

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

FLUIDMASTER, INC.

Petitioner

v.

DANCO, INC.
Patent Owner

Case IPR2024-00635
Patent 10,934,698 B1

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. 10,934,698 to Schuster et al.
EX1002	Prosecution History of U.S. Patent No. 10,934,698 to Schuster et al. (Application No. 16/686,328, filed March 2, 2021)
EX1003	Complaint (Dkt. 1) in <i>Danco, Inc. v. Fluidmaster, Inc., et al.</i> , Case No. 8:23-cv-01156 (C.D. Cal.), filed June 28, 2023
EX1004	Expert Declaration of Dr. Kimberly Cameron, Regarding Invalidity of the Challenged Claims of U.S. Patent No. 10,934,698 to Schuster et al.
EX1005	U.S. Patent No. 9,103,105 to Schuster et al.
EX1006	Prosecution History of U.S. Patent No. 9,103,105 (Application No. 14/457,697 filed August 12, 2014)
EX1007	U.S. Patent No. 9,139,993 to Schuster et al.
EX1008	Prosecution History of U.S. Patent No. 9,139,993 to Schuster et al. (Application No. 14/164,424, filed January 27, 2014)
EX1009	Prosecution History of U.S. Patent No. 8,650,671 to Schuster et al. (Application No. 13/346,355, filed January 9, 2012)
EX1010	Prosecution History of U.S. Patent No. 8,104,105 to Schuster et al. (Application No. 12/786,904, filed on May 25, 2010)
EX1011	Prosecution History of U.S. Patent No. 7,743,436 to Schuster et al. (Application No. 10/958,797, filed October 5, 2004)
EX1012	Prosecution History of U.S. Patent No. 6,823,889 to Schuster (Application No. 10/798,606, filed on Mar. 11, 2004)
EX1013	Amended Complaint (Dkt. 35) in <i>Danco, Inc. v. Fluidmaster, Inc., et al.</i> , Case No. 8:23-cv-01156 (C.D. Cal.), filed October 2, 2023
EX1014	U.S. Patent No. 6,546,568 B1 to Schuster issued April 15, 2003 from Application No/ 09/969,320 filed October 1, 2001, as a continuation of Application No. 09/634,249 filed August 8, 2000 (now U.S. Patent No. 6,295,660)

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	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
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	[Reserved]
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

'698 Patent Claim Elements

Element Designation	Claim Element
1[Pre]	A toilet system, comprising:
1[A1]	a toilet fill valve that comprises: a body comprising an extended portion that forms a bowl fill outlet port;
1[A2]	a water inlet configured to couple to a water source; and
1[A3]	a tank water outlet configured to output water to a toilet tank;
1[B1]	a bowl fill valve configured to attach directly to the body of the toilet fill valve, the bowl fill valve comprising:
1[B2]	a bowl fill valve inlet port configured to mate directly to the bowl fill outlet port of the body of the toilet fill valve;
1[B3]	a bowl fill valve outlet port;
1[B4]	a protrusion configured to insert into a recess of the toilet fill valve and retain the bowl fill valve to the toilet fill valve, the protrusion being configured to snap fit into the recess;
1[B5]	a water flow adjustment handle; and
1[B6]	a slot configured to receive an extension of the toilet fill valve and prevent rotation of the bowl fill valve relative to the toilet fill valve; and
1[C]	a tube configured to attach directly to the bowl fill valve outlet port of the bowl fill valve.
2	The toilet system of claim 1, wherein the bowl fill outlet port comprises a male end, and wherein the bowl fill valve inlet port comprises a female receptacle for the male end of the bowl fill outlet port.
3[A]	The toilet system of claim 1, wherein the protrusion of the bowl fill valve is an annular protrusion located on a bowl fill valve side wall of the bowl fill valve,
3[B]	wherein the recess of the toilet fill valve is an annular recess located on a bowl fill outlet port side wall of the bowl fill outlet port,
3[C]	wherein the slot of the bowl fill valve is located on the bowl fill valve side wall, and wherein the extension of the toilet fill valve is a rib on the bowl fill outlet port side wall.

4	The toilet system of claim 1, wherein the bowl fill outlet port extends radially from a longitudinal axis of the body of the toilet fill valve.
5	The toilet system of claim 4, wherein the toilet fill valve further comprises an actuation arm that extends radially from the longitudinal axis of the body of the toilet fill valve, and wherein the actuation arm is angularly offset relative to the bowl fill outlet port.
6	The toilet system of claim 1, wherein the toilet fill valve further comprises a float configured to move along at least a portion of the body of the toilet fill valve.
7	The toilet system of claim 6, wherein the at least a portion of the body of the toilet fill valve extends through the float.
8[Pre]	A bowl fill valve, comprising:
8[A]	a bowl fill valve inlet port configured to mate directly to a bowl fill outlet port of a body of a toilet fill valve;
8[B]	a bowl fill valve outlet port configured to attach directly to a tube that provides water from the bowl fill valve outlet port to an overflow tube;
8[C]	a protrusion configured to insert into a recess of the toilet fill valve and retain the bowl fill valve to the toilet fill valve, the protrusion being configured to snap fit into the recess;
8[D]	a slot configured to receive an extension of the toilet fill valve and prevent rotation of the bowl fill valve relative to the toilet fill valve; and
8[E]	a water flow adjustment handle being configured to adjust water flow from the bowl fill valve inlet port to the bowl fill valve outlet port.
9	The bowl fill valve of claim 8, wherein the bowl fill valve inlet port comprises a female receptacle for a male end of the bowl fill outlet port.
10[Pre]	A method, comprising:
10[A]	coupling a water inlet of a toilet fill valve to a water source;

10[B1]	attaching a bowl fill valve directly to a body of the toilet fill valve by at least:
10[B2]	mating a bowl fill valve inlet port of the bowl fill valve directly to a bowl fill outlet port that extends from the body of the toilet fill valve;
10[B3]	snap fitting a protrusion of the bowl fill valve into a recess of the toilet fill valve; and
10[B4]	inserting an extension of the toilet fill valve into a slot of the bowl fill valve, wherein the slot is configured to prevent rotation of the bowl fill valve relative to the toilet fill valve; and
10[C]	attaching a tube directly to a bowl fill valve outlet port of the bowl fill valve.
11	The method of claim 10, further comprising adjusting a flow of water out of the bowl fill valve.
12[Pre]	A bowl fill valve, comprising:
12[A]	a bowl fill valve inlet port configured to mate directly to a bowl fill outlet port of a body of a toilet fill valve
12[B]	a bowl fill valve outlet port configured to attach directly to a tube that provides water from the bowl fill valve outlet port to an overflow tube;
12[C]	a protrusion on the bowl fill valve configured to snap fit into a recess of the toilet fill valve and retain the bowl fill valve to the toilet fill valve;
12[D]	a slot configured to receive an extension of the toilet fill valve and prevent rotation of the bowl fill valve relative to the toilet fill valve; and
12[E]	means for adjusting water flow out of the bowl fill valve outlet port.
13	The bowl fill valve of claim 12, wherein the means for adjusting water flow out of the bowl fill valve outlet port comprises an adjustment handle.
14	The toilet system of claim 1, wherein the bowl fill valve inlet port is configured to be inserted within a portion of the bowl fill outlet port.

I. INTRODUCTION

Petitioner respectfully request *inter partes* review (“IPR”) of claims 1-14 (“Challenged Claims”) of U.S. Patent No. 10,934,698 (the “’698 patent,” EX1001), titled “Toilet 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 valve. The claimed connection, however, is a well-known quick connector between fluid flow conduits.

Petitioner presents prior art not considered during prosecution of the ’698 patent that discloses the features that Patent Owner (“PO”) contended were missing from the prior art. Specifically, this art discloses toilet fill valves with extended portions configured to directly attach to a bowl fill valve using a mating arrangement that snap fits the bowl fill valve to the toilet fill valve and locks the respective pieces together to prevent rotation of the bowl fill valve.

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 '698 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 two additional patents involved in that litigation: U.S. Patent Nos. 9,139,993 and 9,103,105.

The '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.

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 '698 patent, are submitted herewith as EX1029.

U.S. Patent No. 9,139,993 issued from Appl. No. 14/164,424 (the “’424 Application”), filed on Jan. 27, 2014, as 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 identifies the following Child Data for the ’424 Application: Pat. No. 9,103,105; Pat. No. 10,934,698; and Pat. No. 10,519,639.

U.S. Patent No. 9,103,105 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.

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

Petitioner provides the following designation of counsel:

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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 (027854.0000056) 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 '698 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 1-14 of the '698 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. 5,249,830 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. 5,862,538 to Ho issued June 26, 1999 (EX1022, “Ho”).

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

The earliest alleged priority date for the '698 patent is March 11, 2004 (EX1001, 2).² Guoxin, the Quick Connection Art, 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).

The following specific grounds of rejection are asserted under § 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.

² Petitioner does not concede entitlement to this priority date.

Ground	Claims	Statute	Prior art
1	1-14	§103	Guoxin in view of Ho, further in view of Quick Connection Art

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 ’698 patent and its prosecution history. Here, there is one term that requires construction: “*means for adjusting water flow.*”

The expression “means for adjusting water flow” is a means-plus-function limitation under §112 (pre and post AIA). The specification of the ’698 patent discloses that this water flow adjustment function is performed by a “water flow adjustment handle” of the bowl fill valve. *See* EX1001, Abstract (“The bowl fill valve can include...a water flow adjustment handle.”); 2:22-24 (“In addition, the bowl fill valve 109 includes a handle 119 that facilitates a manual adjustment of the bowl fill valve 109.”); 4:28-32 (“Next, the bowl fill valve handle 119 is adjusted so that the bowl fill valve 109 is placed in a predefined position that allows a predefined flow of water to refill the toilet bowl. In this manner, one adjusts the actual flow of water that refills the toilet bowl.”); 5:38-44; 6:32-43. The ’698 patent does not

describe any other structures or mechanisms for adjusting the water flow through the bowl fill valve.

Additionally, PO has served infringement contentions asserting that the “means for adjusting water flow” covers (i.e., read on) a “water flow adjustment handle.” See EX1029, Exhibit I (EX1029-106-EX1029-120), p. 15 (EX1029-120). For purposes of this petition, Petitioner adopts Patent Owner’s construction of “means for adjusting water flow” to cover a “handle” (structure), and equivalents thereof, “for adjusting water flow” (function).” See EX1004, ¶46; 35 U.S.C. § 112.

V. DISCRETIONARY FACTORS

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

This is the only petition challenging the ’698 patent and no other parties have petitioned to challenge it. Thus, the Board has not yet considered the ’698 patent’s validity and this IPR would be an appropriate use of the Board’s resources.

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.

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. 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

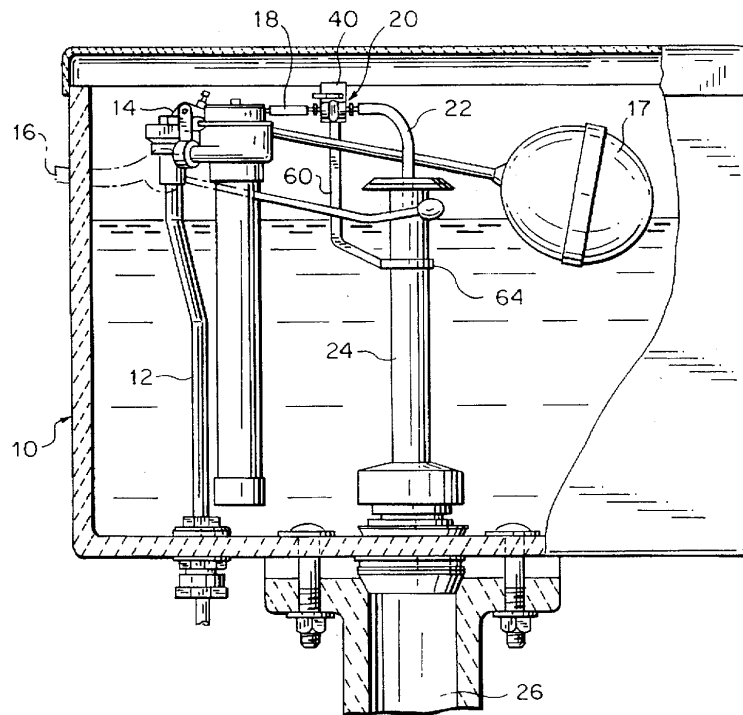
The '698 patent is directed to a purported improvement to a toilet fill valve for a flush toilet. *See* EX1001, Abstract. Toilet fill valves are not new. EX1004, ¶75; *see, e.g.*, EX1021 (Brown, filed March 6, 1959). Rather, toilet fill valves with various mechanisms to control the flow of water to the toilet bowl during a flush cycle were well known in the art. EX1004, ¶75. After a toilet is flushed, the toilet fill valve is responsible for refilling the water stored in the toilet's tank and in the 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, 1:63-70.

