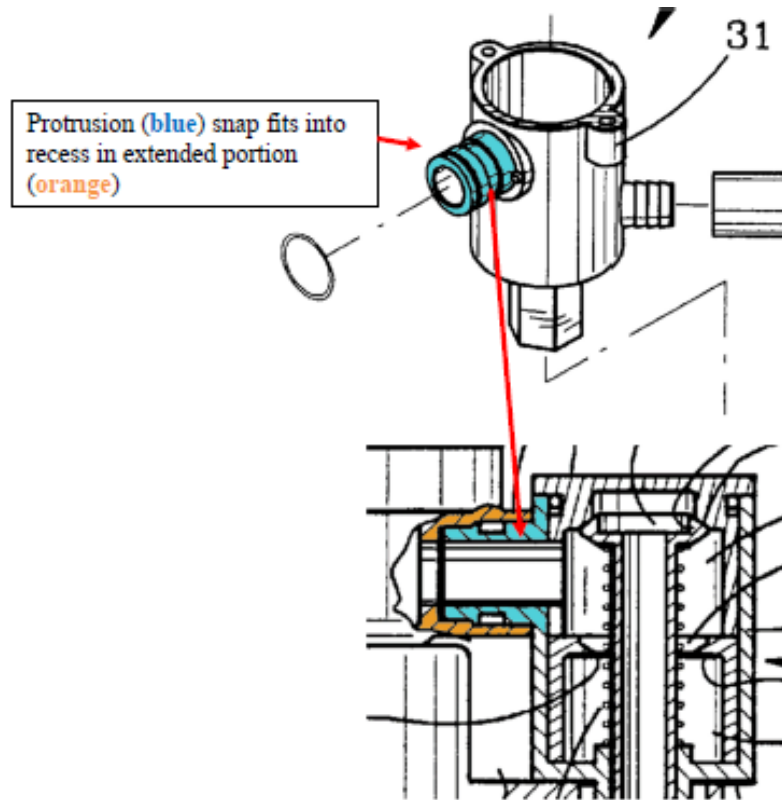
a. 1[Pre], 24[Pre]

Claims 1 and 24 each recite “A system, comprising: a toilet fill valve ...; a bowl fill restriction ...; and a tube ...” As illustrated in the annotated figures, Guoxin and Ho each disclose a system including these three elements. EX1004, ¶120.

b. 1[A], 24[A]

Guoxin discloses a toilet fill valve having an extended portion that is integrally molded with the water inlet device 1, as shown in Figure 3 and the exploded view of Figure 4. EX1004, ¶123. The extended portion of Guoxin’s toilet fill valve forms a bowl fill outlet port. *Id.*

To the extent PO *incorrectly* argues that the extended portion illustrated in Guoxin is not “integrally molded,” Ho most clearly discloses an integrally molded extended portion on a toilet fill valve with a recess into which a bowl fill restriction device with a protrusion is inserted and locked into place. *See* EX1022, annotated Figs. 3 and 5 below; EX1004, ¶124.



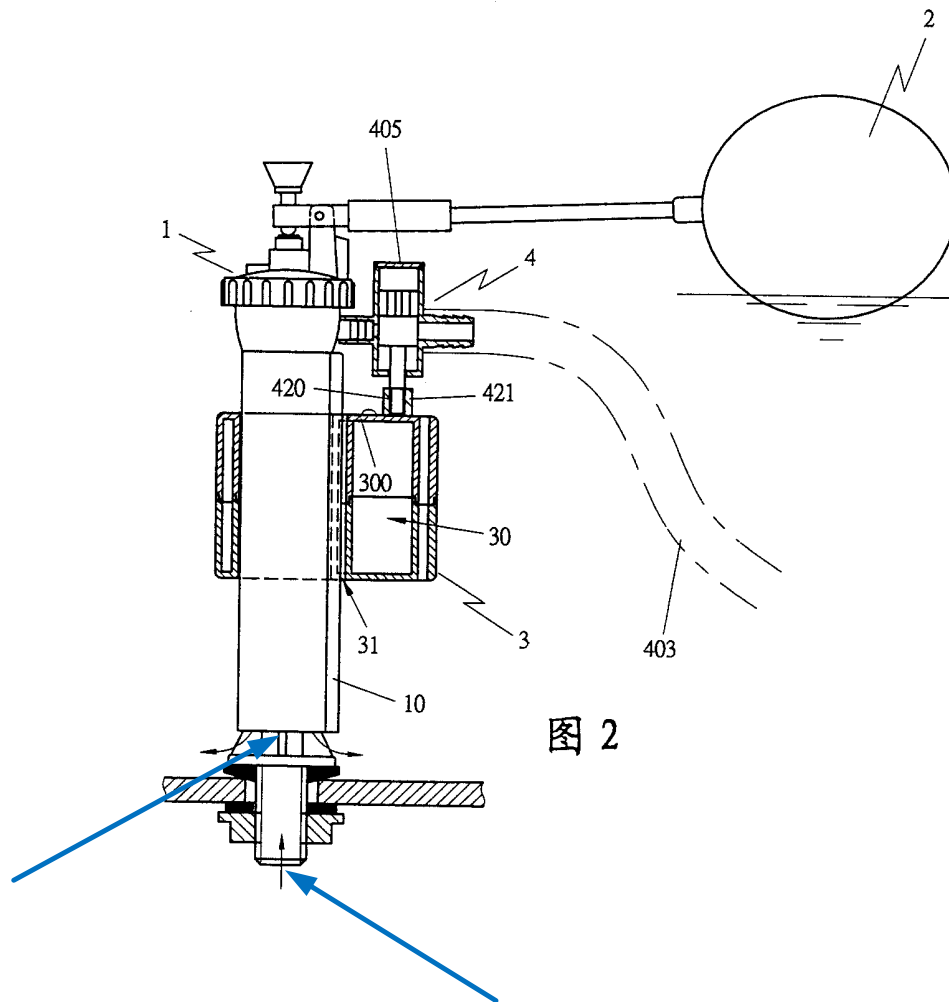
Integrally molding the extended portion of Guoxin with the inlet device as taught by Ho would be advantageous in improving the strength and integrity of the connection, and to make it easier to manufacture and assemble. EX1004, ¶125. It would have been obvious to integrally mold the extended portion of Guoxin with the inlet device as taught by Ho to achieve these benefits. *Id.*

Thus, Guoxin, and the combination of Guoxin and Ho, satisfies elements **1[A]** and **24[A]**. EX1004, ¶126.

c. 1[B], 24[B]

Guoxin (water inlet device 1, EX1016, 2:8-9) and Ho (water supplying pipe 21, EX1022, 2:56) each discloses a water inlet, as is conventional in the art,

configured to receive water from a water source. EX1004, ¶129. Annotated Guoxin (EX1016) Figure 2 below includes an arrow that shows the flow of water and is facing upward and into water inlet device 1.



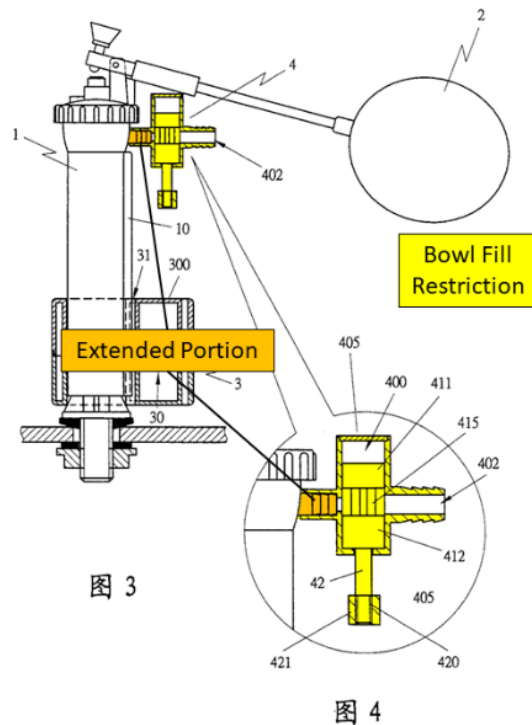
Guoxin and Ho each satisfy this element. EX1004, ¶130.

d. 1[C], 24[C]

Guoxin illustrates the tank water outlet as shown in annotated Figure 2 above. Ho discloses tank water outlet via passage 321 of valve rod 32. EX1022, 4:32-39, Fig. 10; EX1004, ¶133. Guoxin and Ho each disclose a tank water outlet, as is conventional in the art, and satisfy this element. *Id.*

e. 1[D1], 24[D1]

Guoxin discloses a bowl fill restriction in the form of switching mechanism 4 that attaches directly to the extended portion of the body of the toilet fill valve via the mating engagement of switching valve inlet 401, and the ridged protrusion (extended portion) on water inlet device 1. EX1016, 2:8-20, Figs. 2-5; *see also*, annotated Figs. 3-4 below; EX1004, ¶136.



Ho discloses bowl fill restriction 30 (diverter valve means) that attaches directly to the extended portion of the toilet fill valve. EX1022, 3:8-13, Fig. 5 and 8-11; EX1004, ¶137. Guoxin and Ho each satisfy this element. *Id.*, ¶137.

f. 1[D2]

Guoxin discloses a protrusion that is configured to insert into a recess in inlet 401 of bowl fill restriction, and its ridges or protrusions lock within inlet 401. EX1004, ¶140; *see* EX1016, annotated Figs. 3 and 4 above.

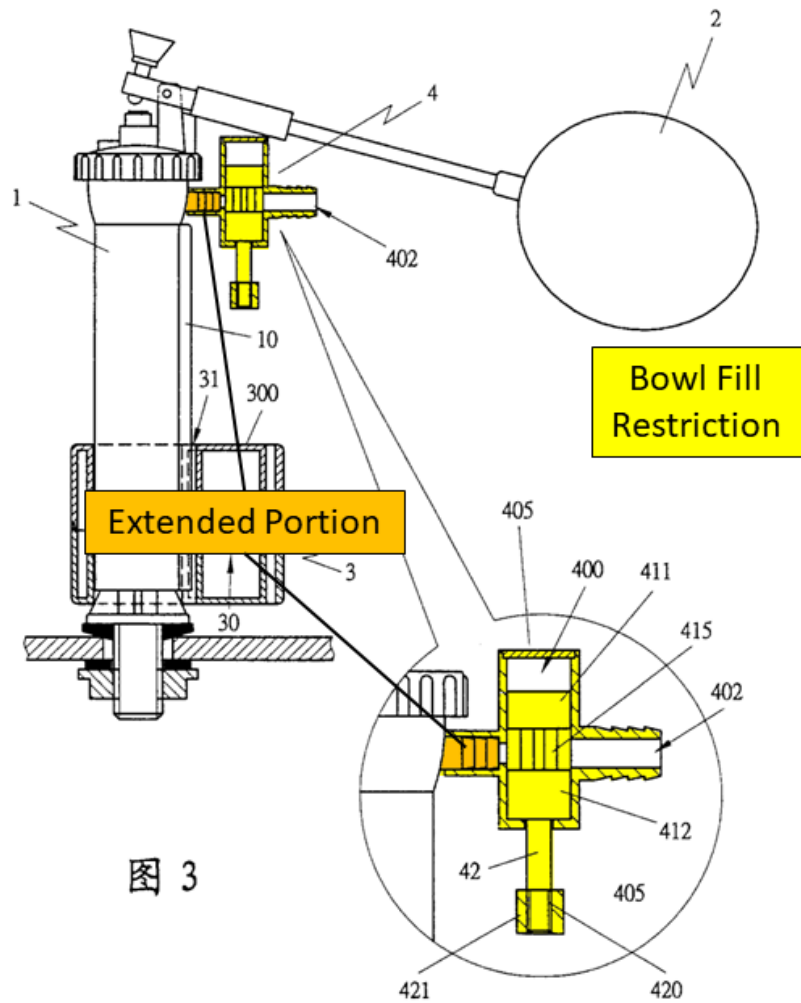
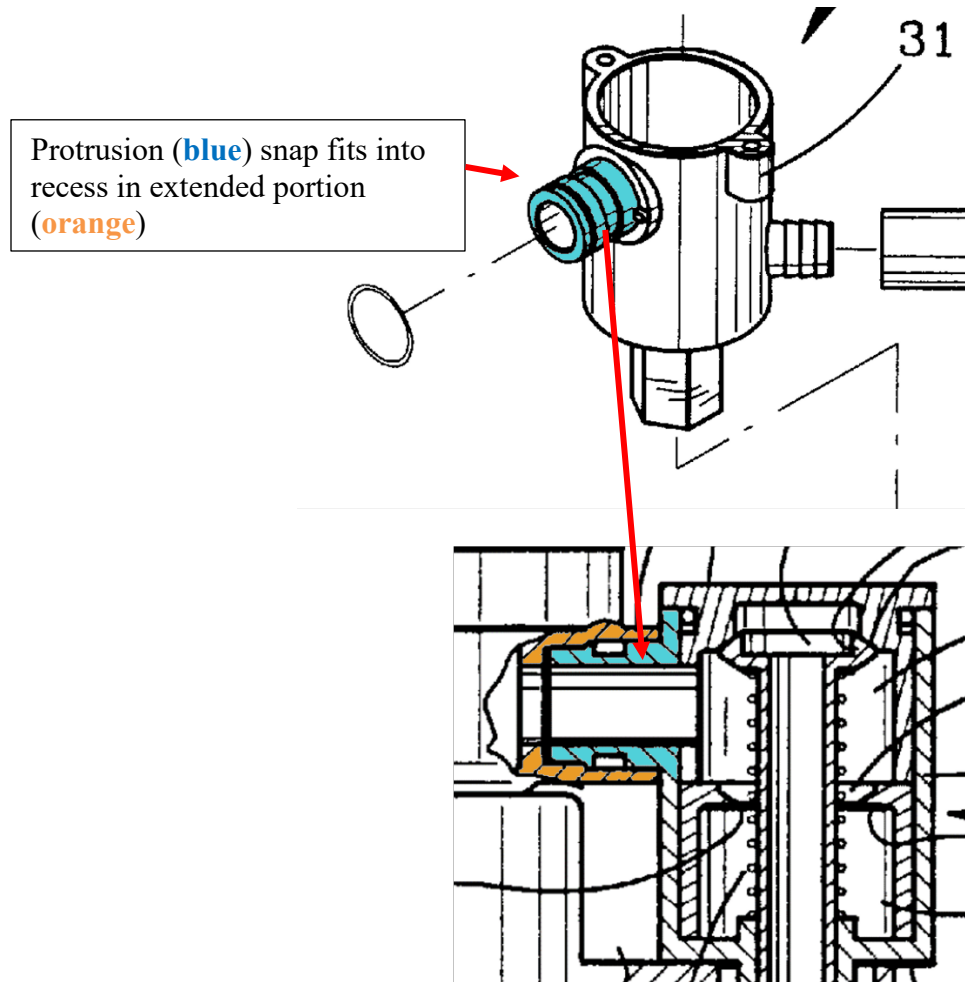


图 3

图 4

Ho discloses a protrusion configured to fit into a recess in the extended portion of the toilet fill valve, which is simply the reverse mating engagement as that shown by Guoxin. EX1004, ¶141; *see* EX1022, annotated Figs. 3 and 5 below.