Brown discloses two water saving mechanisms. The preferred mechanism is a valve attached directly to the bowl refill outlet on the toilet fill valve that allows the amount of water flowing into the toilet bowl to "be reduced to the necessary minimum." EX1021, 3:65-68. The less preferred mechanism is a U-shaped tube

extending from the bowl refill outlet of the toilet fill valve that has a smaller (restricted) diameter than conventional refill tubes but lacks the “feature of adjustability.” *Id.*, 4:20-44. Brown therefore informs a POSITA that both a bowl fill valve and a reduced diameter bowl fill tube can reduce the flow of water to the overflow tube, but that the reduced diameter bowl fill tube lacks adjustability. EX1004, ¶76.

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 '698 patent and related patents. EX1002, 61-70, 94-106; EX1009, 124-125. 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.

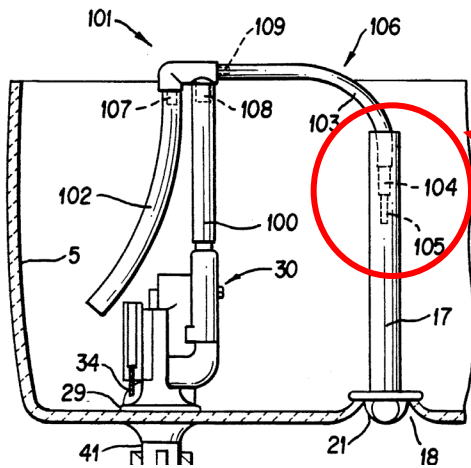


B. Fluid Flow Restrictors or Diverters Were Well-Known

In addition to valves, other mechanisms for controlling water flow were also well-known. As referenced above, Brown disclosed a reduced diameter tube to restrict flow into the toilet bowl. 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, ¶77.

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

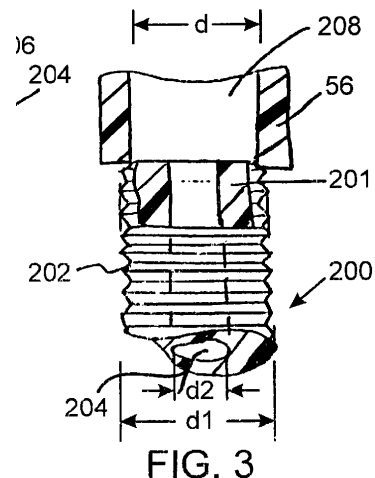
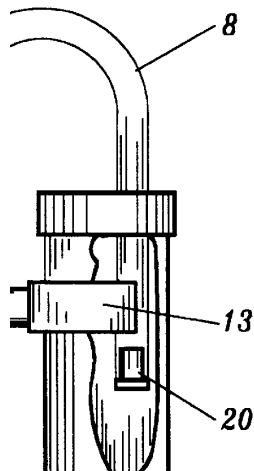


The free end of bowl fill assembly 106 is inserted in overflow tube 17. Bowl fill assembly 106 comprises bowl fill tube 103 and optional flow control inserts 104 and 105.

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.

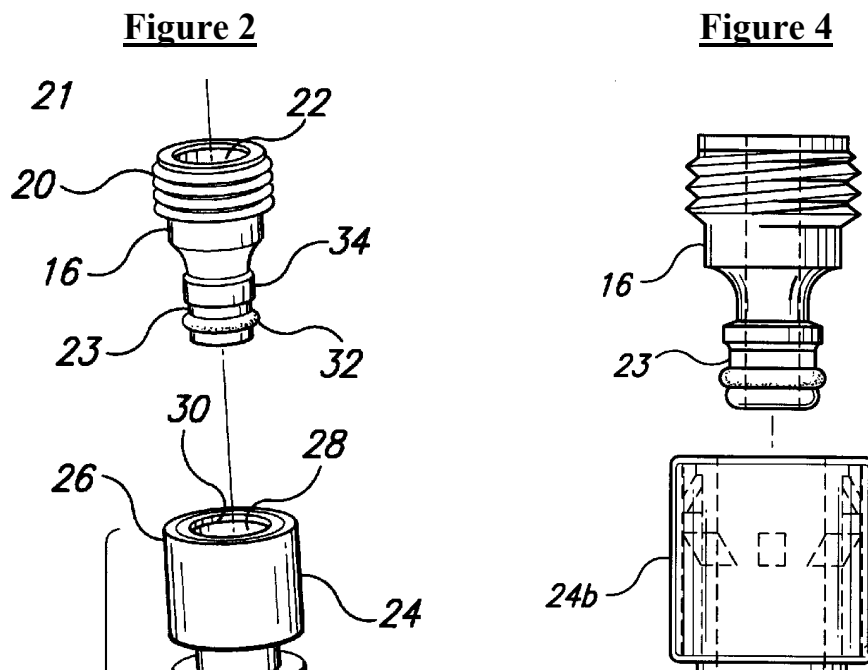


See EX1027 (Williams), 3:8-17, Fig. 1.

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

C. Fluid Flow Couplings Were Well-Known

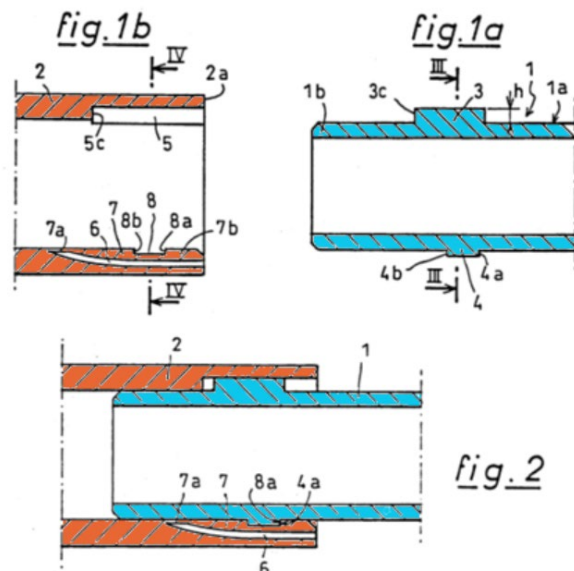
While the '698 patent is directed to a toilet component, the underlying technology generally consists of techniques, mechanisms, and apparatuses (e.g., pipes, valves, connectors, fixtures, etc.) to deliver and transport fluid in a controlled manner. EX1004, ¶81. Thus, a POSITA would look generally to fluid flow components, such as the Quick Connection Art, in the design of toilet components. *Id.* As an example, during prosecution of the '698 patent, the Examiner cited Bjerke (EX1017) as disclosing a conventional quick-connect coupling for a water flow system. *See* EX1002, 64-65. 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 below.

Calmettes also teaches that “the immobilization of two coaxial tubes may be sought after, both with regard to a relative rotation and to a translation, whenever it is desired to obtain an efficient mechanical connection between the two tubes.”

EX1018, 1:17-22, 1:58-64.



Notably, Calmettes’ snap fit connection is the same type of connection illustrated in Figures 5A and 5B of the ’698 patent. See EX1004, ¶84, EX1018, Figures 1a and 1b (reproduced below); EX1001, Figure 5B (reproduced below).

'698 Patent

Calmettes

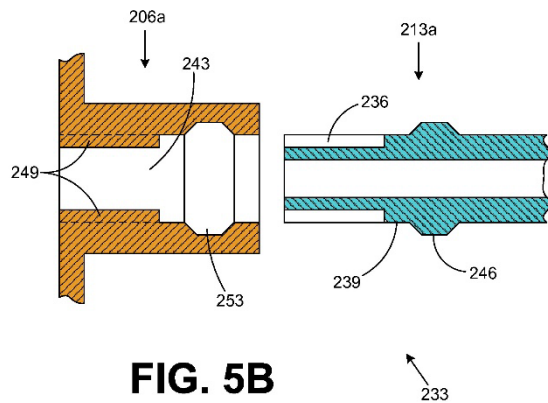
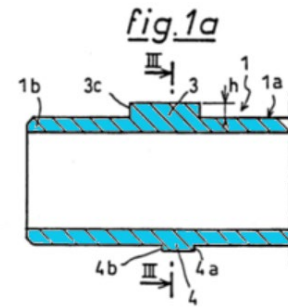
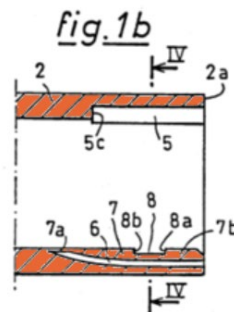


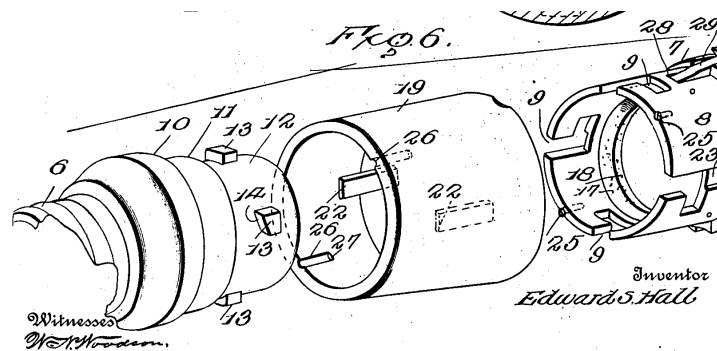
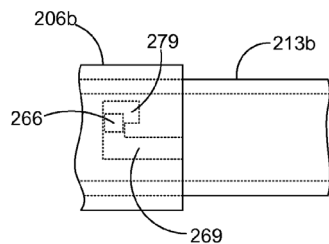
FIG. 5B



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. 6B compared to Fig. 6 (each reproduced below).

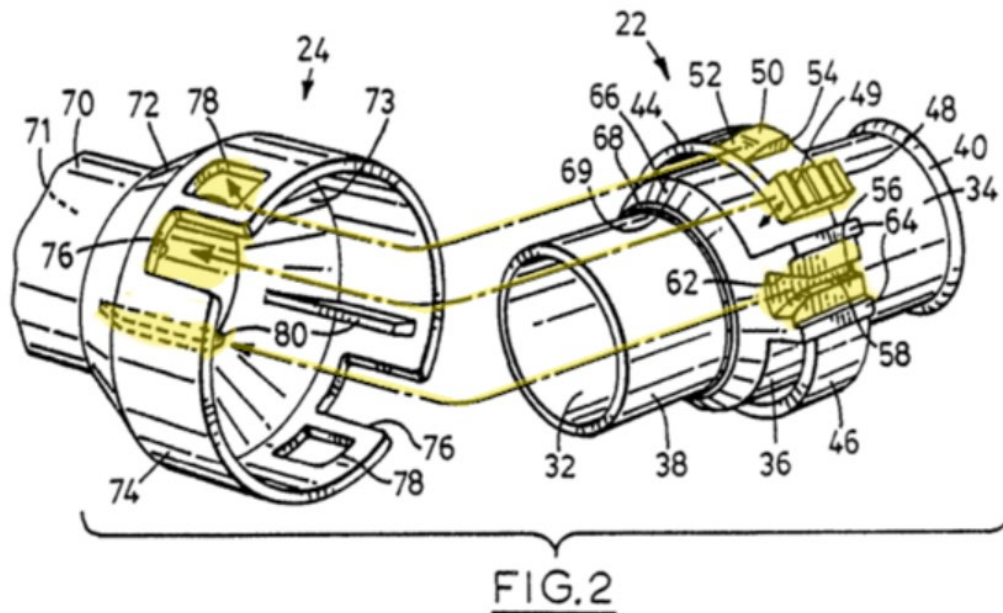
'698 Patent

Hall



Notably, Hall's coupling is the same as that shown in Figures 6A-6C of the '698 patent. EX1004, ¶85.

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 and rotation (*see* EX1004, ¶86):



VII. SUMMARY OF THE '698 PATENT

A. Description of the Alleged Invention of the '698 Patent

The purported invention recited by the Challenged Claims concerns a toilet system with an adjustable bowl fill valve, which refills the toilet bowl, and that is connected directly to a toilet fill valve with a snap fit connection, and which refills the toilet tank. EX1001, Abstract, Claims 1-14. Because the adjustable valve could create a pressure head in a hose connecting it to the toilet fill valve, the '698 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, 4:13-21; EX1009-072-EX1009-073. The '698 patent further discloses that the bowl fill valve: has a protrusion that is configured to insert into a recess of the toilet fill valve in order to retain the bowl fill valve; a slot that receives an extension of the toilet fill valve; and a water flow adjustment handle. *Id.*, Abstract.

B. Summary of the Prosecution History of the '698 Patent

U.S. Application No. 16/686,328 (the "'328 application") was filed on November 18, 2019, and issued on March 2, 2021 as the '698 patent. EX1001 at 1. The '328 application claims priority as a continuation of U.S. Application No. 14/856,901, filed on September 17, 2015, 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 '328 application claims were rejected, *inter alia*, as anticipated by U.S. Patent No. 5,708,991 ("DeMarco") and for obviousness based on (1) DeMarco over U.S. Patent No. 6,409,221 ("Robinson") and (2) DeMarco over U.S. Patent No. 4,100,928 ("Schoepe"). EX1002-098–EX1002-102. With respect to the obviousness rejections, the Examiner stated that while DeMarco taught nearly all aspects of the claims, it was silent on the specifics of the clamp, snap-fit, and slot structures of the bowl fill valve and the extension of the toilet fill valve. *Id.*, 102–103. However, the

Examiner found that these details were taught in Robinson. *Id.*, 102–103. With respect to then pending claim 8, the Examiner also stated that while DeMarco addressed most of the claimed limitations, Shoepe further taught a toilet fill valve extending through a float. *Id.*, 103.