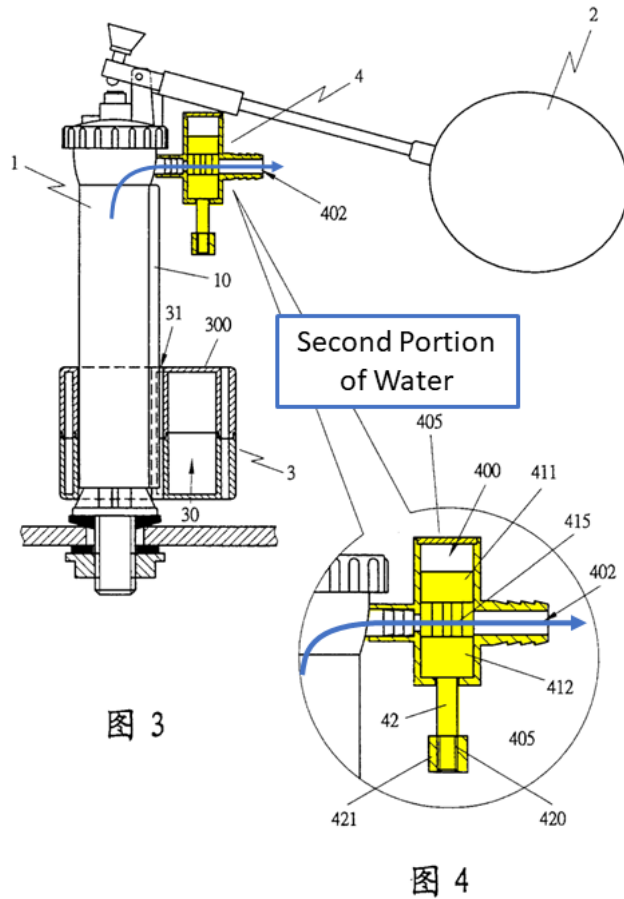
As explained above, it would have been obvious to use the mating engagement of Ho to attach the extended portion of Guoxin's toilet fill valve with switching mechanism 4 of Guoxin, as a simple substitution of one known coupling arrangement for another to obtain predictable results. EX1004, ¶¶142-144. Accordingly, the combination of Guoxin and Ho renders obvious a protrusion on a bowl fill restriction that snaps or locks into a recess in an integrally molded extended portion of the toilet fill valve, thereby satisfying this element. EX1004, ¶145.

g. 24[D2]

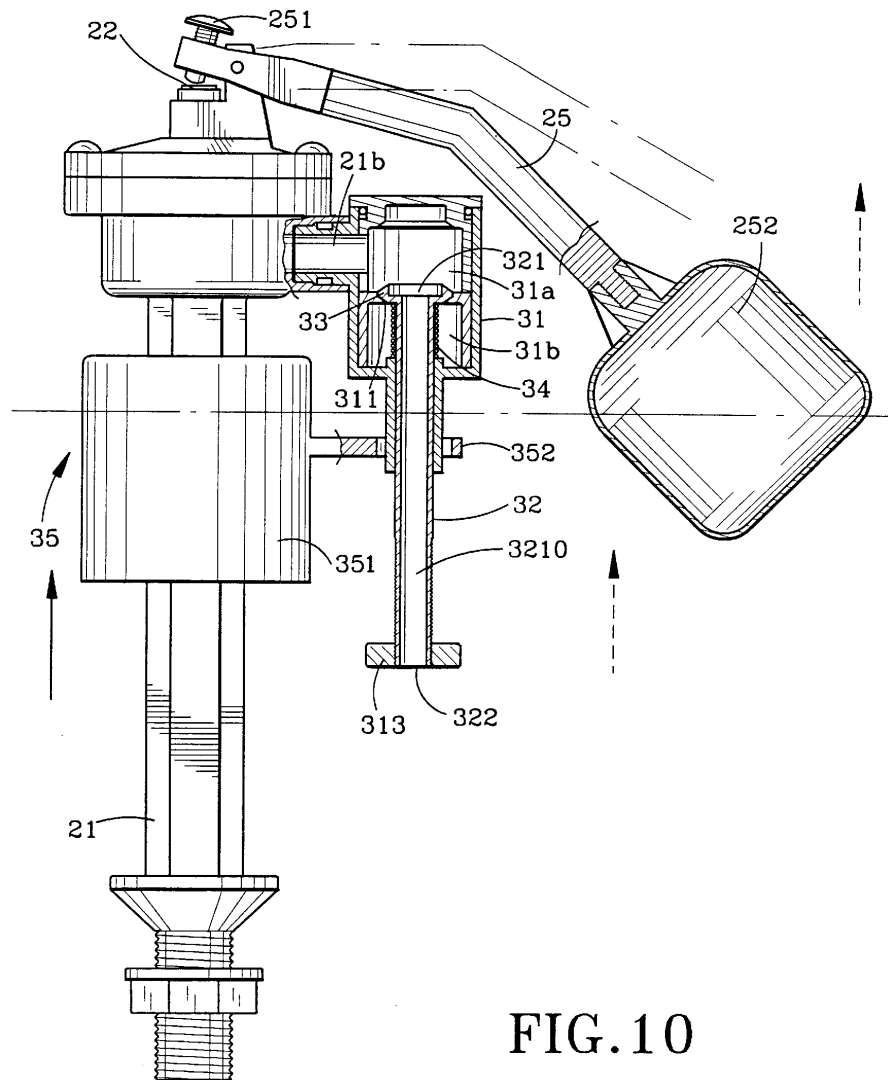
See discussion of claim element **1[D2]**. Guoxin and Ho disclose means for locking the bowl fill restriction to the extended portion. EX1004, ¶147. Guoxin in view of Ho therefore satisfies this element. *Id.*

h. 1[D3], 24[D3]

Guoxin illustrates a first portion of water exiting water inlet device 1 at the bottom (radially extending downward arrows in Figure 2), and a second portion exiting through the extended portion and into switching mechanism 4 via inlet 401. EX1004, ¶150; *see also*, EX1016, annotated Figs. 3-4 below.



Ho discloses a first portion of water that exits through tube 32 to refill the tank (Fig. 10 below), and a second portion of water that exits through toilet bowl refill tube 40 (not shown in Fig. 10) via water flowing through valve seat 311 into chamber 31. EX1004, ¶151.

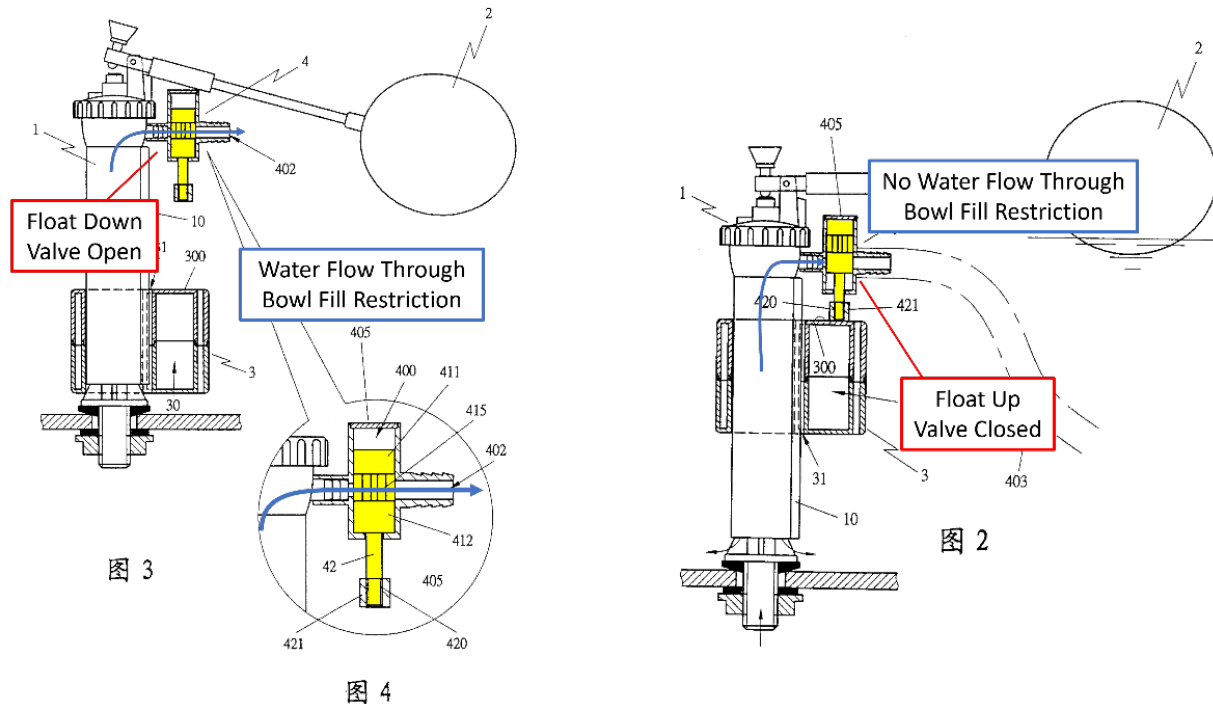


Guoxin and Ho each satisfy this element. EX1004, ¶152.

i. 1[D4], 24[D4]

Guoxin discloses ring 415 that constricts the flow of water, as well as lower annular surround 412 that gradually rises upward in switching valve 41 as the water rises in the tank to eventually close the flow of water into the toilet bowl via water

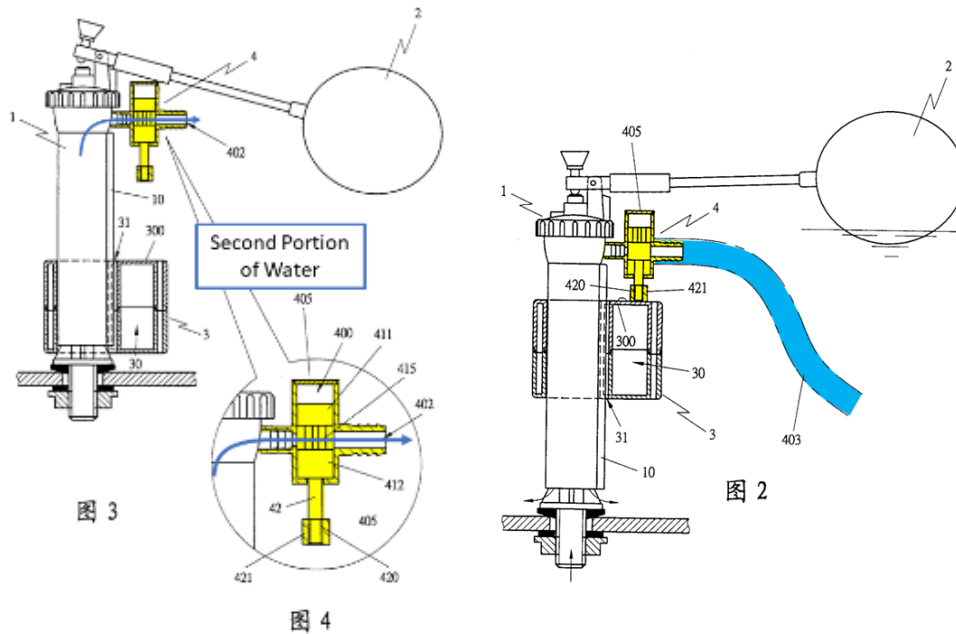
outlet 402. EX1016, 2:25-27, Figs. 2-5; *see also*, annotated Figs. 2-4 below;
EX1004, ¶155.



Guoxin therefore satisfies this element. EX1004, ¶156.

j. 1[E], 24[E]

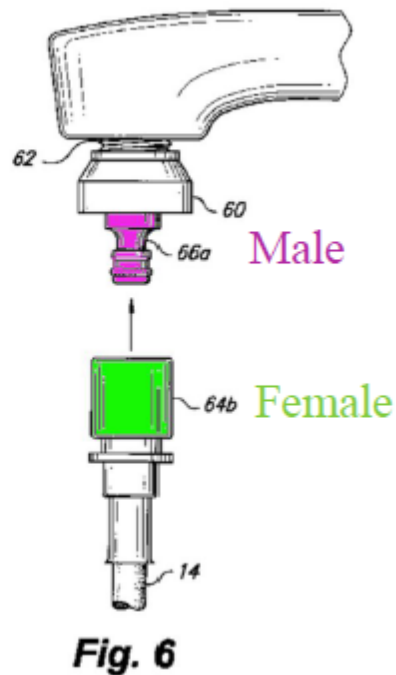
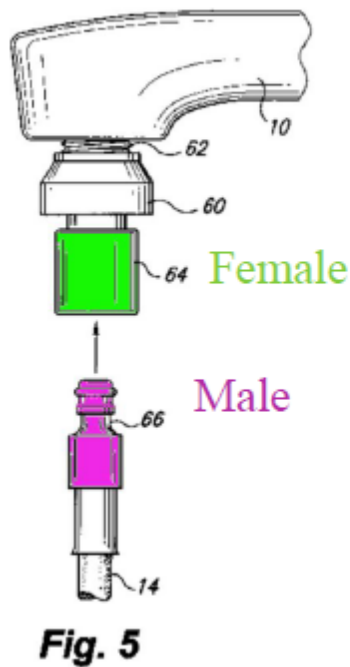
Guoxin discloses a tube configured to attach directly to the bowl fill restriction to direct the second portion of water to a toilet tank overflow tube, as is conventional in the art. *See* annotated figure of Guoxin illustrated above regarding claim elements **1[Pre]** and **24[Pre]** and annotated Fig. 2 below; EX1004, ¶159.



Guoxin discloses tube 403 (Fig. 2), that is configured to provide water supply to the toilet bowl. EX1016, 2:17-18; EX1004, ¶160. Guoxin therefore satisfies this element. *Id.*

k. Summary

The only element of independent claims 1 and 24 not expressly disclosed by Guoxin is an extended portion containing a recess that mates with a corresponding protrusion of the switching mechanism 4. As discussed above, switching or reversing the mating surfaces (recess and protrusion) to one or the other fluid conduits is merely a matter of design preference, and would have been obvious to a POSITA. EX1004, ¶161; *See, e.g.*, EX1017 (Bjerke), 7:15-24, Figs. 5-6 (below) (interchangeability of male 66/64a and female 66/66a portions of quick connect system).



Indeed, the '105 patent discloses the obvious interchangeability of protrusions, ribs, recesses, etc., on the respective couplings. EX1001, 7:21-33; EX1004, ¶162. The '105 patent also contemplates the use of any of a variety of well-known snap fit and sealing configurations: “Also, other snap fit and sealing configurations may be employed beyond those specifically described herein.” *Id.*, 9:52-53; EX1004, ¶162. Finally, as discussed above, Ho discloses this feature of the claims.

In view of the foregoing, Guoxin alone, or Guoxin in view of Ho renders obvious independent claims 1 and 24. EX1004, ¶163.

2. Independent claim 9 is obvious over Guoxin in view of Ho

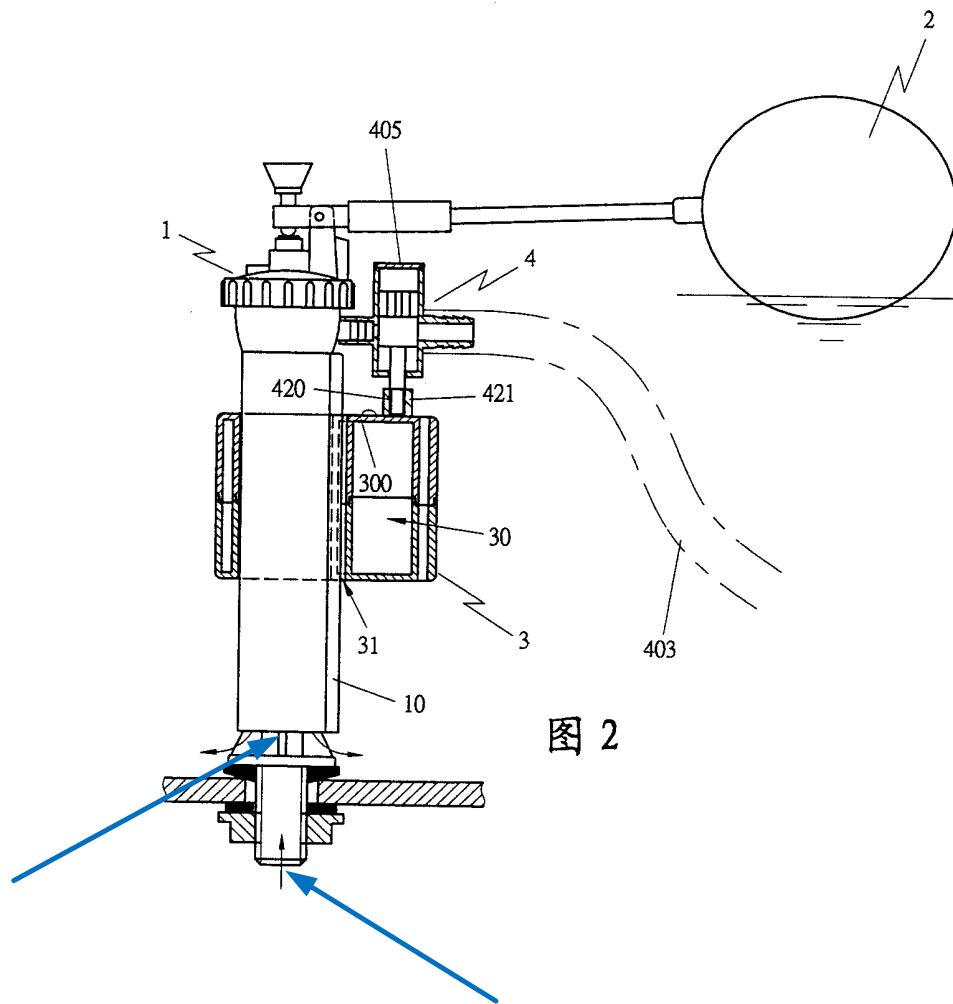
Independent claim 9 is obvious over Guoxin in view of Ho for the generally the same reasons as claims 1 and 24 are obvious as described above. Claim 9 is fundamentally nothing more than the method (steps) performed when using the system of claims 1 and 24.

a. 9[Pre], 9[A]

In addition to the discussion of **1[B]** and **24[B]** above, Petitioner notes that Guoxin discloses a water inlet device 1 that includes a conventional ball float 2 “to control whether or not the water inlet device admits water,” as shown by the upward pointing arrow at the bottom of Figure 2. *See* EX1004, ¶166; EX1016, 2:8-10. Guoxin therefore satisfies these elements. *Id.*

b. 9[B]

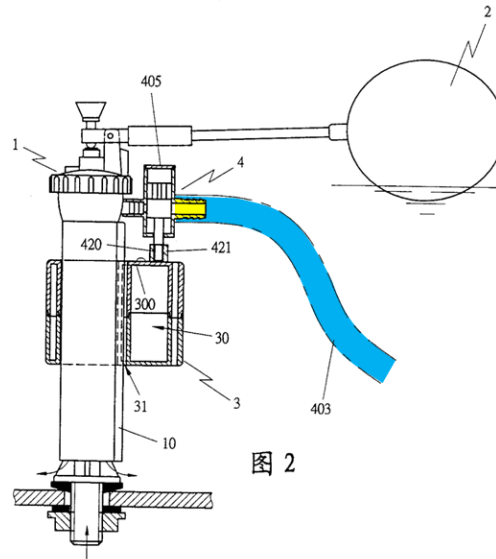
In addition to the discussion of **1[C]** and **24[C]** above, Petitioner notes that in operation, Guoxin discloses this claim element. EX1004, ¶168. Guoxin illustrates a first tank water outlet as shown by the downwardly and radially extending arrows at the bottom of Figure 2. *Id.*; EX1016. Guoxin therefore satisfies this element. *Id.*



c. 9[C1]

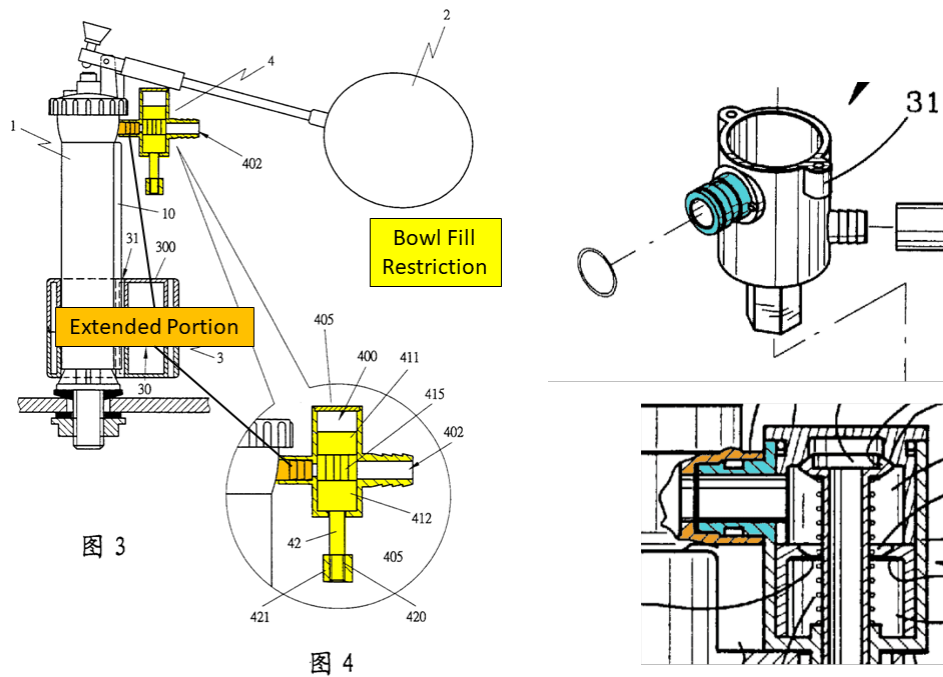
In addition to the discussion of 1[D3] and 24[D3] above, Petitioner notes that Guoxin discloses water being supplied from water inlet 1 into switching mechanism 4 as a second portion of water to be supplied to the toilet bowl via switching mechanism 4 through the extended portion and through inlet 401 of the bowl fill

restriction. EX1004, ¶170; EX1016, 2:8-20, Figures 2-5. Guoxin satisfies this element. *Id.*



d. 9[C2]

In addition to the discussion of **1[A]** and **24[A]** above, Petitioner notes that both Guoxin and Ho disclose and illustrate radially extending extended portions integrally molded with the toilet valve body. EX1004, ¶172. Thus, Guoxin, and the combination of Guoxin and Ho, satisfies this element. *Id.*



e. 9[C3]

Guoxin’s switching mechanism 4 attaches directly to the extended portion of toilet fill valve. See EX1016, Fig. 4; EX1004, ¶174. Ho illustrates diverter valve means 30 attached directly to the extended portion of the toilet fill valve. EX1022, Figs. 3, 4 and 6-11. Thus, Guoxin, and the combination of Guoxin and Ho, satisfies this element. *Id.*

f. 9[C4]

Guoxin and Ho show Guoxin’s switching mechanism 4 and Ho’s diverter valve 30 as unitary structures. Furthermore, claim 3 of Guoxin specifically recites that the switching mechanism 4 and valve stem (together the bowl fill restriction) are “integrally formed, making assembly and combination exceedingly convenient

and fast.” EX1016, 3:3-4; EX1004, ¶176. Thus, to the extent that Guoxin’s switching mechanism 4 and Ho’s diverter valve 30 are not considered to be “constructed as a single piece,” constructing them as a single piece would have been an obvious matter of design preference to a POSITA. EX1004, ¶176. Indeed, a POSITA would understand that having the bowl fill restriction as a single piece would be advantageous in that assembly of the bowl fill restriction and toilet fill valve would simply require snapping or pressing the two pieces together. *Id.* Examples of bowl fill restrictions being constructed as a single piece are also found throughout the prior art, such as in Williams and Alles. Thus, this element is obvious in view of the prior art. *Id.*, ¶176.

g. 9[C5]

Guoxin satisfies this element for the same reasons discussed in **1[D4]** and **24[D4]** above. EX1004, ¶178.

h. 9[D]

In addition to the discussion of **1[E]**, **24[E]** above, Petitioner notes that directing a second portion of water to a toilet tank overflow tube is conventional in the art and disclosed by Guoxin. As such, Guoxin satisfies this element. EX1004, ¶180.

i. Summary

Guoxin and Ho individually or in combination disclose or render obvious all of the elements recited by independent claim 9. EX1004, ¶181.

3. Independent claim 15 is obvious over Guoxin in view of Ho

Independent claim 15 is obvious over Guoxin in view of Ho for the generally the same reasons as claims 1 and 24 are obvious as described above. Claim 15 is fundamentally nothing more than the method (steps) performed when assembling the system of claims 1 and 24. Regarding assembly, toilet fill valves have been made easier to assemble and replace by homeowners, and consequently, toilet fill valve replacement kits were readily available at hardware and home improvement stores long before the earliest effective filing date of the '105 patent. EX1004, ¶182. Fabricating various parts separately and designing the separate parts for easy assembly would have been considered obvious design parameters and/or obvious and routine optimization to a POSITA prior to the '105 patent filing date. *Id.* There is nothing unique, unexpected, or unobvious in the method steps recited by method 15. *Id.* Indeed, claim 3 of Guoxin specifically recites that the bowl fill restriction (switching mechanism 4) and valve stem are “integrally formed, ***making assembly and combination exceedingly convenient and fast.***” EX1016, 3:3-4, emphasis added; EX1004, ¶182.

a. 15[Pre]

To the extent any of the respective pieces of the toilet fill valve and bowl fill restrictions disclosed by Guoxin and Ho are assembled prior to operation of the toilet fill valve, the cited art inherently discloses a method of assembling the respective parts. EX1004, ¶184. Claim 3 of Guoxin specifically recites that the bowl fill restriction (switching mechanism 4) and valve stem are “integrally formed, making assembly and combination exceedingly convenient and fast.” EX1016, 3:3-4; EX1004, ¶184.

b. 15[A1]

For the same reasons discussed above with respect to elements 1[A], 24[A], 1[D1], 24[D1], 9[C2], and 9[C3], Guoxin alone or in view of Ho disclose or renders obvious this element. EX1004, ¶186.

c. 15[A2]

This claim element does not further limit this method claim, and prior art that restricts or diverts fluid flow away from the bowl fill outlet port will inherently satisfy this element. For the same reasons discussed above with respect to elements 1[A], 24[A], 1[D4], 24[D4], and 9[C5], Guoxin and Ho disclose or render obvious this element. EX1004, ¶188.

d. 15[B]

For the same reasons discussed above with respect to element **1[D2]** above, the combination of Guoxin and Ho renders obvious this element. EX1004, ¶190.

e. 15[C]

In addition to the discussion of elements **1[E]**, **24[E]**, and **9[D]** above, Petitioner notes that directing a second portion of water to a toilet tank overflow tube is conventional in the art and disclosed by Guoxin. EX1004, ¶192. Thus, Guoxin satisfies this element for the same reasons discussed above regarding **1[E]**, **24[E]**, and **9[D]**. *Id.*

f. Summary

Guoxin and Ho individually or in combination disclose or render obvious all of the elements recited by independent claim 15. EX1004, ¶193.

4. Dependent claims 2-3, 6, 8, 10-14, and 16-23 are obvious over Guoxin in view of Ho

a. Claim 2

Both Guoxin and Ho disclose an extended portion extending radially from a longitudinal axis of the fill valve. EX1016, Fig. 1; EX1022, Figs. 3 and 6-11; EX1004, ¶195. Guoxin in view of Ho renders obvious claim 2. *Id.*

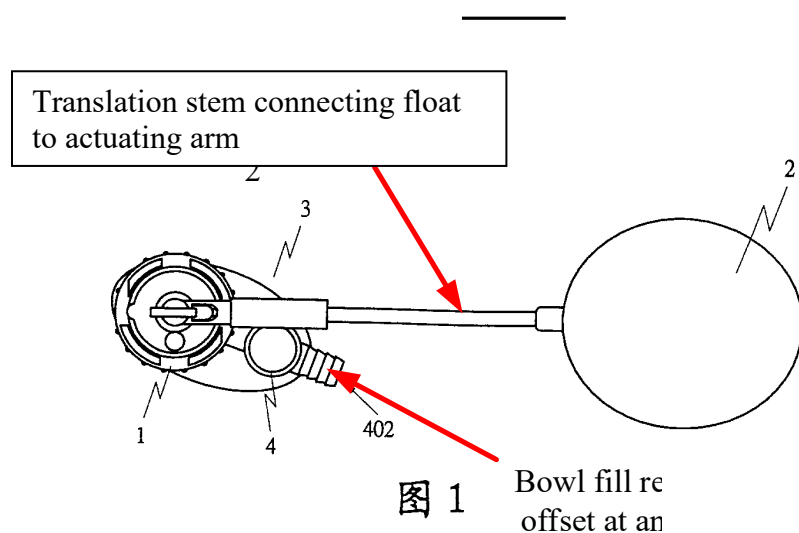
b. Claim 3

Dependent claim 3 does not further limit claim 1 and recites the same limitation as recited by **1[D2]**. EX1004, ¶197. To the extent claim 3 further limits

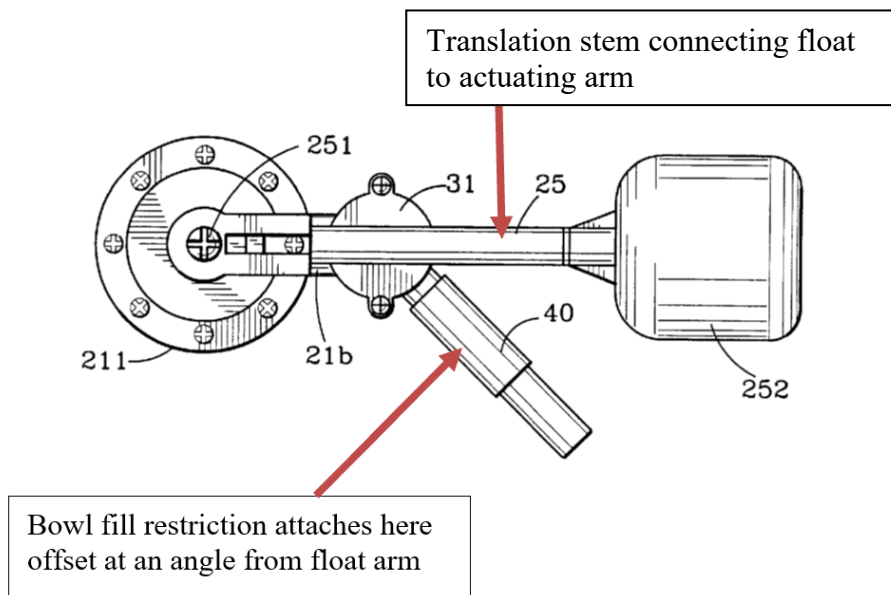
claim 1, Guoxin in view of Ho renders obvious the features of claim 3 for the same reasons discussed above with respect to element 1[D2]. *Id.*

c. Claim 6

The features recited by claim 6 are disclosed and illustrated in each of Guoxin and Ho, and would have been 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. EX1004, ¶199; *see* EX1016, Fig. 1 below; EX1022, Fig. 6 below.



Ho



Guoxin and Ho disclose the features of dependent claim 6, thereby rendering this claim obvious. EX1004, ¶200.

d. Claim 8

Dependent claim 8, to the extent it recites a limitation, merely recites the inherent feature and function of preventing a pressure head formed in the outlet tube. EX1004, ¶202. The '105 patent states that the direct connection, without an intervening hose or tube, prevents the pressure head. EX1001, 4:3-6; EX1004, ¶202. Given that the '105 patent defined "integral" as either molded as a single piece or connected directly to one another, Guoxin and Ho each inherently discloses the elements of claim 8 by virtue of the direct connection between the bowl fill restriction and the extended portion of the toilet fill valve. EX1004, ¶202.

e. Claim 10

For the same reasons discussed above with respect to claim 8, Guoxin and Ho disclose a direct connection that inherently prevents a pressure head from being formed in the tube and claim 10 is obvious over Guoxin and Ho. EX1004, ¶204.

f. Claims 11 & 12

Guoxin discloses terminating the flow of the second portion of water when the toilet bowl reaches a certain level. EX1016, 2:25-27; EX1004, ¶207. That level is set by adjusting the T-shaped nut to change the position of how the switching valve's stem is driven, which in turn alters amount of water that can leave the bowl fill restriction before the float valve stops water from entering the water inlet. EX1016, 2:27-33; EX1004, ¶207. Guoxin also discloses a conventional ball cock valve attached to float 2, which controls “whether or not the water inlet device admits water.” EX1016, 2:8-10; EX1004, ¶207. Guoxin therefore satisfies the elements of claims 11 and 12. EX1004, ¶207.

g. Claims 13 & 14

These features are discussed above with reference to elements 1[A], 24[A], 15[A1] and claim 2. Thus, claims 13 and 14 are obvious for the same reasons discussed above. EX1004, ¶210.

h. Claim 20

This feature is fully disclosed or rendered obvious by Guoxin and Ho, as discussed above with reference to dependent claim 3. EX1004, ¶212.

i. Claims 21 & 23

This feature is recited in element 9[C4]. For the same reasons discussed above, claims 21 and 23 would have been obvious over the prior art. EX1004, ¶215. The features of dependent claims 21 and 23 therefore are obvious over Guoxin in view of Ho. *Id.*

j. Claim 22

The features of dependent claim 22 are the same as the elements of 1[D2], 24[D2], and claim 7. EX1004, ¶217. For the same reasons discussed above, dependent claim 22 is obvious over the prior art. *Id.*

B. Dependent Claims 4, 5, 7, and 16-19 are Obvious Under 35 U.S.C. §103(a) Over Guoxin in view of Ho, and Further in View of the Quick Connection Art

The connection between the two fluid channels recited by dependent claims 4, 5, 7, and 16-19 are well-known fluid flow connections disclosed by numerous documents such as Bjerke, Calmettes, Hall, and Kimber—the Quick Connection Art. EX1004, ¶218.