PO responded by amending various claims, canceling claims, and providing additional remarks. *Id.*, 73–92. PO traversed the examiner’s anticipation rejection by amending the claims to recite to “the protrusion being a snap fit into the recess,” a feature PO alleged was not disclosed in DeMarco. *Id.*, 87. PO stated that DeMarco’s reseal hose 22 lacked a “recess” and instead conformed to the surface of the tubular stem 44, leading to a pressure head buildup that could eventually dislodge the hose from the stem. *Id.*, 85–87.

Regarding the §103 rejections, PO argued that Robinson’s design, where the male joint member 200 fits into the female joint member 300 with interlocking tabs 210 and 310 through a twist/rotation and thus did not suggest a snap fit or a slot and rib arrangement. *Id.*, 87–90. PO also argued that DeMarco and Schoepe did not cover the system of claim 1 with a snap fit connection. *Id.*, 91.

In a final rejection, the pending claims were rejected due to obviousness. EX1002-061-EX1002–070. Examiner noted while DeMarco covers most claimed elements, it lacked the “snap fit connection” which Bjerke compensates for with its quick connection type. *Id.*, 63–67. The Examiner also noted that it would be obvious

to a POSITA to substitute DeMarco's connection with Bjerke's quick connection as a matter of substituting one alternative equivalent connection for another. *Id.*, 64. Finally, the Examiner stated that while DeMarco does not include elements such as the slot, male and female receptacles, annular protrusion, and annular recess, Bjerke does. *Id.*, 63–67.

PO responded by requesting continued examination, canceling some claims, amending others, and adding new ones. *Id.*, 46–59. Claim 1 was amended to include a slot limitation to prevent rotation. *Id.*, 54–57. PO stated Bjerke's backflow prevent assembly 18 does not equate to the "toilet fill valve," lacking a slot that engages with an extension of the toilet fill valve. *Id.*, at 56. Additionally, PO argued that Bjerke does not suggest a configuration to "prevent rotation of the bowl fill valve relative to the toilet fill valve." *Id.*

PO later filed a terminal disclaimer, which was approved, and the Examiner allowed all claims. *Id.*, 26–27, 30–31, 10–16. No substantive reasons for allowance were provided by the Examiner.

C. Prosecution Histories of Related Patents

The '698 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.

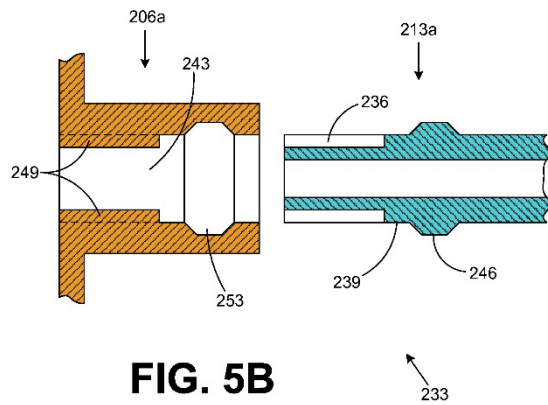
VIII. GROUNDS OF UNPATENTABILITY

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

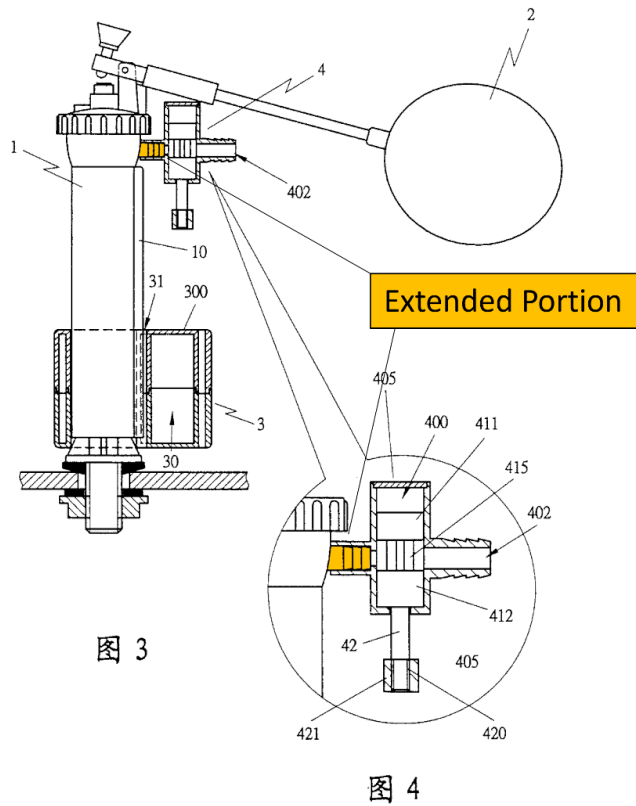
A. Claims 1-14 Are Obvious Under 35 U.S.C. §103 Over Guoxin in View of Ho and Further in View of the Quick Connection Art

Guoxin (EX1015-EX1016) was not considered during prosecution of the '698 patent and is more material than the prior art considered. EX1004, ¶197. Guoxin discloses a coupling arrangement between the bowl fill valve and the toilet fill valve where the toilet fill valve has an extension that forms the bowl fill outlet port (male connector), which is inserted into a recess in the bowl fill valve (female connector) in order to regulate the amount of water flowing into the toilet bowl. This is the reverse of the mating arrangements depicted in the '698 patent, but as explained below, is the same arrangement claimed in the patent. *See* EX1001, annotated Fig. 5B; EX1016, annotated Figure 4.

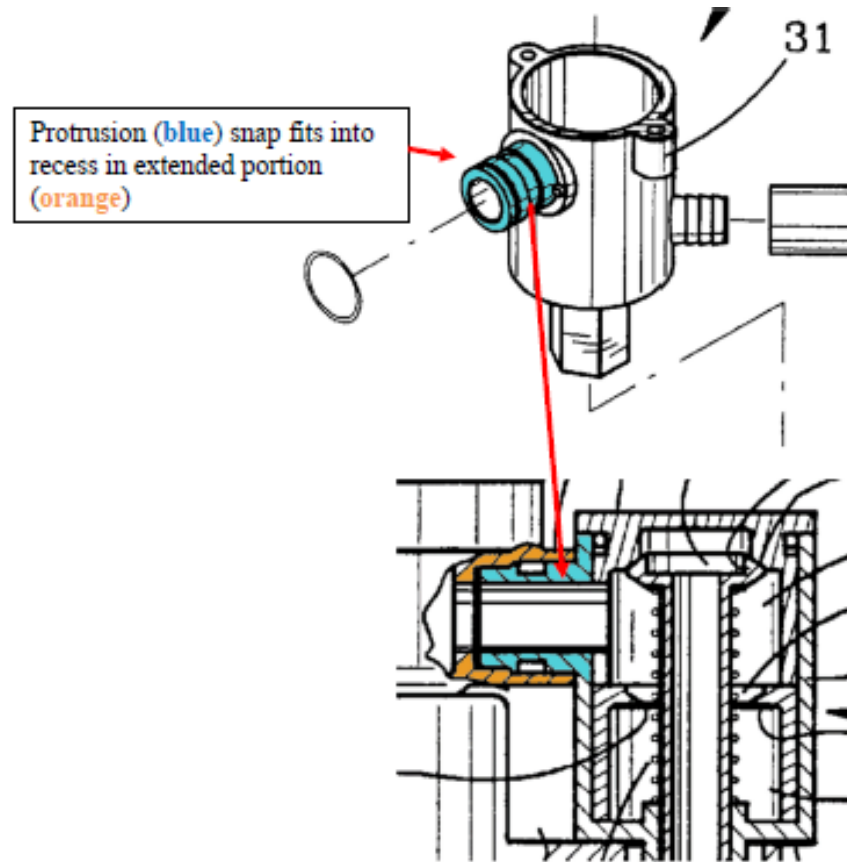
'698 Patent



Guoxin



Ho discloses an extended portion on a toilet fill valve with a recess (female connector) into which a bowl fill valve inlet port (male connector) of a bowl fill valve is inserted and locked into place. *See* EX1022, annotated Figs. 3 and 5 below.



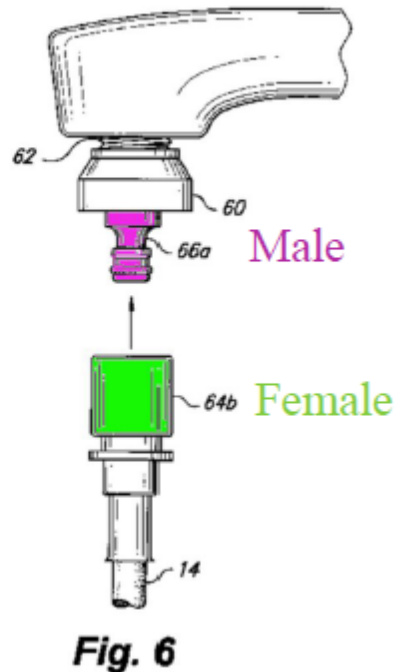
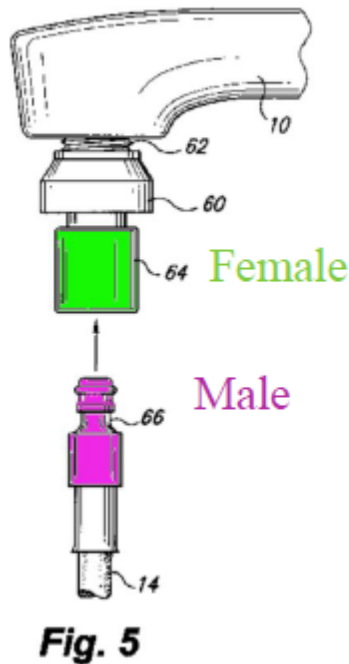
Ho was not considered during prosecution of the '698 patent and is more material than the art considered. EX1004, ¶99. Both Guoxin and Ho are directed to toilet valve systems. *See, e.g.*, EX1016, 2 (title “Toilet Water Tank Water Supply Switching Device”); EX1022, 1 (title “Toilet Flushing Device”). The systems of both Guoxin and Ho utilize and describe bowl fill valves (e.g., “switching mechanism 4” in Guoxin 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. *See, e.g.*, EX1016, 5:1-2 (“By adopting the said solution: This achieves more accurate control of the switching valve for the water

supply...”), Figs. 1-4; EX1022, 1:6-9 (“This invention relates to a toilet flushing device, more particularly to a toilet flushing which has a diverter valve unit for directing water from the water supplying pipe to the rim flushing conduit of the toilet bowl.”), Figs. 1-5.

Using Ho’s connection instead of Guoxin’s would have been obvious to a POSITA as a matter of design preference, as they are well-known substitute structures for performing the same function in their known and expected manner. EX1004, ¶100; *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 416 (2007). Similarly, the snap fit and slot/rib (or slot/extension) connections between the two fluid channels recited by the claims are well-known fluid flow connections disclosed by numerous documents such as Calmettes, Hall, and Kimber—the Quick Connection Art. EX1004, ¶100. Indeed, the ’698 patent acknowledges that any of a variety of well-known snap fit and sealing configurations could be used for the connection: “Also, other snap fit and sealing configurations may be employed beyond those specifically described herein.” EX1001, 10:6-7; EX1004, ¶100.

One of ordinary skill in the art would understand that male and female fluid flow connectors are generally interchangeable and the decision to make one component a male connector and the other a female connector is a matter of design preference. EX1004, ¶101. For example, Bjerke (EX1017) shows that male and female connectors can be reversed in relation to each other and are thus

interchangeable. *See, e.g.,* EX1017, 7:15-24, Figs. 5-6 (below) (reversal/interchangeability of male 66/64a and female 66/66a portions of quick connect/disconnect system).



As another example of the interchangeability of male and female connectors, and specifically connectors for toilet fill valves, the obviousness of such a substitution is also supported by the prosecution of the '698 patent, where PO presented claim 3, which recited the precise arrangement disclosed by Guoxin (e.g., male protrusion as the bowl fill outlet port and female receptacle at the bowl fill inlet port) and referred to paragraphs [0033] and [0042] of the specification as support. EX1002-080-EX1002-081. In particular, Paragraph [0033] states:

...the bowl fill outlet port 206 may comprise a female receptacle and, correspondingly, the bowl fill valve inlet port 213 may comprise a male end compatible with a female receptacle. Alternatively, the bowl fill valve inlet port 213 may comprise a female receptacle and the bowl fill outlet port 206 may comprise a male end compatible with such female receptable.

Id.