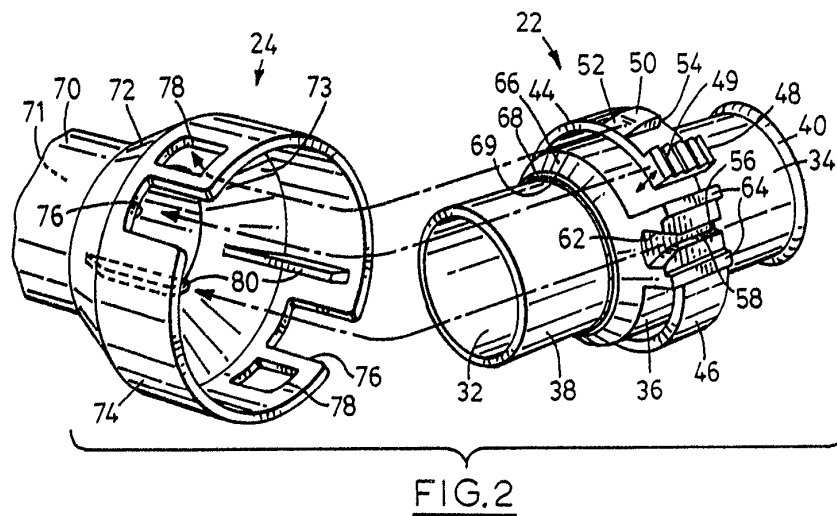
1. Claims 4 & 5

Dependent claims 4 and 5 recite clamping (4) or snapping (5) the bowl fill restriction to the extended portion. EX1004, ¶221. To the extent Guoxin in view of Ho does not expressly disclose these mechanisms of attachment, it would have been obvious to a POSITA to use any known method of connecting two fluid channels to one another, such as any of those disclosed in the Quick Connection Art. *Id.* The '105 patent does not define the terms “clamping” or “snapping” and uses the term clamping only once with reference to the fluid flow connection between the toilet and bowl fill valves. EX1001, 2:23-26; EX1004, ¶221. Rather, the '105 patent uses the term “clamping” as generally referring to the use of compressive force. *Id.*, 8:20-26. Further, the '105 patent places no criticality on the particular connection mechanism employed: “...other snap fit and sealing configurations may be employed beyond those specifically described herein.” *Id.*, 9:52-53; EX1004, ¶221.

Guoxin's bowl fill restriction is clamped on and over an extended portion, as shown in Figures 2-5, such that a compressive force is exerted on the extended portion in order to maintain a tight connection. EX1016; EX1004, ¶225. Such a connection is similar to that of Horad, Shaw, and Williams, all of which rely upon compressive force (i.e., clamping) in order to create the friction necessary to maintain connections with the bowl fill restriction. Guoxin in view of Ho and further

in view of the knowledge of a POSITA, therefore renders obvious dependent claim 4. EX1004, ¶225.

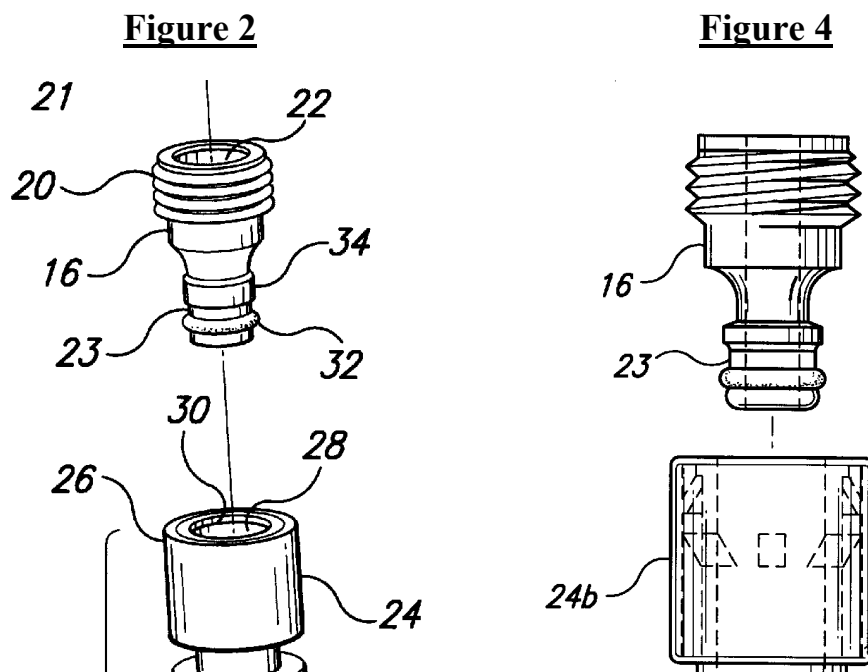
Kimber discloses a clamping arrangement between fluid flow couplings that has the advantage of making the connection between two fluid flow channels easy and detectable by the user by virtue of the male and female fittings snapping together and the use of mating slots, protrusions, projections, and apertures. EX1020, 4:17-21; EX1004, ¶226. Figure 2 below illustrates the coupling arrangement between male fitting 22 and tubular female fitting 24.



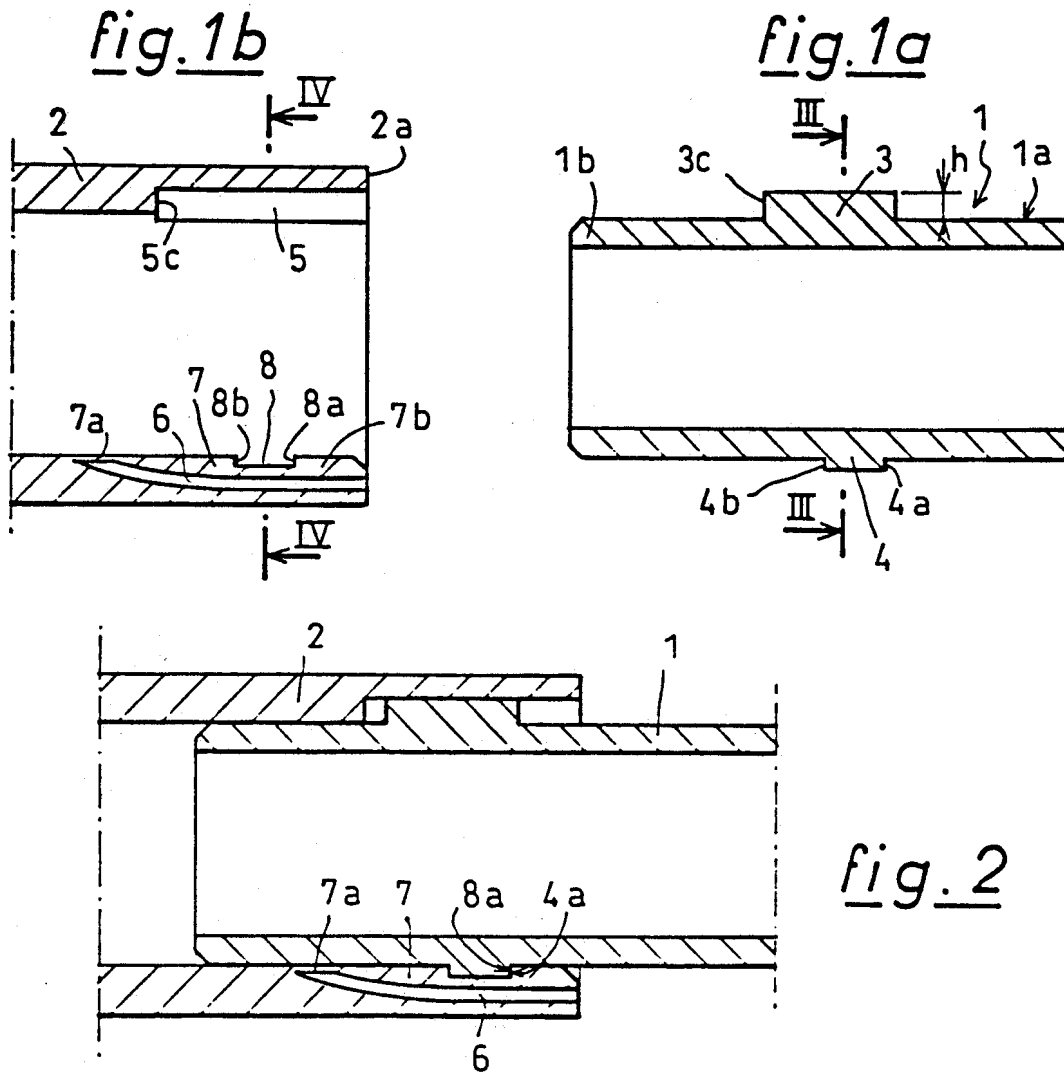
Kimber discloses the female fitting being formed as part of a molded portion of an automobile engine, which would have rendered obvious switching the mating protrusion and recess of Guoxin such that the extended portion of Guoxin comprises a female fitting with a recess molded together with the toilet fill valve. EX1004,

¶227. The spring arms 48 form an arrangement with apertures 78 in end 24 when inserted. *Id.*

Bjerke and Calmettes each disclose a snap-fit connection between fluid flow channels. EX1004, ¶228. This connection is shown in annotated Figures 2 and 4 of Bjerke below.



Notably, Ho (EX1022, Figs. 3 and 5) shows a connection similar to that shown in Bjerke. EX1004, ¶229. The mating arrangement of the coupling device of Calmettes (EX1018) can be seen with reference to Figures 1a, 1b, and 2, reproduced below.

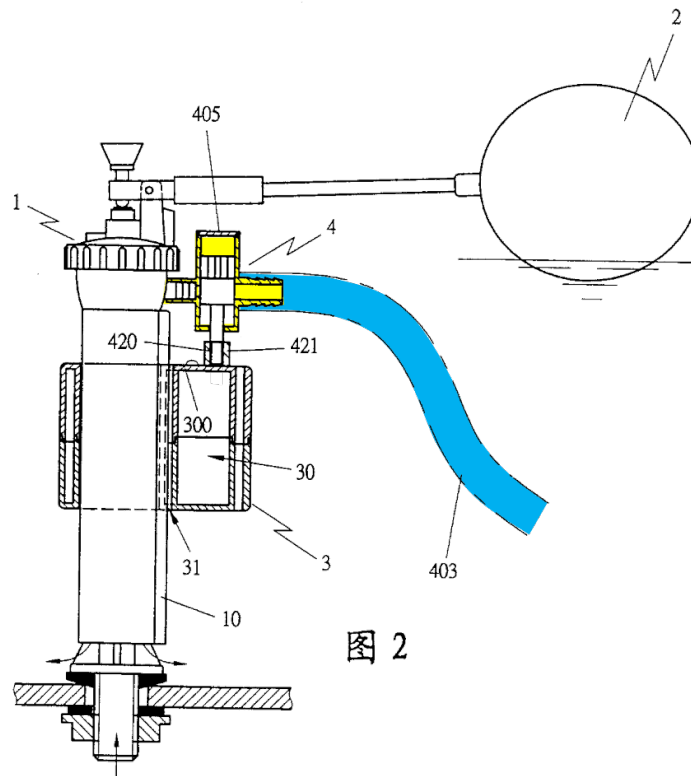


As shown above and explained in Calmettes, the male end of the coupling, denoted by numeral 1, includes a rib, or boss 3 extending axially on one side, and protuberance 4 extending axially on the opposite side of boss 3. EX1018, 3:20-4:54, Fig. 2; EX1004, ¶230. Boss 3 mates with groove 5 formed in the interior wall of the female end of the coupling, denoted by numeral 2. *Id.*, 4:22-28; EX1004, ¶230. Similarly, protuberance 4 mates with groove 8 to form a snap-fit connection. *Id.*,

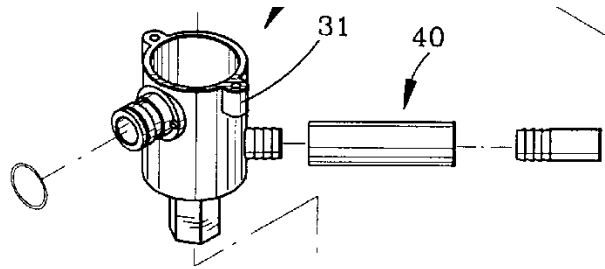
4:32-51; EX1004, ¶230. Guoxin and Ho, in view of either Kimber, Bjerke or Calmettes renders obvious claim 5. EX1004, ¶230.

2. Claim 7

As described and shown above with respect to claims 1[E], Guoxin and Ho each discloses a connection between fluid flow channels in which one end comprises a nipple with annular ridges that is inserted into a tube that directs water from the water flow regulator to the toilet tank overflow tube. *Id.*; see also, EX1016, annotated Fig. 2 below, EX1022, 3:12-17, Figs. 1-2, 4-5, relevant portion of Fig. 5 below. Thus, Guoxin and Ho each satisfy claim 7. *Id.*



EX1016, Fig. 2 (Annotated)



EX1022, Fig. 5 (Excerpt)

3. Claims 16-19

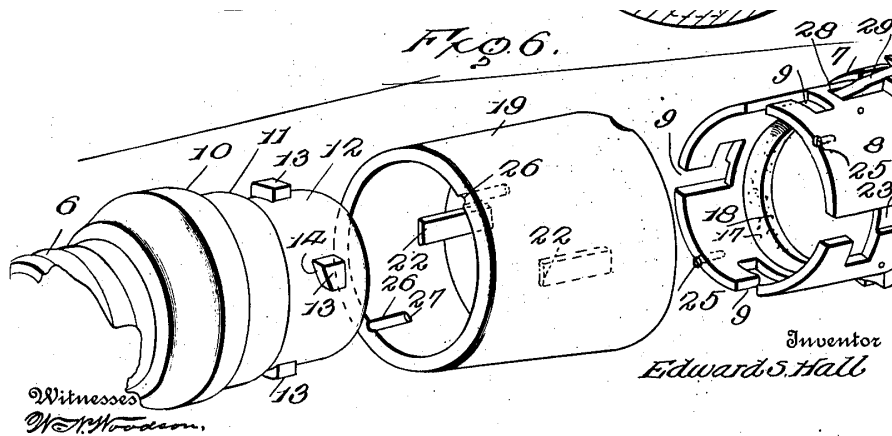
Dependent claims 16-19 recite various mechanisms for preventing the bowl fill restriction from detaching from the extended portion of the body. EX1004, ¶237. Petitioner assumes for the sake of this Petition only that “preventing” in the context of these dependent claims is not a permanent prevention, but rather only prevents detachment during normal operation of the toilet fill valve.

As discussed above with respect to **1[D2]**, Guoxin discloses a protrusion that is configured to insert into and lock within a recess in inlet 401 of the bowl fill restriction, EX1004, ¶238; EX1016, Figs. 3-4. Similarly, Ho discloses a protrusion configured to snap fit into a recess in the extended portion of the toilet fill valve. EX1004, ¶238; *see* EX1022, Figs. 3 and 5 below. As such, Guoxin and Ho each disclose the elements of claim 16.

Further, preventing detachment via clamping or snapping the bowl fill restriction would have been an obvious design choice, as described above with

reference to claims 4 and 5. EX1004, ¶239. As stated therein, Guoxin in view of Kimber renders obvious the subject matter of claim 17, which recites clamping the bowl fill restriction to the toilet fill valve, and Guoxin in view of Bjerke or Calmettes renders obvious the subject matter of claim 18, which recites a snap-fit connection. *Id.*

Dependent claim 19 would also have been obvious over Guoxin in view of Hall. EX1004, ¶240. Figure 6 of Hall (EX1019) illustrates the fluid flow connection device described therein:



This well-known coupling in which axial protrusions 13 (lugs) on the male portion mate with grooves 9 (bayonet slots) formed in the female portion, which upon insertion, can be rotated to lock in place, is the same configuration shown in Figures 6A-6C of the '105 patent. EX1019, 66-85; EX1001, Figs. 6A-6C; EX1004, ¶241. Guoxin and Ho, in view of Hall therefore renders obvious claim 19. *Id.*

C. Claims 1-3, 6, 8-15, and 20-24 are Obvious Under 35 U.S.C. §103 Over Brown in View of Ho

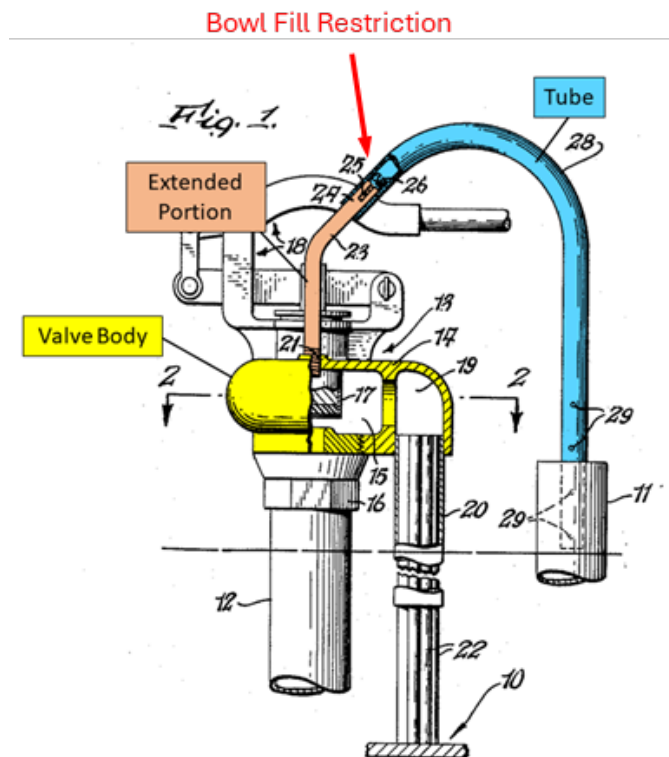
Brown is listed on the face of the '105 patent but was not cited to reject the claims. To the extent Brown does not expressly disclose an element of the Challenged Claims, the element is disclosed by Ho, which was not considered by the Examiner. EX1004, ¶242. To the extent that it is argued that Brown does not disclose an extended portion integrally molded with the toilet fill valve that extends outwardly and that contains a recess into which a protrusion from a bowl fill valve or restriction device is inserted, Ho discloses this and this connection in Ho can be used in the system of Brown. *Id.*

Both Brown and Ho are directed to toilet valve systems that utilize and describe bowl fill restrictions (e.g., “set screw 26” in Brown and “diverter valve means 30” in Ho) that attach directly to the toilet fill valve to accurately control the amount of water that flows from the toilet fill valve into the toilet bowl. EX1004, ¶242; *see, e.g.*, EX1021, 1:2-4, 1:63-70, Figs. 1, 3, 4; EX1022, 1, 1:6-9, Figs. 1-5. Similar to the discussion above in Section VIII.A with respect to Guoxin and Ho, the toilet fill valve connectors at issue here are likewise interchangeable; EX1004, ¶244. In view of the foregoing, 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. *Id.*, ¶245.

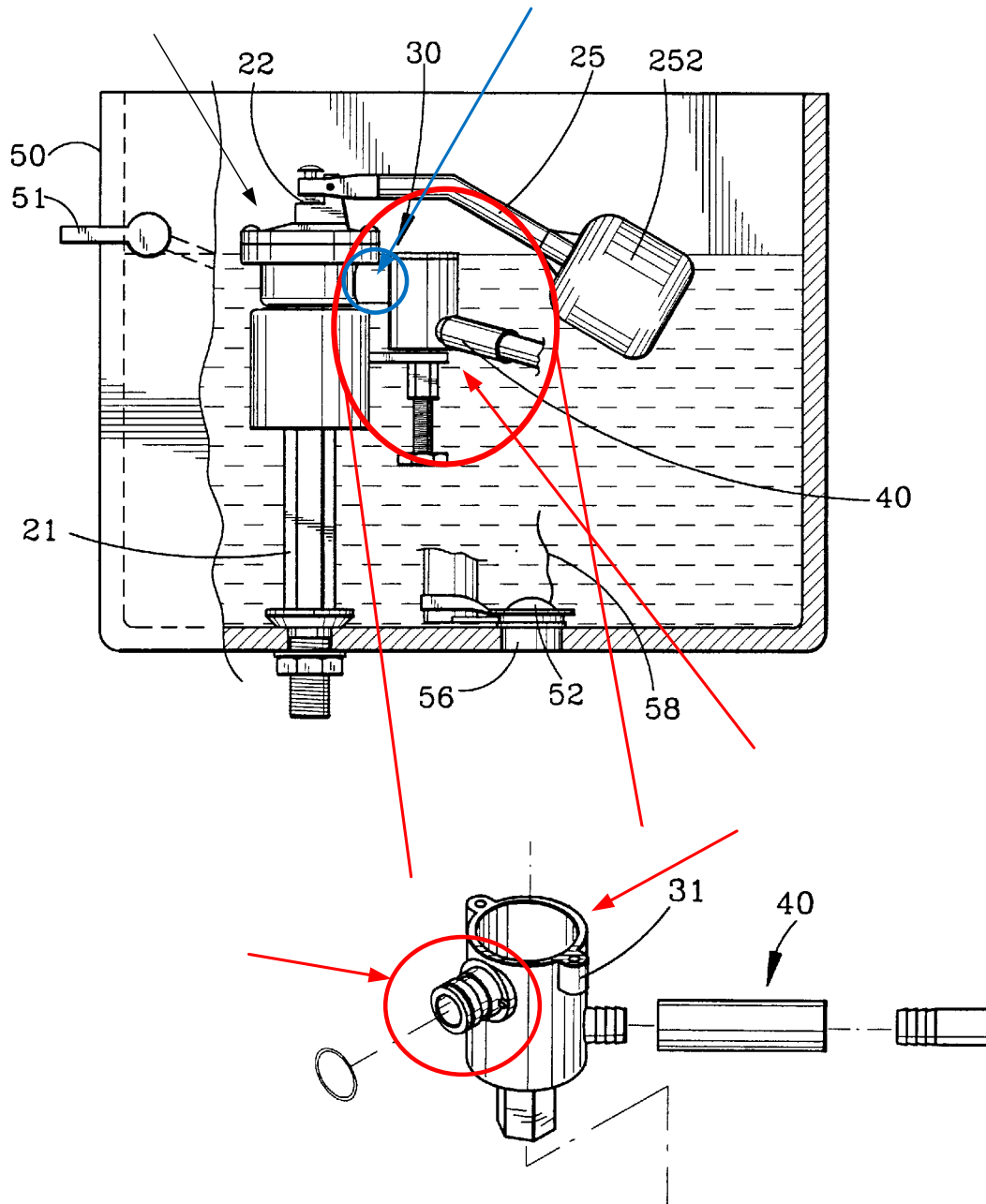
1. Independent claims 1 and 24 are obvious over Brown in view of Ho

a. 1[Pre], 24[Pre]

Annotated figures of Brown and Ho below show a system. Brown discloses a system comprising a toilet fill valve that includes at least an upstanding intake pipe 12, an upstanding overflow pipe 11, and a valve assembly mounted on pipe 12 that is referred to in general by number 13 in the annotated figures below. EX1021, 2:52-57; EX1004, ¶247.



The relevance of Ho to each of the Challenged Claim elements is set forth in Sections VIII.A and VIII.B above. *See* annotated Figures 2 and 5 of Ho (EX1022) below for reference.



Brown and Ho each satisfy the preamble of claims 1 and 24. EX1004, ¶249.

b. 1[A], 24[A]

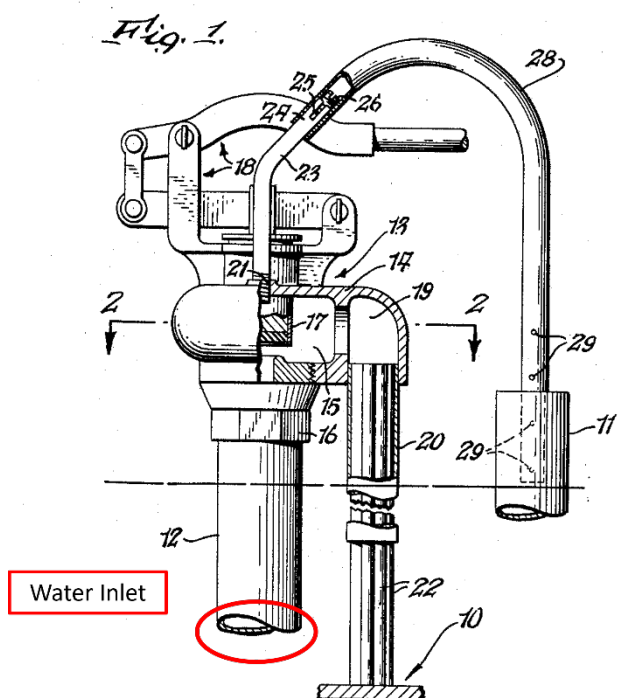
Brown discloses a toilet fill valve with an extended portion 23 that is attached via threaded opening 21. EX1021, 2:65-67. Extended portion 23, or adapter tube 23 of Brown forms a bowl fill outlet port. EX1004, ¶252. Brown's extended portion 23 is integral to the toilet fill valve once attached via threaded opening 21 in view of Petitioner's claim construction. *See* Section I.A.3; EX1004, ¶252.

Alternatively, it would have been obvious to mold the toilet fill valve body of Brown together with the extended portion 23 in a single mold, given the more recently developed molding techniques that were not readily available in 1959 when Brown was filed. EX1004, ¶253. Moreover, Ho discloses integrally molded outlets on a toilet fill valve body that are attached to a bowl fill restriction, thereby rendering obvious integrally molding extended portion 23 with the toilet fill valve body of Brown. *Id.*

Based on Brown alone, or Brown in view of Ho, elements 1[A] and 24[A] are obvious. EX1004, ¶254.

c. 1[B], 24[B]

Brown's upstanding intake pipe 12 (EX1021, 2:54-55, Annotated Fig. 1 below), and Ho's water supplying pipe 21 (EX1022, Fig. 3), each disclose a water inlet configured to receive water from a water source. EX1004, ¶257.

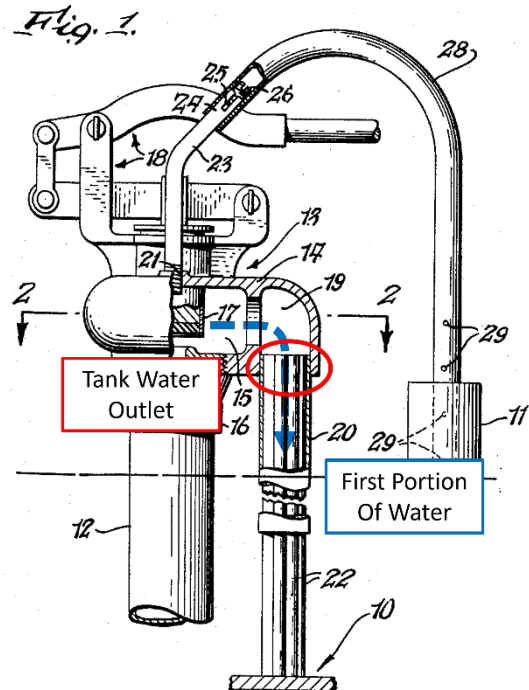


Brown and Ho therefore each satisfy this element. EX1004, ¶258.

d. 1[C], 24[C]

Brown discloses tank water outlet 20 that allows water to flow into tank 10.

EX1021, 3:1-4; Annotated Fig. 1 below; EX1004, ¶261.

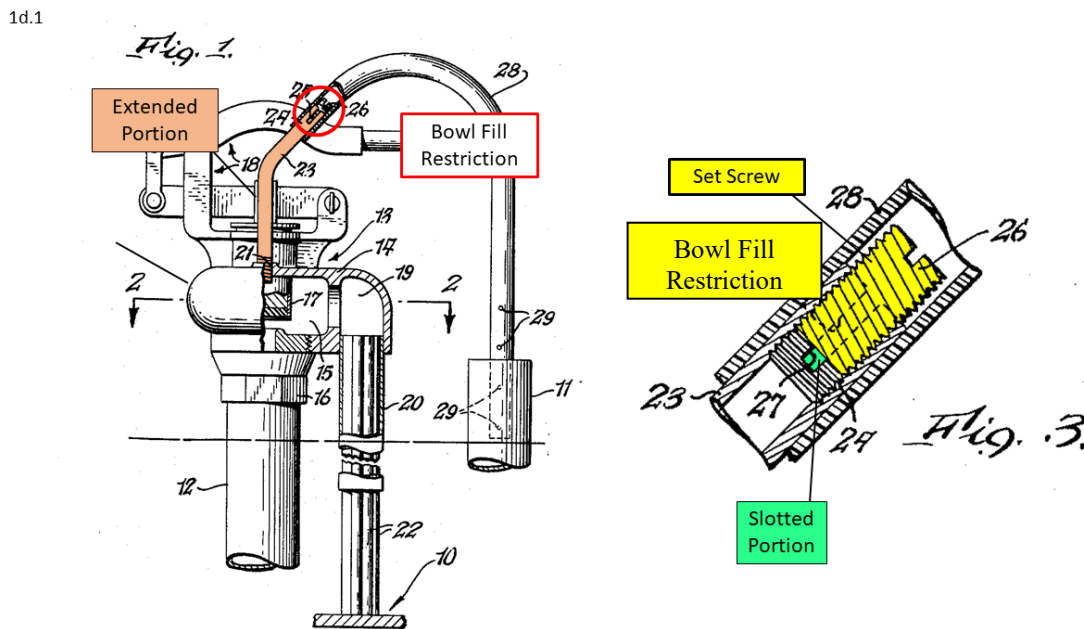


Brown therefore satisfies this element. *Id.*

e. 1[D1], 24[D1]

Brown discloses a bowl fill restriction in the form of set screw 26 that attaches to the slotted portion 24 of adapter tube 23, which is attached directly to the man body of adaptor tube 23 (extended portion) of toilet fill valve and where “[t]he slotted portion 24 of adapter tube 23 and the set screw 26 form an adjustable metering valve for confining the flow of water through the restricted opening 27

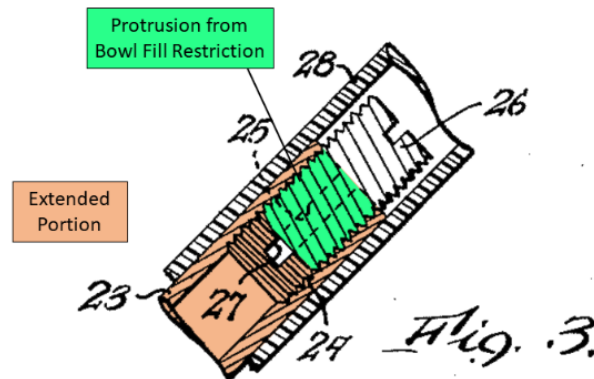
formed between slots 25 of portion 24 and the end of set screw 26.” EX1021, 3:52-56, annotated Figs. 1 and 3 below; EX1004, ¶264. Brown therefore satisfies this element. *Id.*



f. 1[D2]

A portion of set screw 26 of Brown is a protrusion that is configured to insert into a recess in the extended portion (adaptor tube 23) of the toilet fill valve, where the screw threads engage the mating grooves of the adaptor tube in order to lock the set screw to the extended portion. EX1021, annotated Fig. 3 below; EX1004, ¶266. A POSITA would understand that set screw 26 is designed to be self-locking so that it does not back-out once set so that it properly perform its flow control functions.

Id.