Paragraph [0042] also states with respect to the connectors shown in Figs. 5A and 5B that “**it is possible that this arrangement may be reversed....**” *Id.* (emphasis in original). It is clear from the ’698 patent specification and the intrinsic evidence that PO placed no criticality on which portion of the coupling was the male portion and which portion was the female portion. EX1004, ¶103. Placing a protrusion on the bowl fill restriction or on the toilet fill valve bowl fill outlet port therefore would have been an obvious design choice to a POSITA. *Id.*

The toilet fill valve connectors at issue here are likewise interchangeable. Thus, a toilet fill valve with a male connector that mates to a female connector on a bowl fill restriction (as in Guoxin) is equivalent to a toilet fill valve with female connector that mates to a male connector on a bowl fill restriction (as in Ho). EX1004, ¶104. Indeed the ’698 patent confirms the obvious interchangeability of protrusions, ribs, recesses, etc., on the respective couplings. EX1001, 7:36-48 (“it is

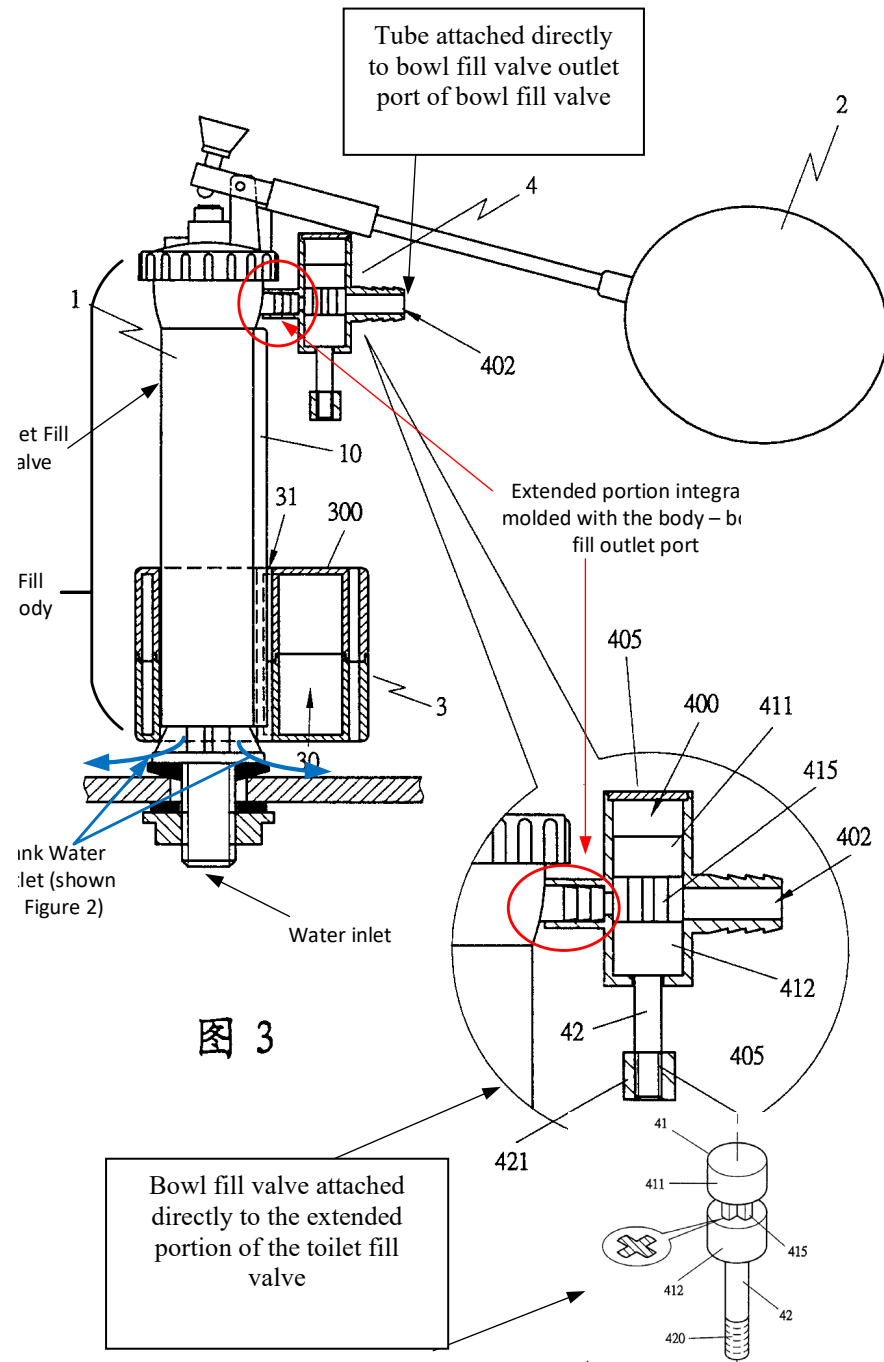
possible that this arrangement may be reversed....in a reverse arrangement”);
EX1004, ¶104.

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, ¶105. Likewise, the choice of whether a male or female connector has a protrusion or a recess for creating a connection would be obvious to a POSITA as a matter of design preference. *Id.* 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.*

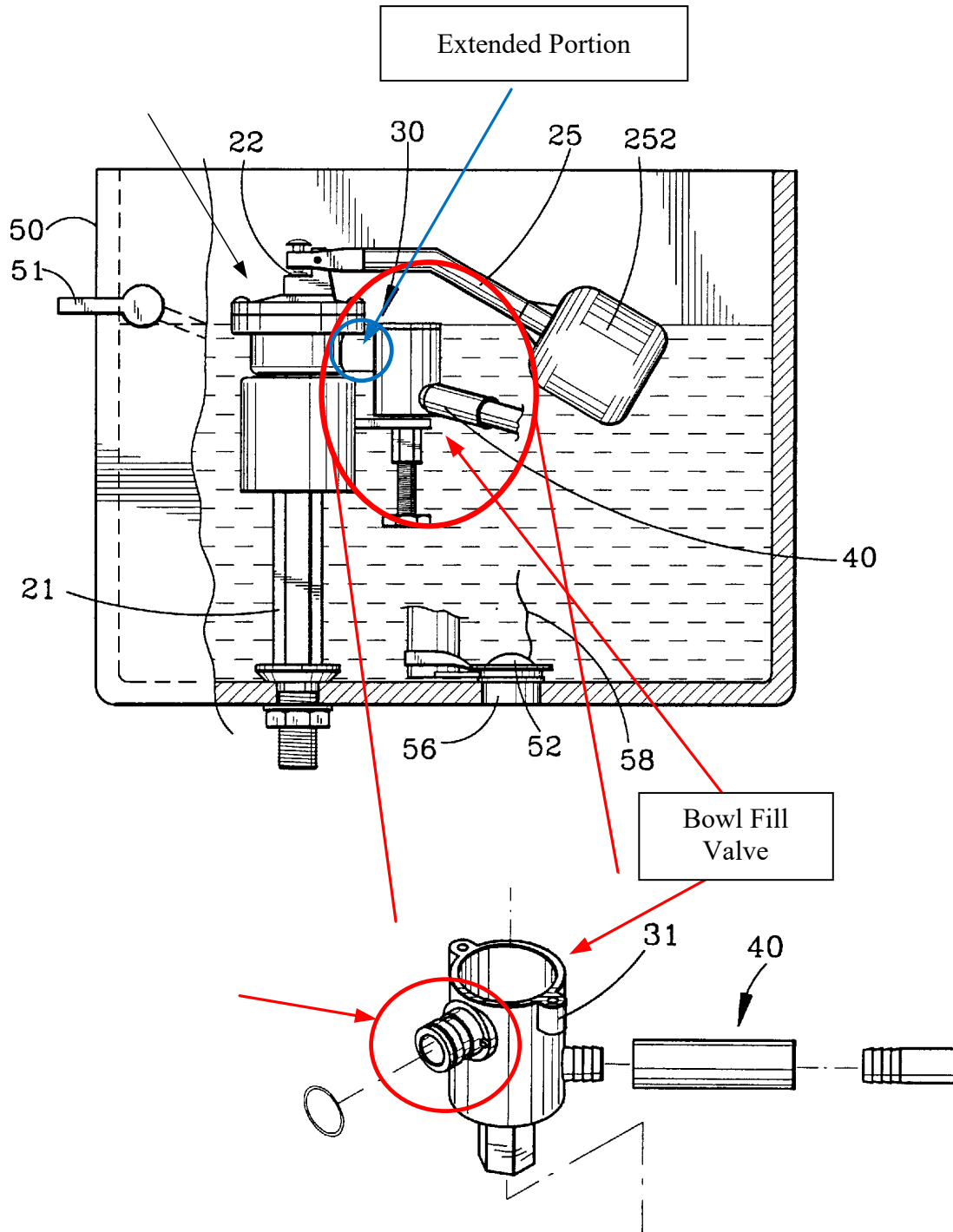
Thus, as explained below, Guoxin in view of Ho and further in view of the Quick Connection Art renders the Challenged Claims obvious.

1. Independent claim 1 is obvious over Guoxin in view of Ho and Further in View of the Quick Connection Art

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.



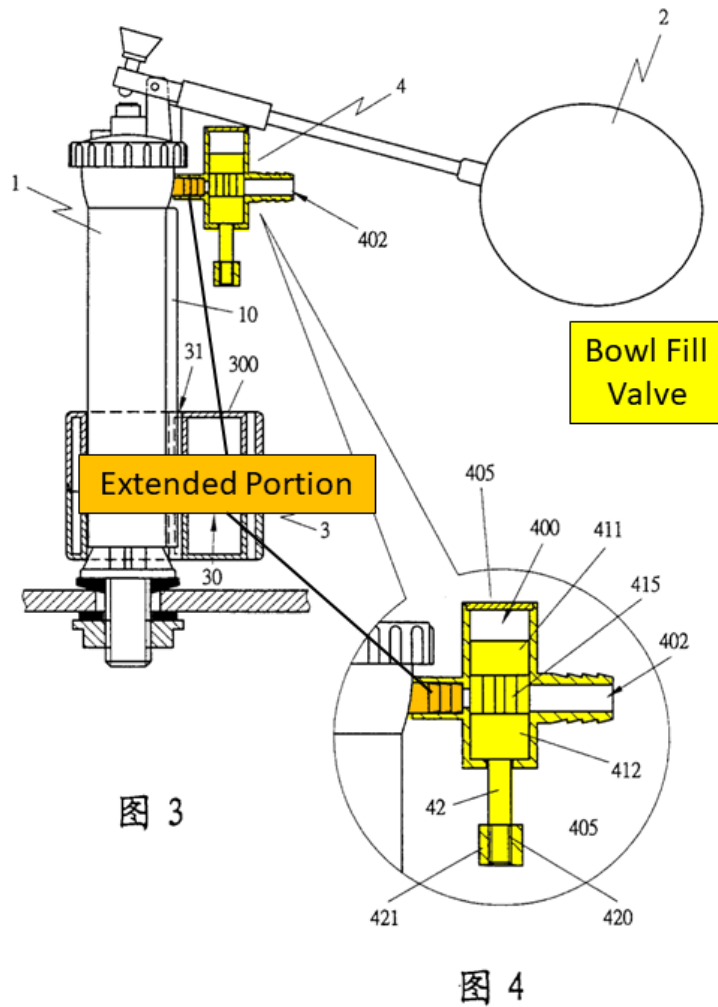
EX1022 (Ho), annotated Figs. 2 and 5 above.

a. 1[Pre]

Claim 1 recites “A toilet 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, ¶108.

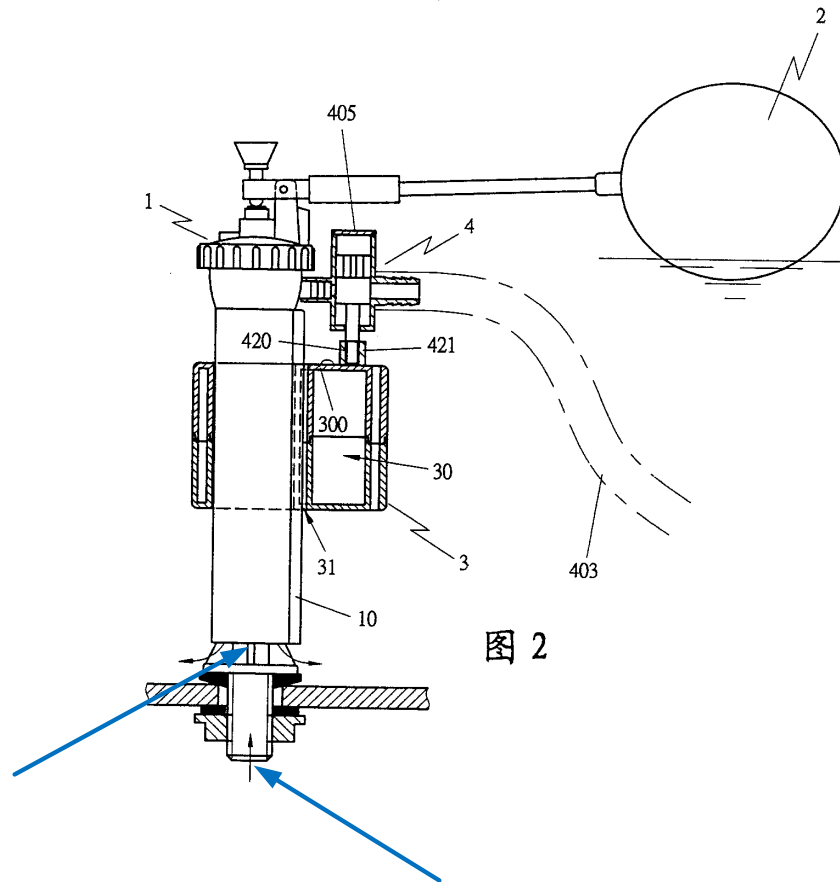
b. 1[A1]