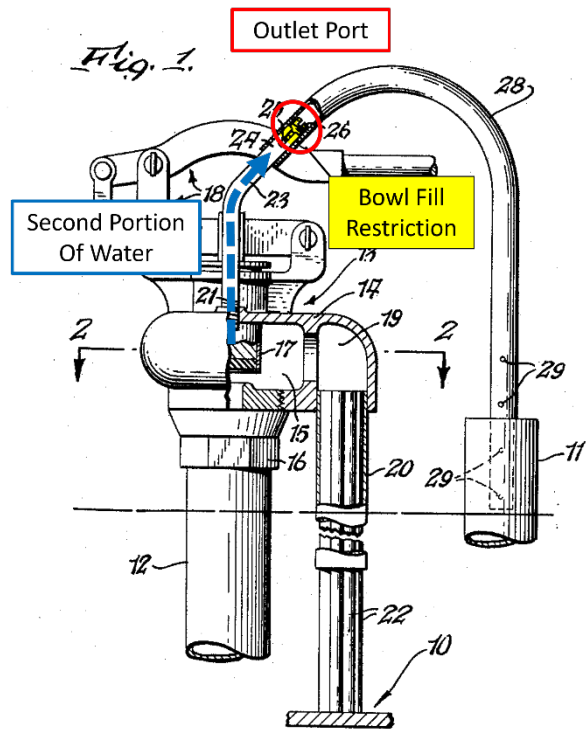
Brown discloses a protrusion on a bowl fill restriction that locks into a recess in an integrally molded extended portion of the toilet fill valve, thereby satisfies this element. EX1004, ¶267.

g. 24[D2]

As described above with reference to claim element 1[D2], Brown discloses means for locking the bowl fill restriction to the extended portion. EX1004, ¶269. Brown therefore satisfies this element. *Id.*

h. 1[D3], 24[D3]

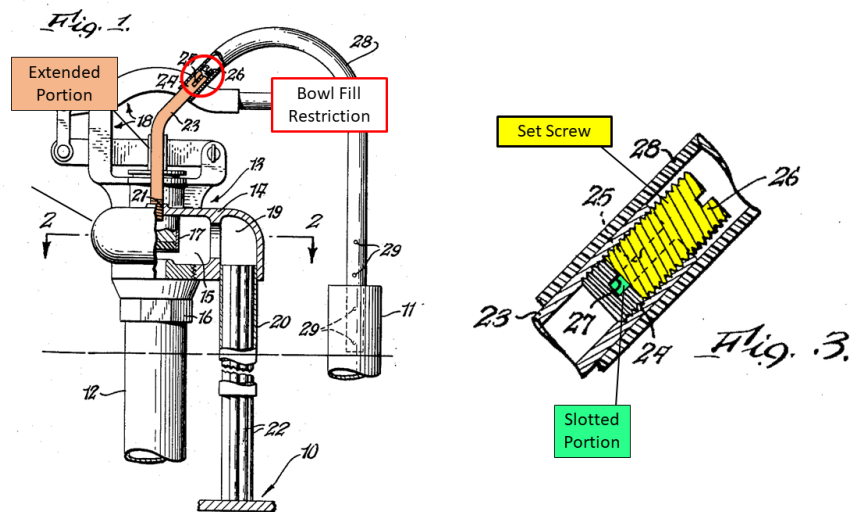
Brown discloses water being supplied from pipe 12 into main chamber 15 and to divide into two paths. EX1004, ¶272. The major portion flows downwardly into tank through fill tube, and the remainder, or second portion, flows through opening 21 through extended portion 23, bowl fill restriction 26, and eventually to overflow pipe 11. EX1021, 2:72–3:6, *see* annotated Figure 1 below; EX1004, ¶272.



Ho's disclosure of this element is discussed above in Section VIII.A.4. Brown and Ho therefore each satisfy this element. EX1004, ¶273.

i. 1[D4], 24[D4]

Brown discloses a bowl fill restriction that is configured to constrict a flow rate of the second portion: "The slotted portion 24 of adapter tube 23 and the set screw 26 form an adjustable metering valve for confining the flow of water through the restricted opening 27...." EX1021, 3:52-56, Figs. 1 and 3; annotated Fig. 3 below; EX1004, ¶276.



Brown therefore satisfies this element. EX1004, ¶276.

j. 1[E], 24[E]

Brown discloses a tube attached directly to the portion of the adaptor tube 23 that forms the metering valve and houses set screw 26. Tube 28 directs the second portion of water to a toilet tank overflow tube, as is conventional in the art. *See* elements 1[Pre] and 24[Pre] above; EX1004, ¶279. Ho discloses a diverter valve 30 (bowl fill restriction) 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. EX1022, 3:6-11, Fig. 2. To the extent it is argued that Brown does not disclose this limitation, a POSITA would understand that the valve disclosed in Ho, with a tube directly attached to the valve could be adapted for use with the system disclosed in Brown for the reasons discussed above. Further, 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. Thus, Brown and Ho each satisfy this element. EX1004, ¶279.

k. Summary

Independent Claims 1 and 24 are obvious over Brown or Brown in view of Ho. To the extent that it is argued that Brown does not expressly disclose integrally molded extended portion of the toilet fill valve body, it would have been obvious to form extended portion 23 of Brown as an integrally molded extension, as disclosed by Ho. EX1004, ¶280. A POSITA would have found it obvious to modify Brown's toilet fill valve, disclosed in 1959 when polymers were first discovered, by using more modern molding technology as illustrated in Ho. *Id.* However, Brown discloses this element given the '105 patent's definition of "integral" would include the extended portion 23 of Brown screwed onto threaded opening 21. Similarly, to the extent it is argued that a tube that is configured to attach directly to the bowl fill restriction is not present in Brown, the system of Brown using the bowl fill restriction of Ho discloses all of the limitations. *Id.* In view of the foregoing, Brown alone, or Brown in view of Ho renders obvious all of the elements recited by independent claims 1 and 24 of the '105 patent. *Id.*

2. Independent claim 9 is obvious over Brown in view of Ho

Independent claim 9 is obvious over Brown in view of Ho for the generally the same reasons as claims 1 and 24 are obvious as described above. Claim 9 is

fundamentally nothing more than the method (steps) performed when using the system of claims 1 and 24. More specifically:

- **9[Pre] & 9[A]:** Brown discloses permitting “supply water to flow from pipe 12 into main chamber 15.” EX1021, 2:72–3:1; *see* Ho discussed above; EX1004, ¶283. Thus, Brown and Ho each satisfy the preamble and this element. *Id.*
- **9[B]:** Brown discloses “The major portion of water flows into auxiliary chamber 19, reversing direction and flowing downwardly into tank 10 through fill tube 20.” EX1021, 3:1-4; EX1004, ¶285. Brown therefore satisfies this element. *Id.*
- **9[C1]:** As discussed above with respect to **1[D3]** and **24[D3]**, Brown discloses water being supplied from pipe 12 into main chamber 15 and divided into two paths. The major portion flows downwardly into tank through a fill tube, and the remainder, or second portion, flows through opening 21 through extended portion 23 (of the toilet fill valve), bowl fill restriction 26, and eventually to overflow pipe 11. EX1021, 2:72–3:6, Fig. 1; EX1004, ¶287. Brown therefore satisfies this element. *Id.*
- **9[C2]:** As discussed above with respect to **1[A]** and **24[A]**, both Brown and Ho disclose and illustrate radially extending extended portions

integrally molded with the toilet valve body. EX1004, ¶289. Thus, Brown alone or in view of Ho, renders this element obvious. *Id.*

- **9[C3]:** Brown discloses a bowl fill restriction in the form of set screw 26 that attaches directly to the extended portion 23 of toilet fill valve. EX1021, 3:52-56, Figs. 1 and 3; EX1004, ¶291. Brown therefore satisfies this element. *Id.*
- **9[C4]:** This claim element does not further limit the method of claim 9. EX1004, ¶293. The figures of Brown and Ho show Brown's set screw 26 and slotted portion 24 and Ho's diverter valve 30 as unitary structures. This is similar to the valve shown in the embodiments of the '105 patent that have a movable handle. Providing a bowl fill restriction as a single piece, as in Brown and Ho, would be advantageous in that assembly of the bowl fill restriction and toilet fill valve would simply require snapping or pressing the two pieces together. *Id.* This element is disclosed by the prior art, is obvious in view of the prior art, and it is not an element that provides any meaningful limitation to method claim 9. *Id.*
- **9[C5]:** Brown satisfies this element for the same reasons discussed with respect to **1[D4]** and **24[D4]** above. EX1004, ¶295.
- **9[D]:** Brown satisfies this element for the same reasons discussed above regarding **1[E]** and **24[E]**. EX1004, ¶297.

In sum, Brown and Ho individually or in combination disclose or render obvious all of the elements recited by independent claim 9. EX1004, ¶298.

3. Independent claim 15 is obvious over Brown in view of Ho

Independent claim 15 is obvious over Brown in view of Ho for the generally the same reasons as claims 1 and 24 are obvious as described above. Claim 15 is fundamentally nothing more than the method (steps) performed when assembling the system of claims 1 and 24. For the same reasons discussed in Section VIII.A.2 above, fabricating various parts separately and designing the separate parts for easy assembly would have been considered obvious design parameters and/or obvious and routine optimization to a POSITA prior to the '105 patent filing date. EX1004, ¶299. There is nothing unique, unexpected, or unobvious in the method steps recited by claims 9 and 15. *Id.* More specifically:

- **15[Pre]:** To the extent any of the respective pieces of the toilet fill valve and bowl fill restrictions disclosed by Brown and Ho are assembled prior to operation of the toilet fill valve, the cited art inherently discloses a method of assembling the respective parts. EX1004, ¶301.
- **15[A1]:** For the same reasons discussed above with respect to **1[A]**, **24[A]** **1[D1]**, **24[D1]**, **9[C2]**, and **9[C3]**, Brown alone or in view of Ho discloses or renders obvious this element. EX1004, ¶303.

- **15[A2]:** As discussed above with respect to **1[A]**, **24[A]**, **1[D4]**, **24[D4]**, and **9[C5]**, this claim element does not further limit this method claim, and prior art that restricts or diverts fluid flow will inherently satisfy this element. EX1004, ¶305. For the same reasons discussed therein, Brown and Ho disclose or render obvious this element. *Id.*
- **15[B]:** A portion of set screw 26 of Brown is a protrusion that is configured to insert into a recess in the extended portion 23 of the toilet fill valve, and its threads lock with mating threads on slotted portion 24 of extended portion 23. EX1021, Fig. 3; EX1004, ¶307; *see* discussion of **1[D2]** and **15[B]** in Section VIII.A.2 above. Additionally, Ho discloses a protrusion configured to snap fit into a recess in the extended portion of the toilet fill valve. *See* EX1022, annotated Figs. 3 and 5 in Section VIII.A.1. Brown and Ho therefore satisfies this element. EX1004, ¶307.
- **15[C]:** Directing a second portion of water to a toilet tank overflow tube is conventional in the art and disclosed by Brown. *See* discussion of **1[Pre]** and **24[Pre]** above; EX1004, ¶396. Brown discloses tube 28, and therefore satisfies this element. *See* **1[E]**, **24[E]**, and **9[D]** above; EX1004, ¶309.

In sum, Brown and Ho individually or in combination disclose or render obvious all of the elements recited by independent claim 15. EX1004, ¶310.

4. Dependent claims 2-3, 6, 8, 10-14, and 16-23 are obvious over Brown in view of Ho

a. Claim 2

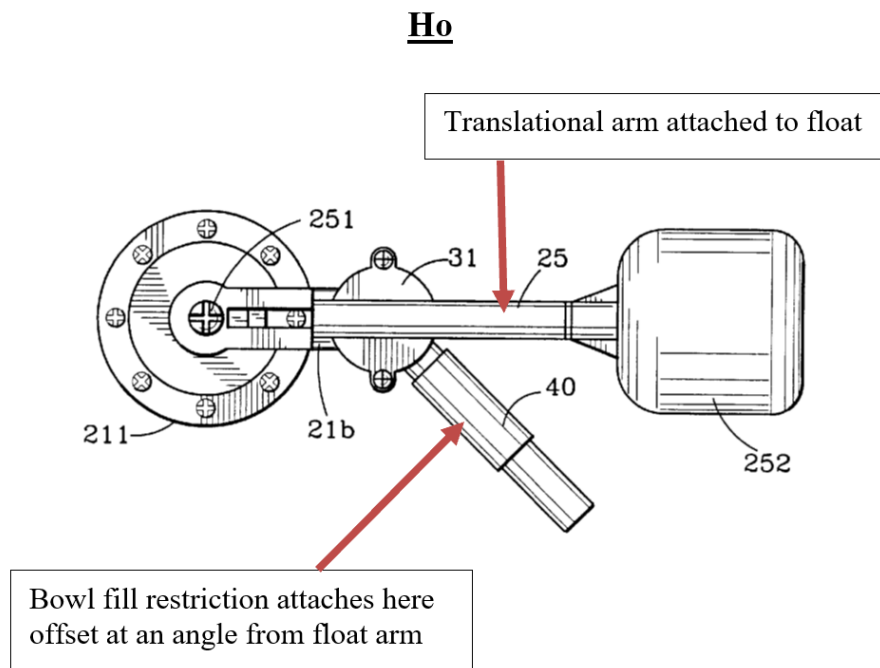
Brown does not disclose its extended portion 23 extending radially, but that feature is disclosed clearly by Ho. EX1022, Figs. 3 and 6-11. EX1004, ¶312. Moreover, when integrally molding the toilet fill valve with the extended portion, as would have been obvious for the reasons stated above, a POSITA 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 bowl fill restriction. *Id.* Furthermore, such an arrangement (i.e., where the extended portion extends radially) allows for flexibility in order to create a more compact toilet fill valve system that could be adapted to fit in more toilet tank designs. *Id.* Brown in view of Ho renders obvious claim 2. *Id.*

b. Claim 3

Brown discloses the features of claim 3 by virtue of inserting a portion of screw 26 into extended portion 23. EX1021, 3:45-51, Figs. 1 and 3; EX1004, ¶314. Ho likewise discloses this feature by inserting the nipple into the recess in the extended portion, as shown in Figure 5 (EX1022). *Id.* Thus, Brown and Ho disclose the features of claim 3. *Id.*

c. Claim 6

The features recited by claim 6 are disclosed and illustrated in each of Brown and Ho, and would have been intuitively obvious to a POSITA. EX1004, ¶316. A POSITA would not design a toilet fill valve with a conventional float attached to a translational arm that was obstructed in some manner from freely translating. *Id.* See EX1021, Fig. 2; EX1022, Fig. 6 below.



Thus, Brown and Ho disclose the features of claim 6, thereby rendering it obvious. EX1004, ¶316.

d. Claim 8

Dependent claim 8, to the extent it recites a limitation to the fill valve of claim 1, merely recites the inherent feature and function of preventing a pressure head

formed in the outlet tube from the bowl fill restriction due to the direct connection between the bowl fill restriction of Brown or Ho, and the extended portion of the toilet fill valve. EX1004, ¶318. When the bowl fill restriction is attached to the extended portion of the toilet fill valve, rather than within the tube directing water to the overflow tube, the pressure head forms within the extended portion instead of within the tube itself. *Id.* Brown and Ho each inherently discloses the elements of claim 8 by virtue of the direct connection between the bowl fill restriction and the extended portion of the toilet fill valve. *Id.*

e. Claim 10

For the same reasons discussed above with respect to claim 8, Brown and Ho disclose a direct connection between the bowl fill restriction and the extended portion of the toilet fill valve, which thereby inherently prevents a pressure head from being formed in the tube. EX1004, ¶320. Thus, claim 10 is obvious over Brown and Ho. *Id.*

f. Claims 11 & 12

Brown discloses using the set screw to ensure the second flow of water to the toilet bowl is at a predetermined level when the toilet fill valve closes the water supply. EX1021, 3:45-71; EX1004, ¶323. If not expressly disclosed, it is very well-known in the art that conventional ball cock valves used in toilet fill valve, such as reciprocating valve 17 in chamber 15 of Brown's ball cock valve assembly 13, open

when the float is lowered, and closes to terminate the water flow when the float rises to the tank refill level. EX1021, 2:52-71, Fig. 1; EX1004, ¶323. Dependent claims 11 and 12 therefore are obvious over Brown alone, or further in view of Ho. EX1004, ¶323.

g. Claims 13 & 14

Dependent claims 13 and 14 are obvious over Brown alone or Brown in view of Ho for the same reasons discussed above with respect to elements **1[A]**, **24[A]**, **15[A1]** and dependent claim 2. EX1004, ¶326.

h. Claim 20

For the same reasons discussed above with respect to claim 3, Brown in view Ho renders obvious claim 20. EX1004, ¶328.

i. Claims 21 & 23

Dependent claims 21 and 23 are either disclosed by Brown and Ho or are obvious over Brown and Ho for the same reasons as discussed with respect to element **9[C4]**. EX1004, ¶331. Indeed, having the bowl fill restriction as a unitary structure, as disclosed by Brown, and illustrated in the Figures of Ho, would be advantageous in that in that assembly of the bowl fill restriction and toilet fill valve would simply require snapping or pressing the two pieces together. *Id.*

j. Claim 22

For the same reasons discussed above with respect to elements **1[D2]** and **24[D2]**, Brown discloses the elements of claim 22 or would have rendered the claim obvious. EX1004, ¶333.