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 below. EX1004, ¶110. The extended portion of Guoxin’s toilet fill valve forms a bowl fill outlet port. *Id.* Similarly, Ho discloses a toilet fill valve having an extended portion that is integrally molded with the toilet fill valve body, as shown in Figures 2-6 (see annotated Figures 2 and 5 above), and which forms a bowl fill outlet port for connection to diverter valve means 30. *Id.* Thus, Guoxin and Ho each satisfy element 1[A].



c. 1[A2]

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, ¶112. Annotated Guoxin (EX1016) Figure 2 below includes an arrow pointing upwards (black arrow in the original) that shows the flow of water at the water inlet. *Id.*



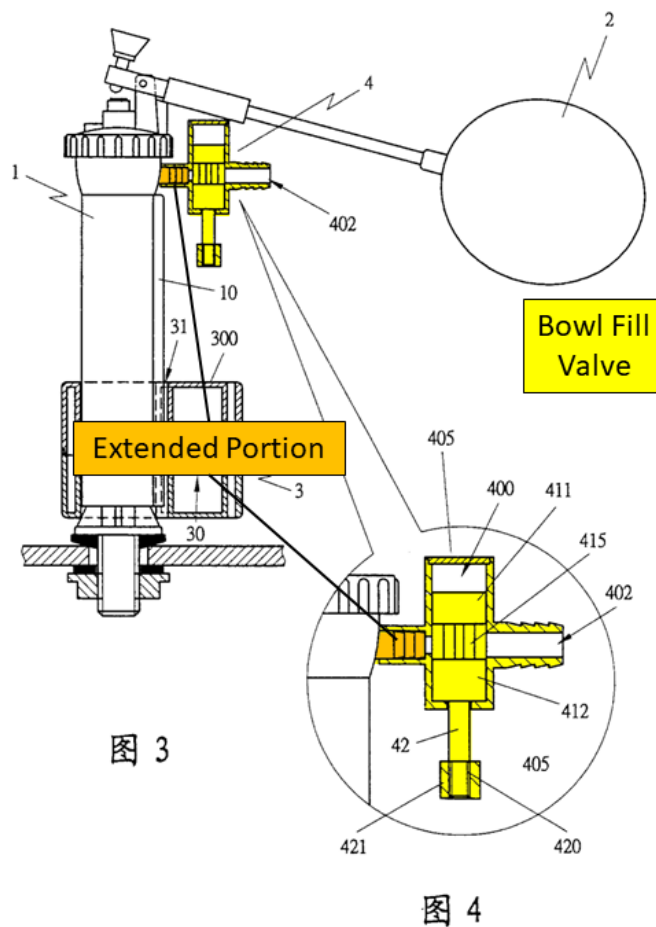
Guoxin and Ho each satisfy this element. *Id.*

d. 1[A3]

Guoxin illustrates the tank water outlet as shown in annotated Figure 2 above (black arrows showing the flow at the tank water outlet in original). Ho discloses tank water outlet via passage 321 of valve rod 32. EX1022, 4:32-39, Fig. 10; EX1004, ¶114. Guoxin and Ho each disclose a tank water outlet, as is conventional in the art, and satisfy this element. *Id.*

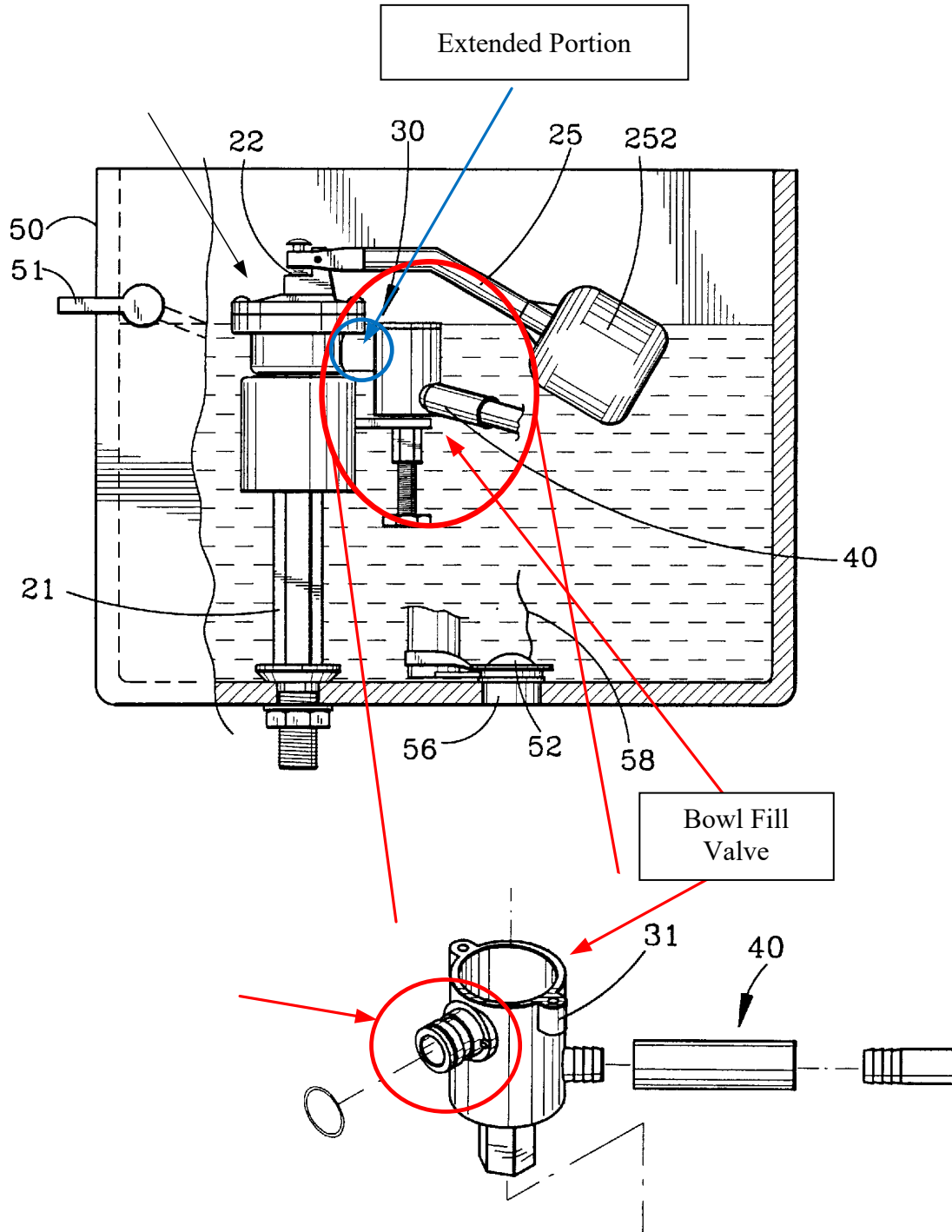
e. 1[B1]

Guoxin discloses a bowl fill valve 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; EX1004, ¶116.



Ho discloses bowl fill valve (diverter valve means 30) that attaches directly to the extended portion of the toilet fill valve. EX1022, 3:8-13, Fig. 5 and 8-11; *see*,

annotated Figs. 2 & 5 below; EX1004, ¶117. Guoxin and Ho each satisfy this element. *Id.*, ¶118.



f. 1[B2]

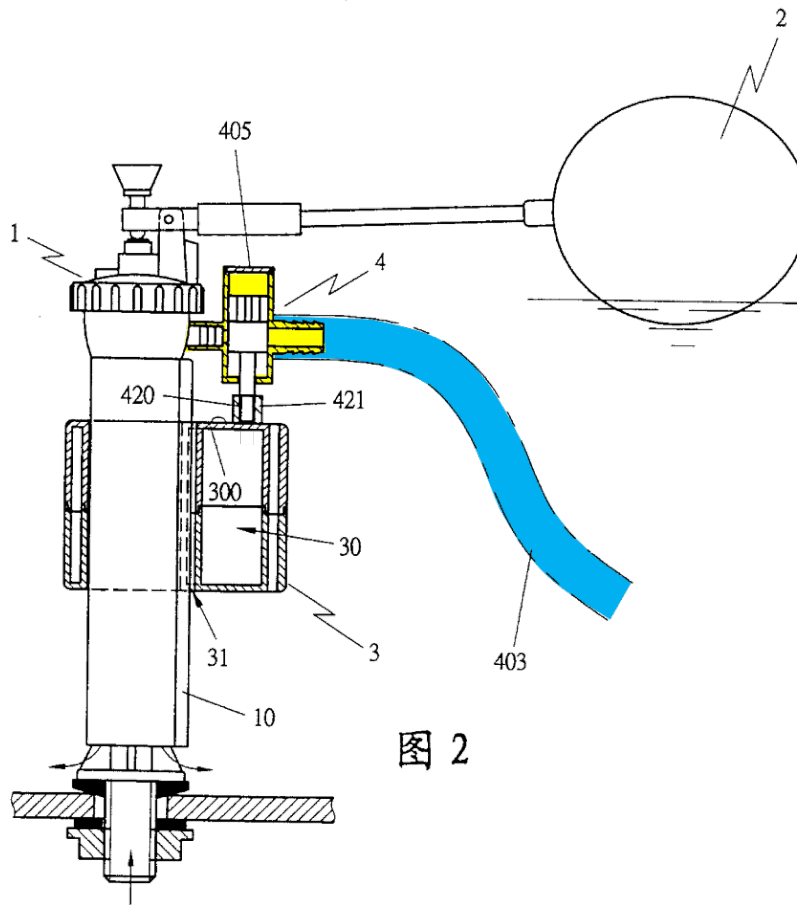
As discussed above with respect to elements **1[A1]** and **1[B1]**, Guoxin discloses a bowl fill valve (switching mechanism 4) with an inlet port that mates directly to the bowl fill outlet port created by the extended portion of the body of the toilet fill valve (water inlet device 1). EX1004, ¶120; *see* EX1016, Figs. 3 and 4.

Ho also discloses a bowl fill valve (diverter valve means) with an inlet port that mates to the bowl fill outlet port created by the extended portion of the body of the toilet fill valve (water supplying pipe 21). EX1004, ¶121; *see* EX1022, Figs. 3 and 5.

Guoxin and Ho each satisfy this element. EX1004, ¶122.

g. 1[B3]

Guoxin discloses a tube 403 configured to attach directly to the bowl fill valve outlet port of the bowl fill valve (switching mechanism 4). *See* EX1016, annotated Fig. 2 below, p. 2 (“The valve seat 40 has water inlet and outlet 401 and 402, where the water outlet 402 can be connected to the water supply pipeline 403, and the water supply line 403 is directed to the toilet to directly provide water supply to the toilet.”); EX1004, ¶124.



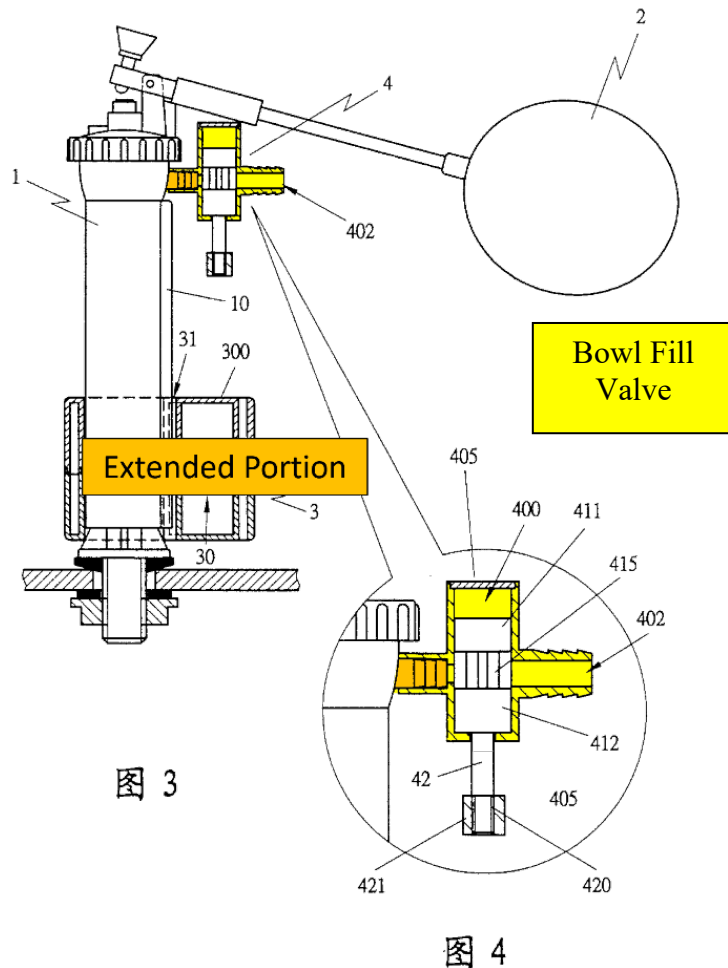
Ho also discloses a tube (supply line 40) configured to attach directly to the bowl fill valve outlet port of the bowl fill valve (diverter valve means 30). EX1022, 3:6-17, 4:5-7; EX1004, ¶125.

Guoxin and Ho each satisfy this element. EX1004, ¶126.

h. 1[B4]

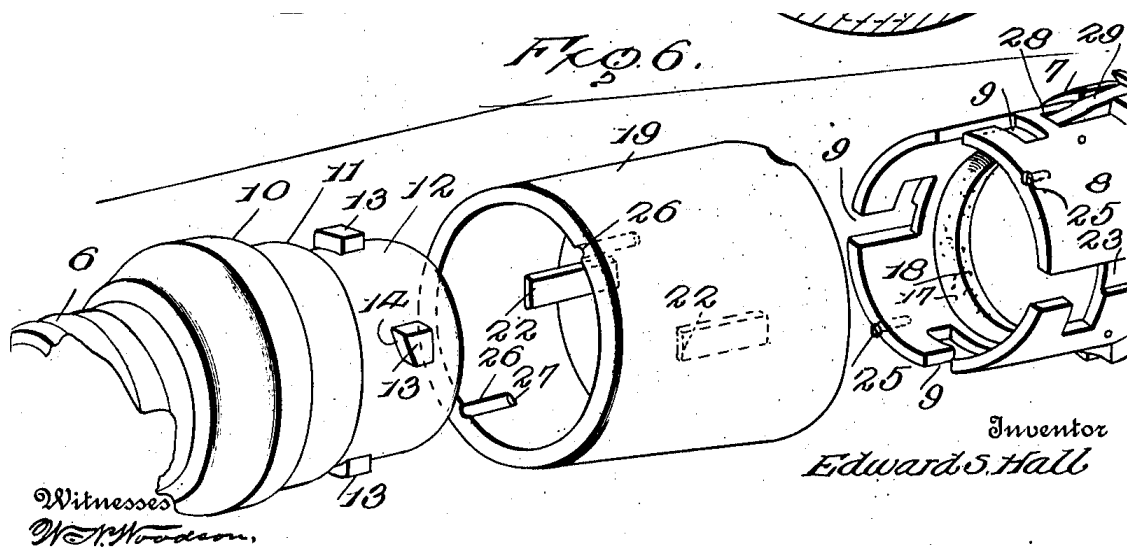
Guoxin discloses a protrusion in the form of annular ridges on the extended portion of the toilet fill valve that forms the bowl fill outlet port. The bowl fill outlet port of Guoxin is a male connector that inserts into the female connector of the bowl

fill valve inlet port. The annular ridges of Guoxin retain the bowl fill valve to the toilet fill valve. *See* EX1016, annotated Figs. 3 and 4 below; EX1004, ¶128.

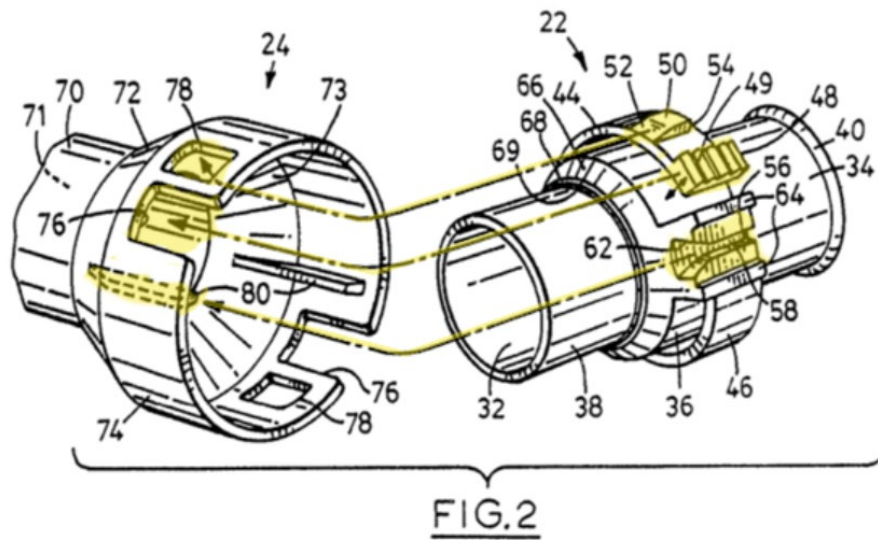


As discussed above, swapping the mating surfaces such that a protrusion is located on the bowl fill valve and inserts into a recess in the toilet fill valve would have been obvious to a POSITA as a matter of design preference. EX1004, ¶129. For example, with reference to Figure 6 of Hall (EX1019), Hall discloses a fluid flow coupler with a coupling sleeve/collar 19 (female connector) in which locking

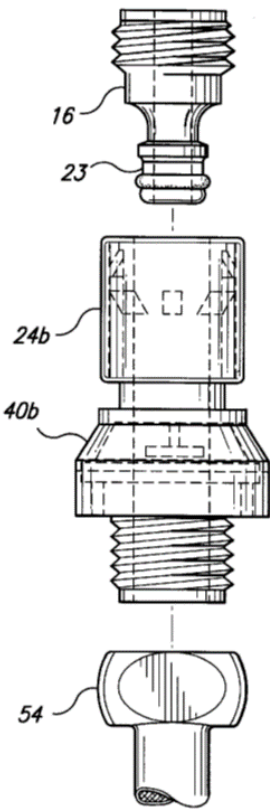
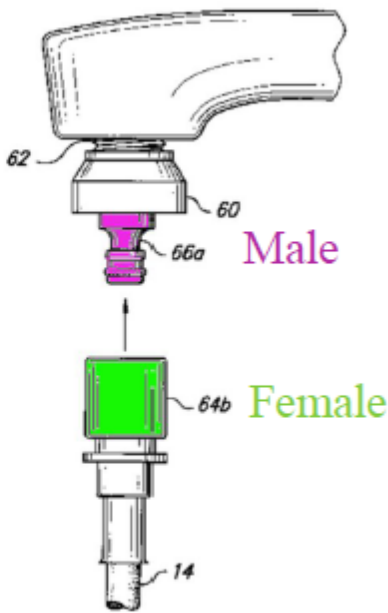
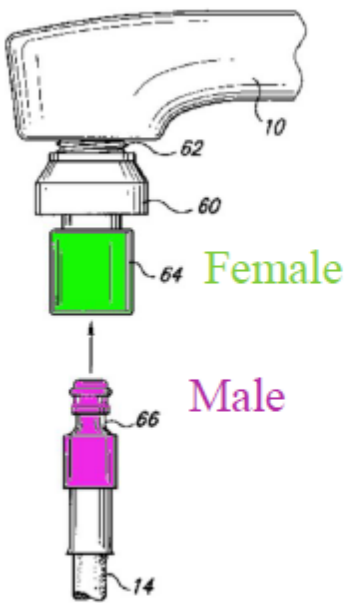
plates 22 are secured to the inner wall sleeve/collar 19 and insert into recesses 23 on cylindrical member 8 (male connector) in order to secure the connector components together. *See* Hall (EX1019), 1:100-2:7, Figure 6 (reproduced below); EX1004, ¶130.



As another example, Kimber (EX1020) also discloses a pipe coupling that comprises a male fitting 22 and a tubular female fitting 24 where the female fitting has protrusions (referred to as keying members 80) within the inner surface of the fitting that insert into recesses on the male fitting (referred to as guide slots 58) in order to maintain the connection between the two components. *See* EX1020, 6-7; EX1004, ¶131.



As another example, Figures 5 and 6 of Bjerke (EX1017) show interchangeability of male 66/64a and female 66/66a portions of a quick connect system. *See, e.g.*, Bjerke (EX1017), 7:15-24, Figs. 5-6 (below); EX1004, ¶132. Annotated Figures 5 and 6, demonstrate the ease with which male and female connectors can be swapped in a given arrangement and disclose the use of protrusions on the inner surface of a female connector and recesses on the outer surface of a male connector in order to create a snap fit connection that retains two components together. EX1004, ¶132. Figure 4 of Bjerke provides a view of the protrusions on the inner surface of the female connector 24b that fit into a recess on the outer surface of the male connector 23 in order to retain the components together. Bjerke (EX1017), 7:15-24, Fig. 4 below; EX1004, ¶132.



The connections between the two fluid channels recited by the claims are well-known fluid flow connections disclosed by numerous documents such as Hall and Kimber. EX1004, ¶133. As such, using the mating engagements of Hall or Kimber to attach the extended portion of Guoxin's toilet fill valve to switching mechanism 4 would have been obvious to a POSITA as a matter of design preference, as they are well-known simple substitute structures for performing the same function (i.e., coupling and retaining fluid flow components together) in their known and expected manner to obtain predictable results. EX1004, ¶133.

Indeed, during prosecution of the '698 patent, PO presented claim 3, which recited the precise arrangement disclosed by Guoxin (e.g., male protrusion as the bowl fill outlet port and female receptacle at the bowl fill inlet port) and referred to paragraphs [0033] and [0042] of the specification as support. EX1002-080-EX1002-081; EX1004, ¶134.

Paragraph [0033] states:

...the bowl fill outlet port 206 may comprise a female receptacle and, correspondingly, the bowl fill valve inlet port 213 may comprise a male end compatible with a female receptacle. Alternatively, the bowl fill valve inlet port 213 may comprise a female receptacle and the bowl fill outlet port 206 may comprise a male end compatible with such female receptable.

Id.; *see also, id.*, [0042] (stating with respect to the connectors shown in Figs. 5A and 5B that “**it is possible that this arrangement may be reversed...**”) (emphasis in original). It is clear from the ’698 patent specification that PO placed no criticality on which portion of the coupling was the male portion and which portion was the female portion—and consequently, no criticality on whether the protrusion is on the bowl fill valve or on the toilet fill valve bowl fill outlet port. EX1004, ¶134.

Accordingly, the combination of Guoxin and the Quick Connection Art renders obvious a protrusion on a bowl fill restriction that snaps into a recess in the toilet fill valve, thereby satisfying this element. EX1004, ¶135.

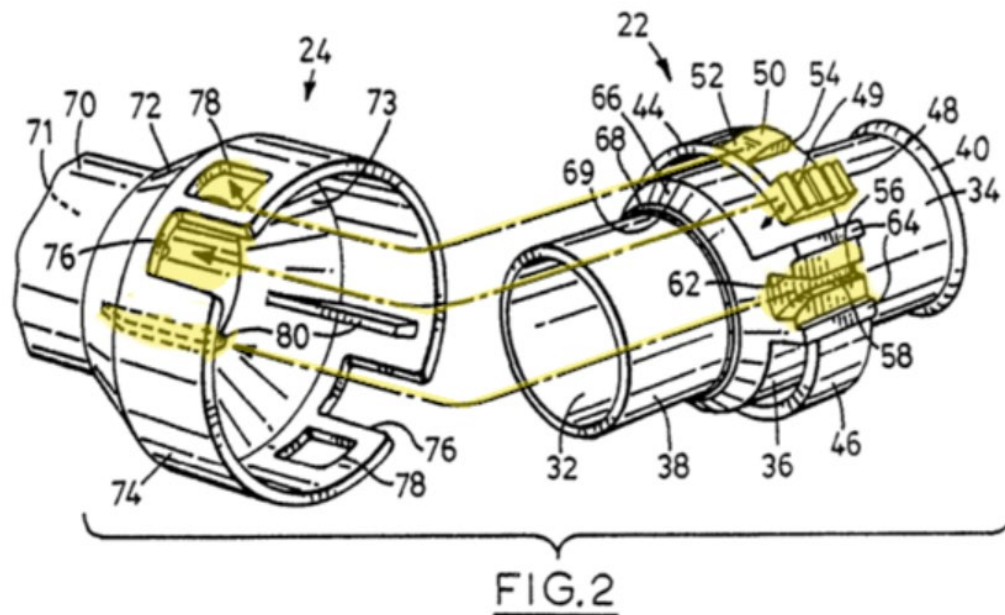
i. 1[B5]

Guoxin discloses an adjustable bowl fill valve that adjusts the water flow rate through the valve based on a setting of the bowl fill valve. EX1016, 2:25-27; EX1004, ¶137. The water level is set by adjusting the T-shaped nut (water flow adjustment handle) to change the position of how the switching valve’s stem is driven—this in turn alters the 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, ¶137. To the extent it is argued that the T-shaped nut is not a handle, it would have been obvious to add material to one side of the nut to create a handle. A POSITA would have found it obvious to do so in order to make the nut easier to manipulate by hand. *Id.* Thus, Guoxin satisfies this element. *Id.*

j. 1[B6]

As discussed above in Sections VI.C and VIII.A and with respect to element 1[B4], snap fit couplings were known in the art. Furthermore, a POSITA would be motivated to select a connection that prevented detachment of the bowl fill valve from the toilet fill valve. EX1004, ¶139. Similarly, a POSITA would also be motivated to select a connection that prevented relative rotation of the bowl fill valve with respect to the toilet fill valve. *Id.* For example, Calmettes teaches that “the immobilization of two coaxial tubes may be sought after, both with regard to a relative rotation and to a translation, whenever it is desired to obtain an efficient mechanical connection between the two tubes.” EX1018, 1:17-22, 1:58-64.

Furthermore, within the Quick Connection Art, Kimber (EX1020) discloses a snap fit pipe coupling that comprises a male fitting and a tubular female fitting where the male fitting has slots configured to receive an extension of the toilet fill valve and prevent rotation of the bowl fill valve relative to the toilet fill valve. Annotated Figure 2 below illustrates the coupling arrangement between male fitting 22 and tubular female fitting 24 where tabs can snap into apertures and axial grooves 62 mate with ribs 80 to prevent axial movement and rotation. *See* EX1004, ¶140.