D. Dependent Claims 4, 5, 7, and 16-19 are Obvious Under 35 U.S.C. §103 Over Brown in View of Ho, and Further in View of the Quick Connection Art

To the extent Brown in view of Ho does not expressly disclose these mechanisms of attachment, it would have been obvious to a POSITA to use any known method of connecting two fluid channels to one another, such as any of those disclosed in the Quick Connection Art, for the same reasons discussed in Section VIII.B above. EX1004, ¶335.

1. Claim 4

Brown discloses a set screw that engages the extend portion of the toilet fill valve through its threads. Ho discloses an integrally molded extended portion on a toilet fill valve with a recess into which a bowl fill restriction device with a protrusion is inserted and locked into place. *See* EX1022, Figs. 3 & 5; EX1004, ¶337. Ho's bowl fill restriction is inserted within extended portion such that a compressive force is created between the internal surface of extended portion and the external surface of the bowl fill restriction in order to maintain a tight connection. EX1004, ¶337. Such a connection is similar to that of Horad, Shaw, and Williams, all of which

rely upon compressive force (i.e., clamping) in order to create the friction necessary to maintain connections with the bowl fill restriction. *Id.*

To the extent Brown in view of Ho does not expressly disclose a bowl fill restriction that is configured to be clamped to the extended portion of the body, it would have been obvious to a POSITA to use any known method of connecting two fluid channels to one another, such as any of those disclosed in the Quick Connection Art. EX1004, ¶¶338-341. Thus, Brown in view of Ho and further in view of the knowledge of a POSITA would therefore render claim 4 obvious. *Id.*

2. Claim 5

As discussed in Section VIII.B above, Bjerke and Calmettes each disclose a snap-fit connection between fluid flow channels. EX1004, ¶343. It would have been obvious to substitute the known fluid channel connections taught by any one of Kimber, Bjerke, and Calmettes for the fluid channel connections disclosed by Brown and Ho, and reasonably expect the fluid flow connections would serve their known and expected purpose and function. EX1004, ¶343; *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 416 (2007). Brown and Ho, in view of either Bjerke or Calmettes renders obvious claim 5. EX1004, ¶343.

3. Claim 7

As discussed above with respect to claims 4 and 5, Ho and Bjerke each discloses a connection between fluid flow channels in which one end comprises a

nipple with annular ridges that that is inserted into a tube that directs water from the water flow regulator to the toilet tank overflow tube. EX1004, ¶345. Brown in view of Bjerke and Ho therefore renders obvious dependent claim 7. *Id.*

4. Claims 16-19

Brown discloses preventing detachment by use of a set screw 26, which is inserted into a recess in extended portion 23, and turned or rotated to adjust the amount of water flowing therethrough, thereby satisfying the elements recited by dependent claims 16 and 19. EX1021, 3:45-71; EX1004, ¶¶351-353.

Preventing detachment via clamping or snapping the bowl fill restriction would have been an obvious design choice, as described above with reference to claims 4 and 5, and for the reasons discussed in Section VIII.B above. EX1004, ¶352. For the same reasons, Brown in view of Kimber renders obvious the subject matter of claim 17, and Brown in view of Bjerke or Calmettes renders obvious the subject matter of dependent claim 18, which recites a snap-fit connection. *Id.*

Dependent claim 19 would also have been obvious over Brown in view of Hall. EX1004, ¶353. Hall, discussed in Section VIII.B above, discloses a well-known coupling, which upon insertion, can be rotated to lock in place. EX1004, ¶353. This is the same configuration shown in Figures 6A-6C of the '105 patent. *Id.* Thus, Brown and Ho, in view of Hall therefore renders dependent claim 19 obvious. *Id.*

E. Claims 1-24 are Anticipated by Schuster

This Ground is premised on the Challenged Claims having a priority date of January 27, 2014, the first time the '105 patent included the expression “bowl fill restriction.” The claimed invention must be described in the written description of the earlier application a manner that conveys to the person skilled in the art that the inventors had possession of the claimed invention with all of its limitations. *Lockwood v. American Airlines, Inc.*, 107 F.3d 1565, 1571 (Fed. Cir. 1997) (“One shows that one is 'in possession' of the invention by describing the invention, with all its claimed limitations, not that which makes it obvious.”); *Tronzo v. Biomet*, 156 F. 3d 1154, 1158 (Fed. Cir. 1998); *Columbia Ins. Co. v. Simpson Strong-Tie Co.*, Nos. 2021-2145, 2021-2157, 2023 WL 2733427, at *3 (Fed. Cir. Mar. 31, 2023) (“...patent owner may only exclude others from what they had actually invented *as of the priority date.*”)(emphasis original) (*citing* *Ariad Pharms., Inc. v. Eli Lilly and Co.*, 598 F.3d 1336, 1351 (Fed. Cir. 2010) (en banc). The earlier filed applications in the '105 patent family do not provide written description support for the Challenged Claims, and as a consequence, Schuster is available as prior art under 35 U.S.C. §102(a)(1).

1. PO will not be able to meet its burden of production to show entitlement to its priority applications

PO has the burden of production to show that each claim has section 112(a) support in the application to which PO claims priority. *In re NTP, Inc.*, 654 F.3d

1268, 1276-77 (Fed. Cir. 2011); *see also* 35 U.S.C. §120 (AIA); *Natural Alternatives Int’l, Inc. v. Iancu*, 904 F.3d 1375, 1380 (Fed. Cir. 2018). This burden-shifting law applies even when the applications from which the patent issued are designated “continuation” applications and in Patent Office proceedings. *Research Corp. Techs., Inc. v. Microsoft Corp.*, 627 F.3d 859 (Fed. Cir. 2010); *accord In re NTP, Inc.*, 654 F.3d 1268, 1276 (Fed. Cir. 2011); *Dynamic Drinkware, LLC v. Nat’l Graphics, Inc.*, 800 F.3d 1375, 1379-80 (Fed. Cir. 2015).

“For a claim to be entitled to the ‘the filing date of an earlier application under 35 U.S.C. §120, each application in the chain leading back to the earlier application must comply with the written description requirement of 35 U.S.C. §112.’” *Parus Holdings, Inc. v. Google LLC*, 70 F.4th 1365, 1373 (Fed. Cir. 2023) (*quoting Lockwood v. Am. Airlines, Inc.*, 107 F.3d 1565, 1571 (Fed. Cir. 1997)). Failure to show written description support in an ancestor application can result in claims being found unpatentable based on intervening prior art. *See, e.g., MaxLite, Inc. v. Jiaxing Super Lighting Elec. Appliance Co.*, IPR2020-00208, Paper 14 (P.T.A.B. June 1, 2021). Furthermore, it is not enough that the claims would have been obvious in view of the ancestor application’s disclosure. *Lockwood*, 107 F.3d at 1571-1572 (“Entitlement to a filing date does not extend to subject matter which is not disclosed, but would be obvious over what is expressly disclosed. It extends only to that which is disclosed.”).

Most notably, where an applicant files a first application describing an invention in narrow terms, and later files an application recasting the invention in broader terms with claims that encompass that original invention along with the broader embodiments of the invention not described in the first application, the later claims are not entitled to the earlier filing date of the first filed application. *See, e.g., Tronzo v. Biomet*, 156 F. 3d 1154, 1158-1160 (Fed. Cir. 1998) (parent application that disclosed “*only* conical shaped cups and nothing broader” did not support broad claims covering conical and non-conical shaped cups; therefore, broad claims not entitled to filing date of parent and found invalid as anticipated by intervening prior art) (emphasis in original)

Here, PO will be unable to show that the applications in the '105 patent family lineage prior to January 27, 2014 provide written description support for the full scope of any Challenged Claim. The patent applications to which the '105 patent's parent application claim priority do not include the expression “bowl fill restriction.” As explained above in Section IV.B.3, the first time the term “restriction” appeared was January 27, 2014, the filing date of the '105 patent parent. *See* EX1008-103–EX1008-147; EX1004, ¶360.

While the '105 patent does not define the expression “bowl fill restriction,” as explained above, PO has asserted that a “bowl fill restriction” covers both bowl fill valves and bowl fill restrictions. Yet, a POSITA would not have read the '904

application to have disclosed a device other than a valve. EX1004, ¶¶361-362. This is because unlike a valve, once a restrictor is installed it is incapable of being adjusted. *Id.* Notably, the '904 application only discloses a bowl fill valve and makes repeated references to the desirability and advantages of the adjustability function of the bowl fill valve. EX1004, ¶¶363-365; EX1009-EX1010; EX1010-169-EX1010-175; EX1010-157, EX1010-160; EX1010-161-EX1010-163.

The '904 application specification makes it clear that the adjustability of the bowl fill valve is a desirable and essential feature of the invention. EX1004, ¶366. Indeed, during prosecution of the grandchild application of the '105 patent, PO argued that a prior art fluid flow restriction device (backflow prevent assembly) “does not serve as a substitute for the toilet fill valve of claim 1.” EX1006-056. Thus, PO did not consider a fluid flow restrictor, or a fluid flow diverter, to be a valve, as that expression is used in the '904 application specification. EX1004, ¶¶367-368; *see, e.g.*, EX1010-158 ([0019]); EX1004, ¶367. 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. EX1004, ¶369. Thus, here, as in *Tranzo*, PO has to recast its invention in broader terms with claims that encompass the original invention along with the broader embodiments of the invention not described in the original application. *See, Tranzo*, 156 F. 3d at

1158-1160. Thus, the earliest effective filing date of the '105 patent claims therefore would be at best January 27, 2014.⁵ EX1004, ¶369.

2. Claims 1-24 of the '105 patent are anticipated by Schuster

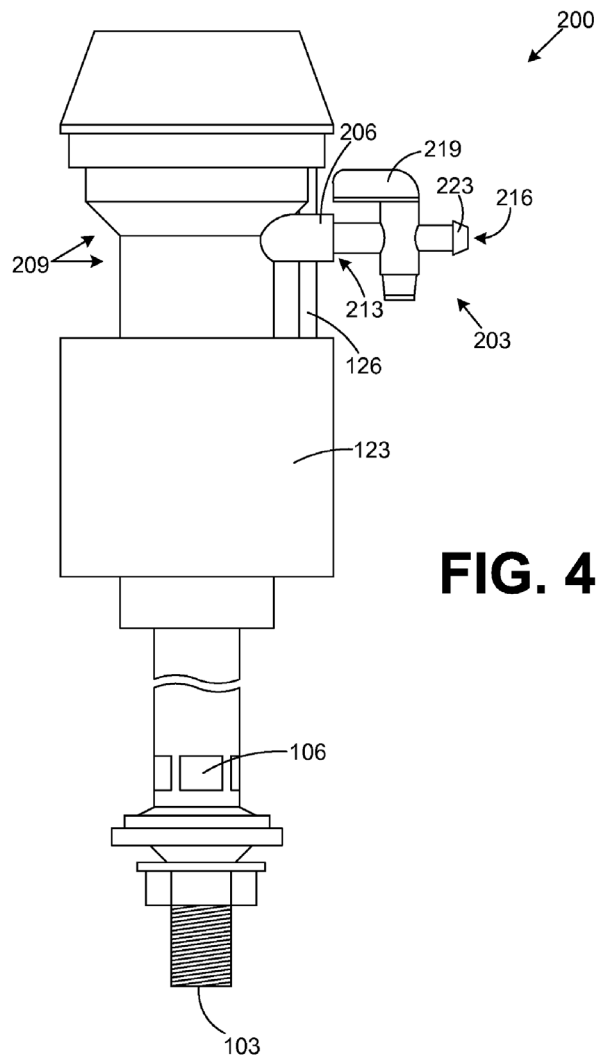
Schuster (EX1029) was published on January 31, 2012, more than a year prior to the '105 patent claims' effective filing date of January 27, 2014. With the exception of the title, Abstract, and claims, Schuster and the '105 patent specifications are believed to be identical. EX1004, ¶354.

a. Independent claims 1 and 24 are anticipated by Schuster

i. 1[Pre], 24[Pre]

Figures of Schuster are provided below, each of which depicts a system. EX1004, ¶369. Schuster discloses a system 200 including a toilet fill valve. EX1029, Abstract, Fig. 4; EX1004, ¶369.

⁵ Petitioner does not agree that there is adequate written description support for the '105 patent claims, but for purposes of this Petition, Petitioner asserts the earliest possible filing date is January 27, 2014.



Schuster satisfies the preamble of claims 1 and 24. EX1004, ¶369.

ii. 1[A], 24 [A]

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. EX1004, ¶372. Schuster thus satisfies this element. *Id.*

iii. 1[B], 24 [B]

Schuster discloses “water inlet 103 at the bottom of the toilet fill valve 100 that is configured to be coupled to a water source.” EX1029, 1:63-65; EX1004, ¶375. Thus, Schuster satisfies this element. *Id.*

iv. 1[C], 24[C]

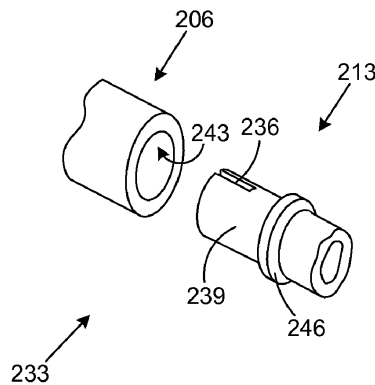
Schuster discloses one or more outlets 106 configured to supply water to a toilet tank. EX1029, 2:1-3, Figs 1 and 3-4; EX1004, ¶378. Schuster thus discloses a tank water outlet, as is conventional in the art, thereby satisfying this element. *Id.*

v. 1[D1], 24[D1]

Schuster discloses a bowl fill valve configured to attach directly to the extended portion of the body. EX1029, 2:18-21, Figs. 1 and 4; EX1004, ¶381. Thus, Schuster satisfies this element. *Id.*

vi. 1[D2]

Schuster discloses a protrusion on the bowl fill valve that is configured to insert into a recess in the bowl fill outlet 206 of the toilet fill valve. EX1004, ¶383. That protrusion is snap fit or locked into place when inserted. EX1004, ¶383; EX1029, 6:48-50; 7:25-47, Fig. 5A shown below:



Schuster satisfies this element. EX1004, ¶383.

vii. 24[D2]

As discussed above with respect to **1[D2]**, Schuster discloses means for locking the bowl fill restriction to the extended portion of the body of the toilet fill valve and thus satisfies this element. EX1004, ¶385.

viii. 1[D3], 24[D3]

Schuster discloses a first portion of water flow exiting the fill valve through holes 106, and a second portion exiting through the extended portion and into bowl fill valve via outlet port 206. EX1029, Abstract; 3:3-17; EX1004, ¶388. Thus, Schuster satisfies this element. *Id.*

ix. 1[D4], 24[D4]

Schuster discloses bowl fill valve with an adjustable handle that can control the flow rate of water exiting the fill valve. EX1029, 4:4-48; EX1004, ¶391.

Regulating or controlling the flow of water through such a valve inherently constricts the flow. EX1004, ¶391. Thus, Schuster satisfies this element. *Id.*

x. 1[E], 24[E]

Schuster discloses tube 146 directly attached directly to the bowl fill valve. EX1029, 3:54-65, Fig. 4; EX1004, ¶394. Thus, Schuster satisfies this element. *Id.*

b. Independent claim 9 is anticipated by Schuster

Independent claim 9 recites a method that inherently happens when the toilet fill valve of Schuster in operation. EX1004, ¶395. Claim 9 is fundamentally nothing more than the method (steps) performed when using the system of claims 1 and 24 – i.e., the system of Schuster. More specifically:

- **9[Pre] and 9[A]:** Schuster discloses receiving water via a water inlet, as is conventional and necessary for a toilet fill valve to operate. EX1029, 1:63-67, Fig. 1. EX1004, ¶397. Thus, Schuster satisfies this element. *Id.*
- **9[B]:** Schuster discloses one or more outlets 106 configured to supply water to a toilet tank. EX1029, 2:1-3, Figs 1 and 3-4; EX1004, ¶399. Thus, Schuster discloses a tank water outlet, thereby satisfying this element. *Id.*
- **9[C1]:** Schuster discloses a first portion of water flow exiting the fill valve 396 through holes 106, and a second portion exiting through the extended portion and into bowl fill valve via outlet port 206. EX1029, Abstract, 3:3-17; EX1004, ¶401. Thus, Schuster satisfies this element. *Id.*

- **9[C2]:** In view of the discussion of **1[A]**, **24[A]**, Schuster satisfies this element. EX1004, ¶403.
- **9[C3]:** In view of the discussion of **1[D1]**, Schuster satisfies this element. EX1004, ¶405.
- **9[C4]:** Schuster discloses a bowl fill valve that is “integral” with the toilet fill valve, which includes being constructed as a single piece. EX1029, 4:49-62, Fig. 4; EX1004, ¶407. Schuster therefore satisfies this element.
Id.
- **9[C5]:** Schuster satisfies this element for the same reasons discussed above with respect to **1[D4]**, **24[D4]**. EX1004, ¶409.
- **9[D]:** Figure 3 of Schuster (EX1029) illustrates tube 146 directing a second portion of water to a toilet tank overflow tube 149 and thus discloses this element. EX1004, ¶411; *see* discussion of **1[E]**, **24[E]** above.

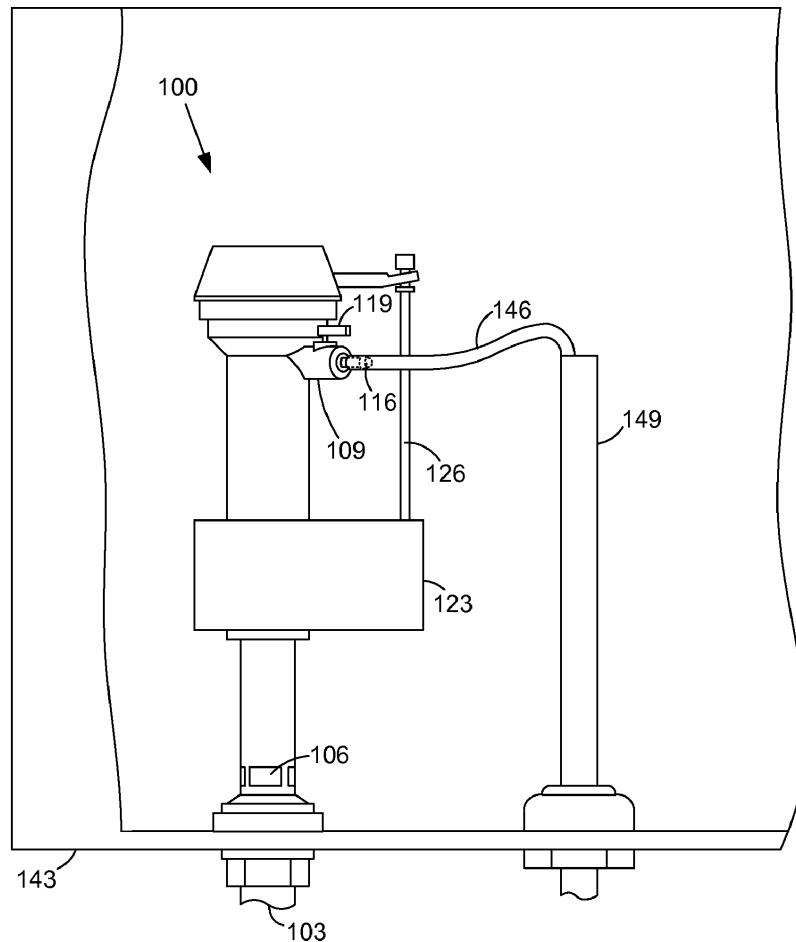


FIG. 3

c. Independent claim 15 is anticipated by Schuster

Independent claim 15 recites a method that inherently happens when the toilet fill valve of Schuster is assembled. EX1004, ¶412. Claim 15 is fundamentally nothing more than the method (steps) performed when assembling the system of claims 1 and 24 – i.e., the system of Schuster. Moreover, fabricating various parts separately and designing the separate parts for easy assembly would have been

considered obvious design parameters and/or obvious and routine optimization to a POSITA prior to the '105 patent filing date. *Id.* More specifically:

- **15[Pre]:** To the extent any of the respective pieces of the toilet fill valve and bowl fill restrictions disclosed by Schuster are assembled prior to operation of the toilet fill valve, Schuster inherently discloses a method of assembling the respective parts. *See* EX1029, claim 9, Fig. 8; EX1004, ¶414.
- **15[A1]:** Schuster satisfies this limitation for the reasons discussed with respect to **1[A]**, **24[A]** **1[D1]**, **24[D1]**, **9[C2]**, and **9[C3]** above. EX1004, ¶416.
- **15[A2]:** Prior art that discloses the direct attachment of a bowl fill restriction to an extended portion of the toilet fill valve will inherently satisfy this element of the claims. As discussed with respect to **1[A]**, **24[A]**; **1[D4]**, **24[D4]**, **9[C1]**, and **9[C5]** above, Schuster satisfies this element. EX1004, ¶418.
- **15[B]:** For the same reasons discussed above with respect to **1[D2]**, Schuster satisfies this element. EX1004, ¶420.
- **15[C]:** For the same reasons discussed above with respect to **1[E]**, **24[E]**, and **9[D]**, Schuster satisfies this element. EX1004, ¶422.

In sum, Schuster discloses all of the elements, and anticipates independent claims 1, 9 15, and 24 of the '105 patent. EX1004, ¶423.

d. Dependent claims 2-3, 4-8, 10-14, and 16-23 are anticipated by Schuster

i. Claim 2

Schuster shows in Figure 1 thereof the extended portion extending radially from a longitudinal axis of the fill valve and thus anticipates claim 2. EX1004, ¶425.

ii. Claim 3

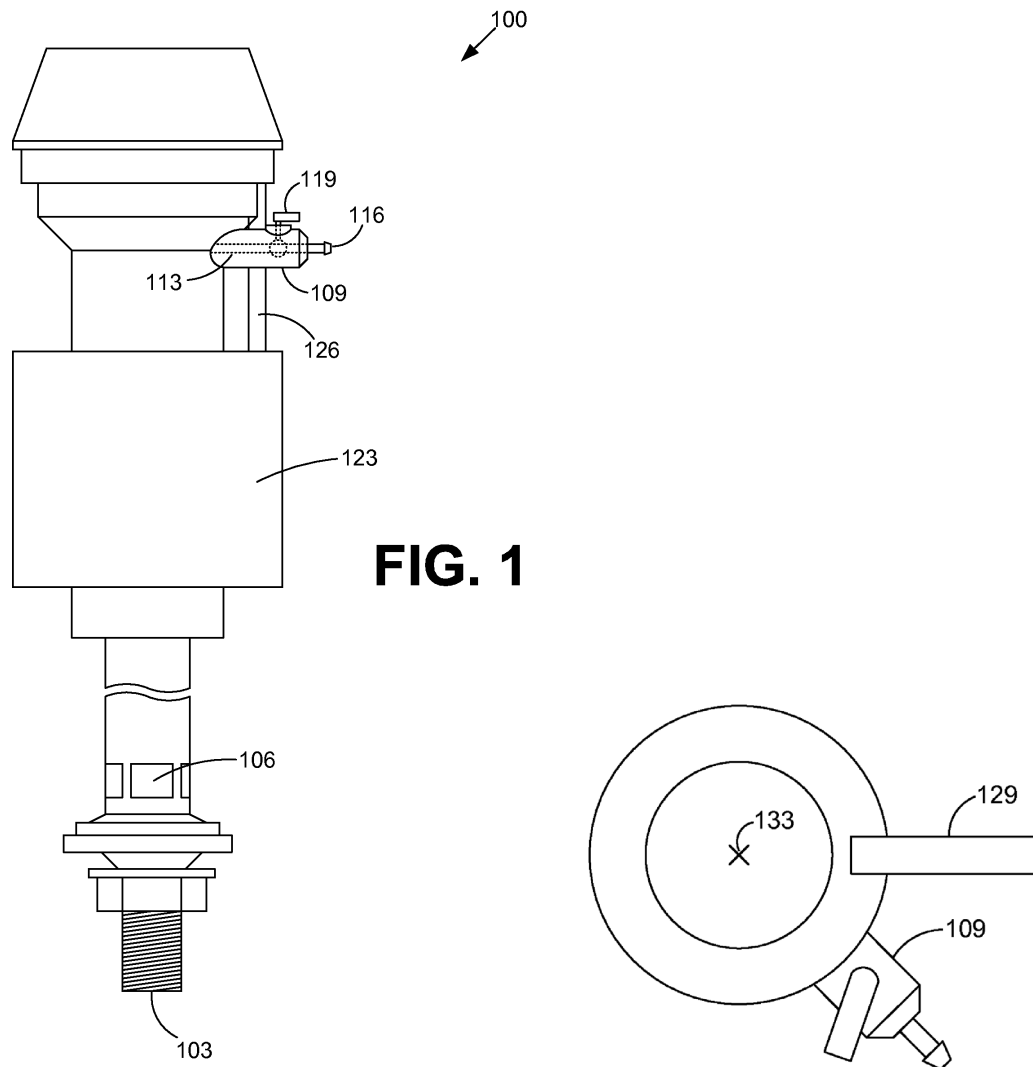
Claim 3 does not further limit claim 1 and recites the same limitation as recited by **1[D2]**. EX1004, ¶427. Regardless, Schuster anticipates claim 3 for the same reasons discussed above with respect to element **1[D2]**. *Id.*

iii. Claims 4 & 5

Schuster discloses: “bowl fill valve 109 may be molded as a portion of the toilet fill valve 100 or it may be snapped or clamped into place, or it may be attached to the toilet fill valve 100 in some other manner, etc.” EX1029, 2:18-21; EX1004, ¶430. Thus, Schuster anticipates claims 4 and 5. *Id.*

iv. Claim 6

Schuster discloses a float 123 attached to an actuating arm 129 via translational stem 126 in which the actuating arm is angularly offset relative to the bowl fill valve to prevent interference with the bowl fill restriction and anticipates claim 6. EX1004, ¶432.



v. Claim 7

As discussed above with respect to claims 4 and 5, Schuster discloses a connection between fluid flow channels in which one end comprises a nipple with annular ridges that is inserted into a tube that directs water from the water flow regulator to the toilet tank overflow tube. EX1004, ¶434. Schuster therefore anticipates claim 7. *Id.*

vi. Claim 8

Claim 8 expressly disclosed by Schuster. EX1004, ¶436. Schuster states that “the fact that the bowl fill valve 109 is integral with the toilet fill valve 100 prevents the creation of a pressure head in the tube 146 as would be the case if the bowl fill valve 109 were included in the middle of the tube 146.” EX1029, 3:67-4:3; EX1004, ¶436. Thus, Schuster anticipates claim 8. *Id.*

vii. Claim 10

Claim 10 is anticipated by Schuster for the same reasons discussed above with respect to claim 8 above. EX1004, ¶438.

viii. Claims 11 & 12

Schuster discloses adjusting the bowl fill valve so that the flow of the second portion of water is terminated at the same time as the flow of first portion, and that the flow is terminated when the water level in the toilet bowl is at a predetermined level. EX1029, 3:54-4:28; EX1004, ¶441. Schuster therefore anticipates claims 11 and 12. *Id.*

ix. Claims 13 & 14

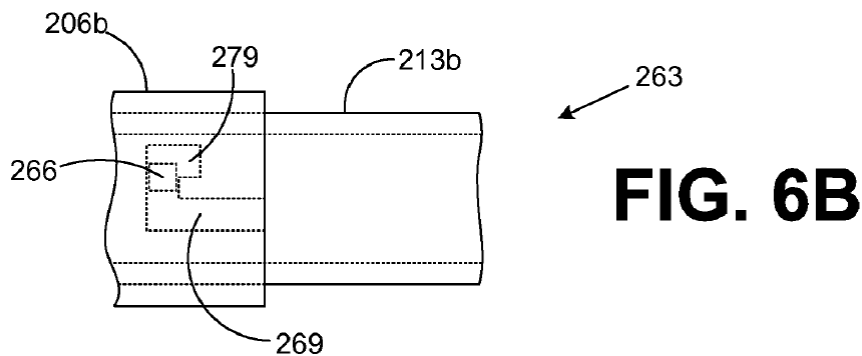
Claims 13 and 14 are anticipated by Schuster for the same reasons discussed above with respect to claim elements 1[A], 24[A], 15[A1] and claim 2. EX1004, ¶444.

x. Claims 16-18

Schuster discloses the use of a snapping or clamping arrangement to couple the bowl fill valve to the toilet fill valve and prevent detachment thereof, as discussed above with respect to dependent claims 4 and 5. EX1029, 2:18-21; EX1004, ¶448. Thus, Schuster anticipates claims 16-18. *Id.*

xi. Claim 19

Schuster discloses the use of locking ears 266 and corresponding locking grooves 269 that lock the bowl fill valve to the toilet fill valve and prevent detachment therefrom. EX1029, 7:25-47, Fig. 6B; EX1004, ¶450. Thus, Schuster anticipates claim 19. *Id.*



xii. Claim 20

Claim 20 is anticipated by Schuster for the same reasons discussed above with respect to claim 3. EX1004, ¶452.

xiii. Claims 21 & 23

Claims 21 and 23 are anticipated by Schuster for the same reasons discussed above with respect to 9[C4]. EX1004, ¶455.

xiv. Claim 22

Claim 22 is anticipated by Schuster for the same reasons discussed above with respect to 1[D2], 24[D2], and claim 7. EX1004, ¶457.

IX. CONCLUSION

Based on the foregoing, it is clear that the Challenged Claims define subject matter that is either anticipated or obvious or both. Thus, the Petitioner requests institution of an *inter partes* review to cancel these claims.

Dated: March 6, 2024

Respectfully submitted,

By: /Carolyn S. Toto /

Carolyn S. Toto (Reg No. 56,817)

Evan Finkel (Reg. No. 49,059)

PILLSBURY WINTHROP SHAW

PITTMAN LLP

725 South Figueroa Street, 36th Floor

Los Angeles, CA 90017-5406

Telephone: (213) 488-7238

Facsimile: (213) 629-1033

carolyn.toto@pillsburylaw.com

evan.finkel@pillsburylaw.com

Counsel for Petitioner Fluidmaster Inc.

X. CERTIFICATE OF COMPLIANCE

Pursuant to 37 C.F.R. §42.24(d), the undersigned certifies that this Petition complies with the type-volume limitation of 37 C.F.R. §42.24(a). The word processing program used to prepare this Petition indicates that the Petition contains 13,944 words, excluding the cover page, signature block, and the parts of the Petition exempted by 37 C.F.R. §42.24(a).

Dated: March 6, 2024

By: / Carolyn S. Toto /
Carolyn S. Toto (Reg No. 56,817)
Evan Finkel (Reg. No. 49,059)
**PILLSBURY WINTHROP SHAW
PITTMAN LLP**
725 South Figueroa Street, 36th Floor
Los Angeles, CA 90017-5406
Telephone: (213) 488-7238
Facsimile: (213) 629-1033
carolyn.toto@pillsburylaw.com
evan.finkel@pillsburylaw.com
Counsel for Petitioner Fluidmaster Inc.

CERTIFICATE OF SERVICE

I hereby certify that a true copy of the **PETITION FOR *INTER PARTES* REVIEW UNDER 37 C.F.R. §42.100** and all exhibits/attachments thereto (Exhs. 1001-1032) were served in their entirety by EXPRESS MAIL® this 6th day of March, 2024 on the attorney of record of Danco, Inc., owner of the subject patent, as indicated below:

THOMAS | HORSTEMEYER, LLP
3200 WINDY HILL ROAD, SE
SUITE 1600 E
ATLANTA, GA 30339

And via e-mail to the attorneys of record for Plaintiff in the concurrent litigation:

Eric G. Maurer (e.maurer@pkhip.com)
Cynthia J. LEE (c.lee@pkhip.com)
David Martinez (dmartinez@robinskaplan.com)
Li Zhu (lzhu@robinskaplan.com)

Dated: March 6, 2024

By: / Carolyn S. Toto /
Carolyn S. Toto (Reg No. 56,817)
Evan Finkel (Reg. No. 49,059)

**PILLSBURY WINTHROP SHAW
PITTMAN LLP**

725 South Figueroa Street, 36th Floor
Los Angeles, CA 90017-5406
Telephone: (213) 488-7238
Facsimile: (213) 629-1033
carolyn.toto@pillsburylaw.com
evan.finkel@pillsburylaw.com

Counsel for Petitioner Fluidmaster Inc.