Accordingly, the combination of Guoxin and the Quick Connection Art renders obvious this element. EX1004, ¶141.

k. **1[C]**

As discussed above with respect to element 1[B3], Guoxin discloses a tube 403 configured to attach directly to the bowl fill valve outlet port of the bowl fill valve (switching mechanism 4). EX1016, Fig. 2; EX1004, ¶143. Ho also discloses a tube (supply line 40) configured to attach directly to the bowl fill valve outlet port of the bowl fill valve (diverter valve means 30). EX1022, 3:6-17, 4:5-7; EX1004, ¶143. Guoxin and Ho each satisfy this element. EX1004, ¶143.

I. Summary

In view of the foregoing, the combination of Guoxin, alone or with Ho, and the Quick Connection Art renders obvious independent claim 1. EX1004, ¶144.

2. Independent claims 8 and 12 are obvious over Guoxin in view of Ho and Further in View of the Quick Connection Art

Independent claims 8 and 12 are obvious over Guoxin in view of Ho and the Quick Connection Art for the generally the same reasons as claim 1 is obvious as described above. The elements of independent claims 8 and 12 largely mirror the bowl fill valve elements of claim 1, omit the toilet fill valve elements, and fail to recite any additional elements.

a. 8[Pre] & 12[Pre]

Elements **8[Pre]** and **12[Pre]** both recite a “bowl fill valve.” For the reasons discussed above with respect to **1[Pre]** and **1[B1]**, Guoxin and Ho each satisfy these preambles. EX1004, ¶147.

b. 8[A] & 12[A]

Elements **8[A]** and **12[A]** both recite “a bowl fill valve inlet port configured to mate directly to a bowl fill outlet port of a body of a toilet fill valve.” For the reasons discussed above with respect to **1[B2]**, Guoxin and Ho each satisfy these elements. EX1004, ¶148.

c. 8[B] & 12[B]

Elements **8[B]** and **12[B]** both recite “a bowl fill valve outlet port configured to attach directly to a tube that provides water from the bowl fill valve outlet port to an overflow tube.” For the reasons discussed above with respect to **1[B3]** and **1[C]**, Guoxin and Ho each satisfy these elements. EX1004, ¶149.

d. 8[C] & 12[C]

Elements **8[C]** and **12[C]** both require “a protrusion” on the bowl fill valve that is configured to snap fit into a recess of the toilet fill valve and retain the bowl fill valve to the toilet fill valve. For the reasons discussed above with respect to **1[B1]**, **1[B2]**, and **1[B4]**, Guoxin in view of the Quick Connection Art renders these elements obvious. EX1004, ¶152.

e. 8[D] & 12[D]

Elements **8[D]** and **12[D]** both require “a slot configured to receive an extension of the toilet fill valve and prevent rotation of the bowl fill valve relative to the toilet fill valve.” For the reasons discussed above with respect to **1[B6]**, Guoxin in view of the Quick Connection Art render these elements obvious. EX1004, ¶153.

f. 8[E] & 12[E]

Element **8[E]** requires “a water flow adjustment handle being configured to adjust water flow from the bowl fill valve inlet port to the bowl fill valve outlet port.” Element **12[E]** requires “means for adjusting water flow out of the bowl fill valve

outlet port.” As discussed above in Section IV.B.3, the “means for adjusting water flow” expression is construed to mean a water flow adjustment handle. For the reasons discussed above with respect to **1[B5]**, Guoxin, alone or with Ho, and the Quick Connection Art render these elements obvious. EX1004, ¶156.

g. Summary

The combination of Guoxin, Ho, and the Quick Connection Art disclose or renders obvious all of the elements recited by independent claims 8 and 12. EX1004, ¶157.

3. Independent claim 10 is obvious over Guoxin in view of Ho and Further in View of the Quick Connection Art

Independent claim 10 is obvious over Guoxin in view of Ho and the Quick Connection Art for the generally the same reasons as claim 1 is obvious as described above. Claim 10 is fundamentally nothing more than the method (steps) performed when assembling the system of claim 1. 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 '698 patent. EX1004, ¶158. 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 '698 patent filing date. *Id.* There is nothing unique, unexpected, or unobvious in the method steps recited

by method 10. *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, ¶158.

a. 10[Pre]

To the extent any of the respective pieces of the toilet fill valve and bowl fill valves 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, ¶160. Claim 3 of Guoxin specifically recites that the bowl fill valve (switching mechanism 4) and valve stem are “integrally formed, making assembly and combination exceedingly convenient and fast.” EX1016, 3:3-4; EX1004, ¶160.

b. 10[A]

For the same reasons discussed above with respect to elements **1[A2]**, Guoxin and Ho each disclose or render obvious this element. EX1004, ¶162.

c. 10[B1]

For the same reasons discussed above with respect to elements **1[B1]**, Guoxin and Ho each disclose or render obvious this element. EX1004, ¶164.

d. 10[B2]

For the same reasons discussed above with respect to element **1[B2]** above, the combination of Guoxin and Ho renders obvious this element. EX1004, ¶166.

e. 10[B3]

For the same reasons discussed above with respect to elements **1[B3]** and **1[B4]**, the combination of Guoxin and Ho or the combination of Guoxin, alone or with Ho, and the Quick Connection Art renders obvious this element. EX1004, ¶168.

f. 10[B4]

For the same reasons discussed above with respect to elements **1[B4]** and **1[B6]**, the combination of Guoxin and Ho or the combination of Guoxin, alone or with Ho, and the Quick Connection Art renders obvious this element. EX1004, ¶170.

g. 10[C]

For the same reasons discussed above with respect to element **1[E]**, Guoxin and Ho each disclose or render obvious this element. EX1004, ¶172.

h. Summary

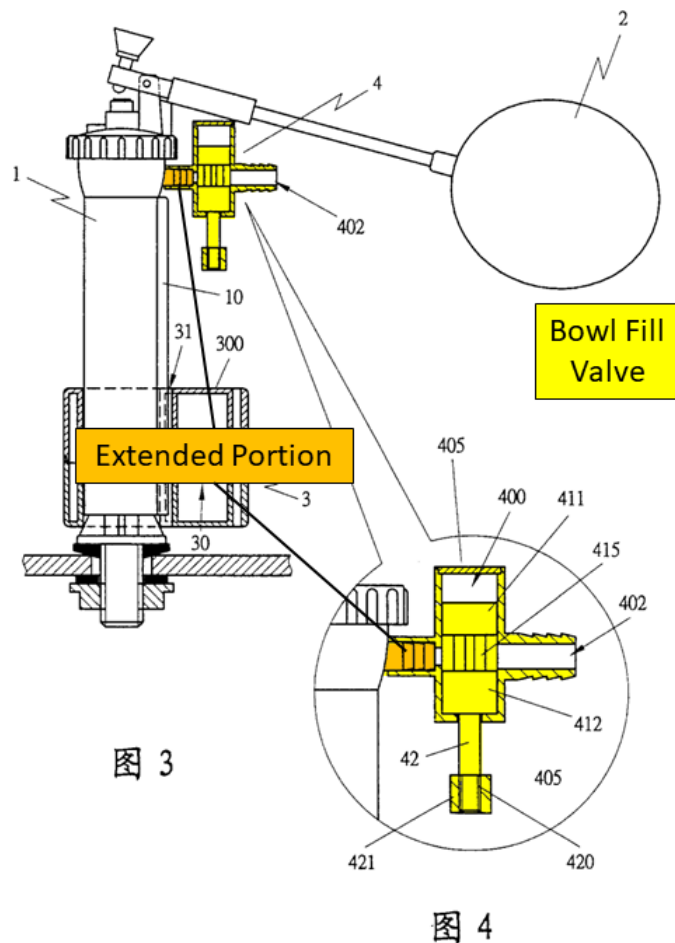
The combination of Guoxin and the Quick Connection Art or the combination of Guoxin, Ho, and the Quick Connection Art disclose or renders obvious all of the elements recited by independent claim 10. EX1004, ¶173.

4. Dependent claims 2-7, 9, 11, and 13-14 are obvious

a. Claims 2 and 9

Dependent claims 2 (which depends from claim 1) and 9 (which depends from claim 8) recite that the bowl fill outlet port of the toilet fill valve is a male connector and the bowl fill valve inlet port of the water flow regulator is a female connector.

EX1004, ¶176. As discussed above with respect to element 1[B1] and 1[B4], Guoxin discloses an extended portion (bowl fill outlet port) on water inlet device 1 that forms a male connector and a corresponding female connector in the form of switching valve inlet 401 (bowl fill valve inlet port) on switching mechanism 4 (bowl fill valve). EX1016, 2:8-20, Figs. 2-5; EX1004, ¶176. Thus, combination of Guoxin and the Quick Connection Art disclose or render obvious claims 2 and 9. *Id.*

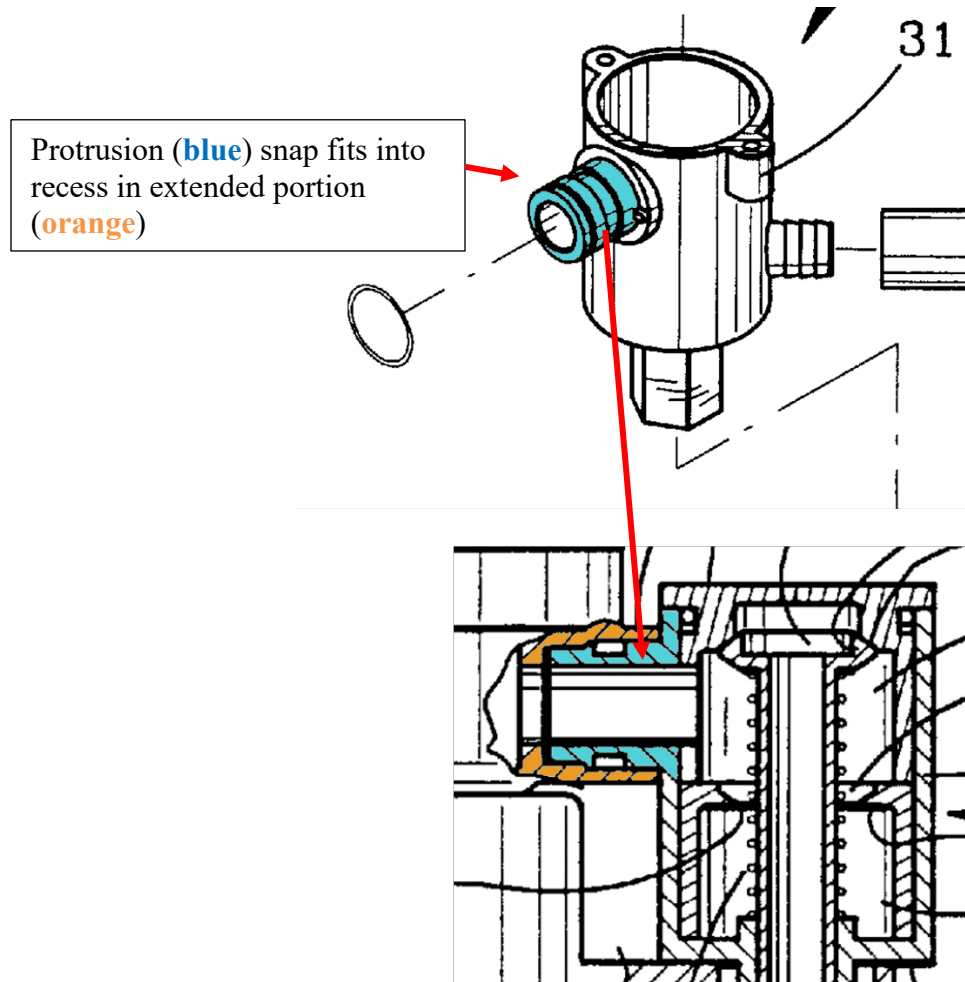


b. Claim 3

As discussed above with respect to elements **1[B4]** and **1[B6]**, the combination of Guoxin, alone or with Ho, and the Quick Connection Art renders obvious this claim. EX1004, ¶178. Petitioner also notes the following with respect to dependent claim 3.

i. 3[A] & 3[B]

As shown in Figures 3 and 5, Ho discloses a bowl fill valve with an annular protrusion located on the side wall of the valve that is configured to snap fit within an annular recess on the side wall of the bowl fill outlet port of the toilet fill valve. EX1004, ¶179; *see* EX1022, annotated Figs. 3 and 5 below.



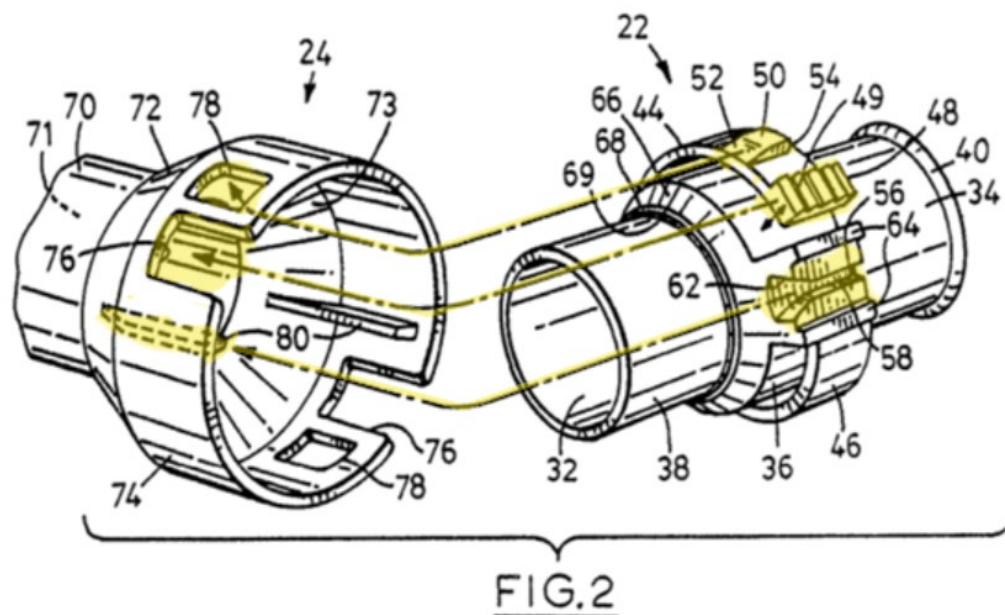
As discussed above, it would have been obvious to use the mating engagement of Ho or the Quick Connection Art to attach the extended portion of Guoxin's toilet fill valve with switching mechanism 4 of Guoxin, as a simple substitution of one known coupling arrangement for another to obtain predictable results. EX1004, ¶180.

Accordingly, the combination of Guoxin and Ho or the combination of Guoxin, Ho, and the Quick Connection Art satisfies this element. EX1004, ¶180.

ii. 3[C]

As discussed above in Sections VI.C and VIII.A and with respect to element 1[B4], snap fit couplings were known in the art and a POSITA would be motivated to select a connection that prevented detachment of the bowl fill valve from the toilet fill valve and relative rotation. EX1004, ¶181; *see* EX1018, 1:17-22, 1:58-64.

As discussed above, Kimber (EX1020) discloses a snap fit pipe coupling that comprises a male fitting and a tubular female fitting where the male fitting has slots on the side wall configured to receive ribs that prevent rotation of the coupling components. Annotated Figure 2 below illustrates the coupling arrangement between male fitting 22 and tubular female fitting 24 where tabs can snap into apertures and axial grooves 62 mate with ribs 80 to prevent axial movement and rotation. *See* EX1004, ¶182.



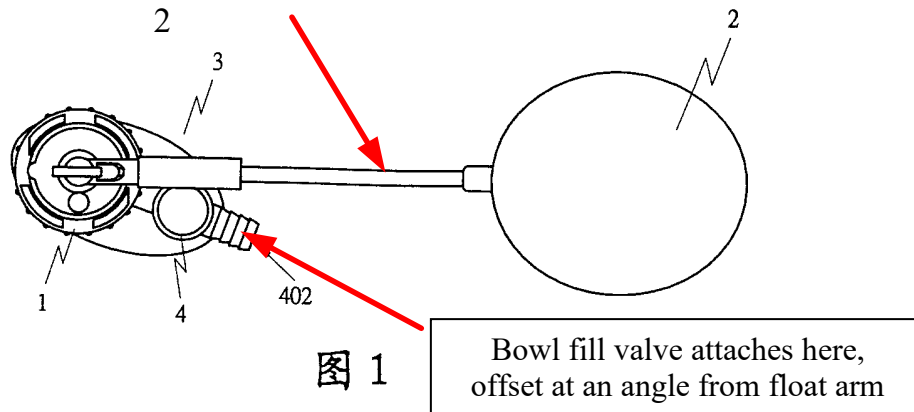
Accordingly, the combination of Guoxin, alone or with Ho, and the Quick Connection Art (specifically Kimber) renders obvious this element. EX1004, ¶183.

c. Claim 4

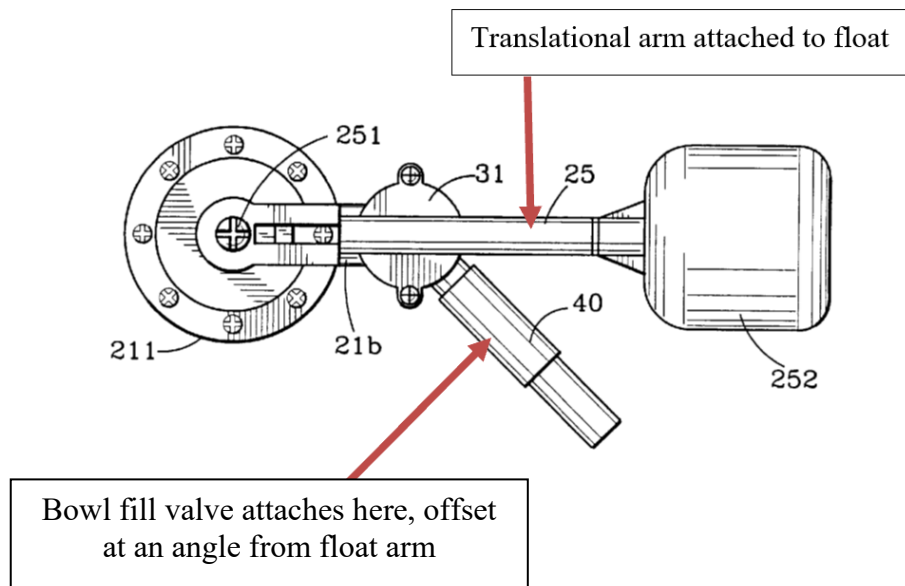
Dependent claim 4 recites the bowl fill outlet port extending radially from a longitudinal axis of the body of the toilet fill valve. EX1004, ¶185. These features are discussed above with reference to elements 1[A1], 1[B1], and 1[B2]. Thus, claim 4 is rendered obvious for the same reasons discussed above. *Id.*

d. Claim 5

Dependent claim 5 recites an actuation arm that extends radially from the longitudinal axis of the body of the toilet fill valve and in which the actuating arm is angularly offset relative to the bowl fill outlet port. EX1004, ¶187. The features recited by claim 5 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. *Id.* See EX1016, Fig. 1 below; EX1022, Fig. 6 below.



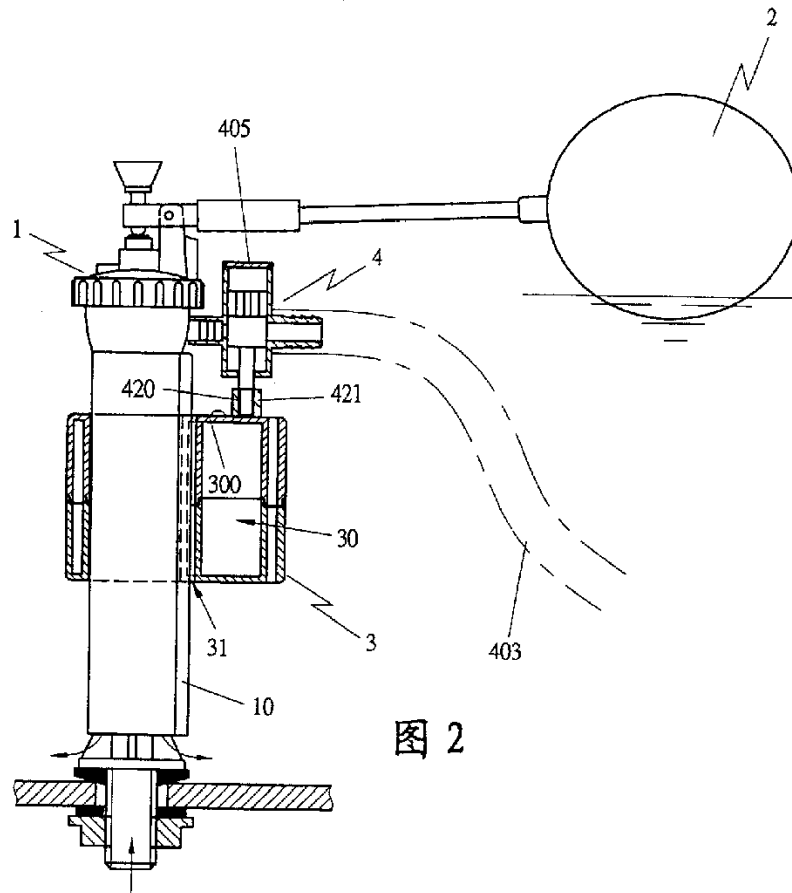
Ho



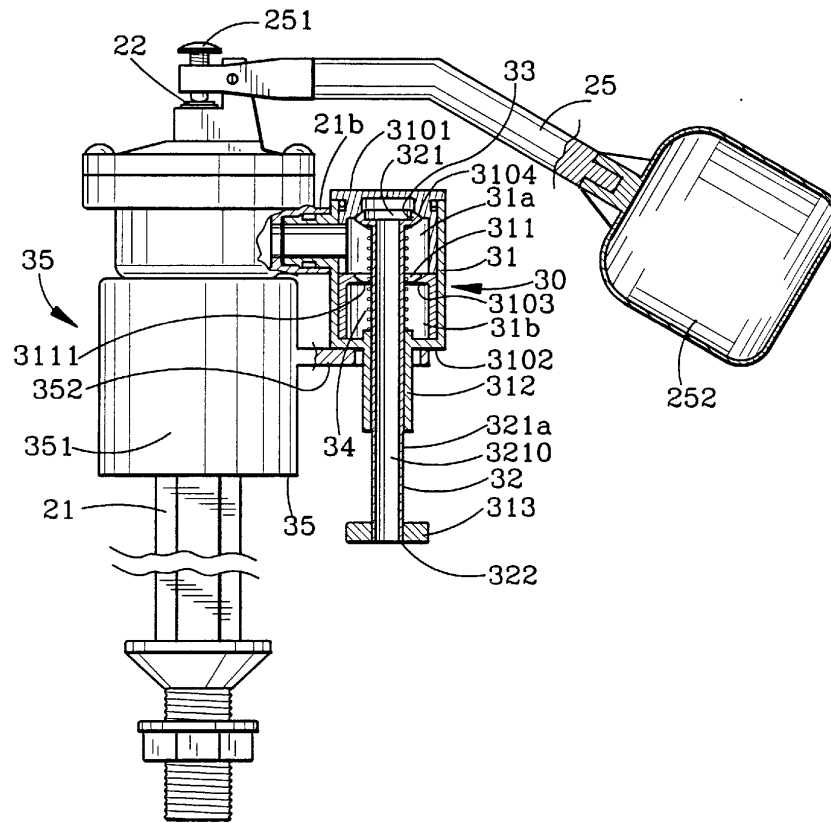
Guoxin and Ho each disclose the features of dependent claim 5, thereby rendering this claim obvious. EX1004, ¶188.

e. Claims 6 & 7

Dependent claim 6 recites a float configured to move along at least a portion of the body of the toilet fill valve. EX1004, ¶191. Dependent claim 7 further recites that at least a portion of the body of the toilet fill valve extends through the float. *Id.* Further to the discussion above with respect to element **1[B5]**, Petitioner notes that both Guoxin and Ho disclose floats that move along at least a portion of the body of the toilet fill valve where at least a portion of the body of the toilet fill valve extends through the float. As shown in Figure 2 of Guoxin below, ball float 3 moves along guide rail 10 of water inlet device 1 (toilet fill valve) and surrounds water inlet device 1 such that at least a portion of the valve body extends through the float. EX1016, 2:10-16, EX1004, ¶191.



Similarly, Figure 3 of Ho (reproduced below) shows float member 35 sleeved onto water supplying pipe 21 (toilet fill valve) such that at least a portion of the valve body extends through the float. EX1022, 3:53-60, EX1004, ¶192.



Guoxin and Ho each disclose the features of dependent claims 6 and 7, thereby rendering these claims obvious. EX1004, ¶193.

f. Claims 11 & 13

Dependent claim 11 recites adjusting a flow of water out of the bowl fill valve. Dependent claim 13 recites means for adjusting water flow out of the bowl fill valve outlet port comprises an adjustment handle. EX1004, ¶196. Claims 11 and 13 are rendered obvious for the reasons discussed above with respect to elements **1[B5]**, **8[E]**, and **12[E]**. EX1004, ¶196.

g. Claim 14

Dependent claim 14 recites a bowl fill valve inlet port that is configured to be inserted within a portion of the bowl fill outlet port. As discussed above with respect to elements **1[A1]**, **1[B1]**, **1[B2]** and **1[B4]**, and claims 2 and 9, Ho discloses a bowl fill valve inlet port with a male connector that is inserted into the female connector of the bowl fill outlet port. Furthermore, as discussed 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, ¶198; EX1002-080-EX1002-081, [0042] (stating with respect to the connectors shown in Figs. 5A and 5B that **“it is possible that this arrangement may be reversed...”**) (emphasis in original). Accordingly, the combination of Guoxin, alone or with Ho, and the Quick Connection Art renders obvious dependent claim 14. EX1004, ¶198.

IX. CONCLUSION

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

Dated: March 6, 2024

Respectfully submitted,

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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 8,025 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

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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:

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