

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

FLUIDMASTER, INC.

Petitioner

v.

DANCO, INC.

Patent Owner

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

SUPPLEMENTAL DECLARATION OF KIMBERLY K. CAMERON, PH.D.

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TABLE OF EXHIBITS

Exh. No.	Description of Exhibit
EX1001	U.S. Patent No. 9,139,993 to Schuster et al.
EX1002	Prosecution History of U.S. Patent No. 9,139,993 (Application No. 14/164,424, filed January 27, 2014)
EX1003	Complaint (Dkt. 1) in <i>Danco, Inc. v. Fluidmaster, Inc., et al.</i> , Case No. 8:23-cv-01156 (C.D. Cal.), filed June 28, 2023
EX1004	Expert Declaration of Dr. Kimberly Cameron, Regarding Invalidity of the Challenged Claims of U.S. Patent No. 9,139,993 to Schuster et al.
EX1005	U.S. Patent No. 10,934,698 to Schuster et al.
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EX1007	U.S. Patent No. 9,103,105 to Schuster et al.
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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)
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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)
EX1015	Registered Utility Model Publication Number CN2447417Y to Guoxin published September 12, 2001

Exh. No.	Description of Exhibit
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
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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
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EX1033	Declaration of Ranjini Acharya in Support of Petitioner's Motion for Admission <i>Pro Hac Vice</i> of Ranjini Acharya

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

GLOSSARY

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

I, Kimberly K. Cameron, Ph.D., declare as follows:

1. I have been retained by counsel for Fluidmaster, Inc. (“Petitioner”) as an independent expert to review U.S. Patent No. 9,139,993 (the “’993 Patent”) and specifically claims 1–20 of the ’993 Patent (“Challenged Claims”), and to provide my opinions in connection with a petition for inter partes review before the Patent Trial and Appeal Board (“the Petition”) in Proceedings No. IPR2024-006633 (the “Proceedings”).

2. I have previously submitted a declaration in the Proceedings, on March 3, 2024. EX1004. My resumé and detailed description of my experience can be found in EX1004.

3. I have previously testified in deposition in the Proceedings, on November 19 and November 20, 2024. EX2008.

4. This declaration incorporates by reference the full contents of EX1004 and EX2008 as if set forth herein, including all reservations of rights as described therein, and supplements my opinions reflected therein.

I. DOCUMENTS RELIED UPON

5. In preparing for and writing this supplemental declaration and forming the opinions expressed herewith, and in addition to the materials I previously identified, I have also reviewed the Board’s Institution Decision in the Proceedings

(Paper 19) and Patent Owner's Response ("POR") in the Proceedings, submitted on December 24, 2024 (Paper 26), as well as all exhibits thereto.

6. I have also reviewed the transcript of the deposition of Patent Owner's expert Michael Jobin, taken March 11, 2025, as well as all exhibits thereto. EX1037.

II. SUMMARY OF SUPPLEMENTAL OPINIONS

7. I submit this supplemental declaration in these Proceedings to address evidence and arguments that have been submitted since I provided my prior declaration including arguments raised by Patent Owner ("PO") in the POR, and various documents that discuss or refer to the subject matter of these references.

8. After reviewing the POR, my opinion remains unchanged that all claims of the '993 Patent are unpatentable as obvious in light of one or more of the prior art references cited in my previous declaration.

9. I also remain of the view that at least Claims 1–18 of the '105 Patent are anticipated by Schuster. EX1029.

III. SUPPLEMENTAL OPINIONS

A. CLAIM CONSTRUCTION

1. "Integrally Molded"

10. I understand that the Board has adopted certain constructions in its Institution Decision, including with respect to the term "integrally molded." Paper 19. I understand that the Board construed "integrally molded" to mean "molded together as a single structure." *Id.*, at 14–15. I also understand that the Board

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

11. I believe that my prior opinions are consistent with the Board’s construction. My opinions have not changed because of the Board’s construction.

2. “Water Flow Regulator”

12. I understand that the Board did not find it necessary to construe “water flow regulator” in its Institution Decision. Paper 19, 15.

13. I understand that PO has proposed “water flow regulator” be construed as “a device for regulating a flow rate of an amount of water flowing therethrough.” POR at 7. While I broadly agree with this construction, I believe that PO originally claimed “bowl fill valve” as a species characterized by its adjustability (*see, e.g.*, EX1012, 47, ¶9; *Id.*, 49, ¶16) whereas PO told the Patent Office that the later-claimed “bowl fill restriction,” when it first replaced “bowl fill valve” with “bowl fill restriction,” was “broader than” the previously-claimed “bowl fill valve”. EX1002, p.133. Therefore, I am of the view that a POSITA would understand “bowl fill restriction” to encompass “a *fixed or adjustable* device for regulating a flow rate of an amount of water flowing therethrough.”

14. I also note that PO has represented that the subsequent replacement of “bowl fill restriction” with “water flow regulator” during the prosecution of the ’993 Patent was a “stylistic” one. POR, 5. Therefore, I understand that PO intends to treat “water flow regulator” as functionally equivalent to a “bowl fill restriction,” and so I believe that a POSITA would likewise understand “water flow regulator” to encompass “a fixed or adjustable device for regulating a flow rate of an amount of water flowing therethrough.”

15. I note that neither PO nor its expert have offered a separate definition of “flow rate.” However, I agree with Mr. Jobin that the plain and ordinary meaning of “flow rate” is “volume per unit time” of fluid passing through a flow control device. *See* EX1037, 68:19–69:6. Moreover, when calculating flow rate, I agree with Mr. Jobin that the volume can be measured at either the input or the output of the flow control device. *Id.*, 69:17–25.

3. Testimony Regarding “Integrally Molded” Structures

16. During my deposition, I was never asked whether I understood the term “integrally molded” as recited in the ’993 Patent to refer only to plastic structures.

17. I was never asked whether I understood the ’993 Patent or its claims to be limited to a particular category of material compositions.

18. I was never asked whether one of ordinary skill in the art would understand “integrally molded” to refer only to plastic structures.

19. I was never asked whether one of ordinary skill in the art would understand “molded” to refer only to plastic structures.

20. I was never asked whether one of ordinary skill in the art would understand that “integrally molded” never refers to metal structures.

21. I was never asked whether one of ordinary skill in the art would understand that “molded” never refers to metal structures.

22. I was never asked whether metal structures are only ever “cast” or “machined.”

23. If PO is now interpreting “integrally molded” to refer solely to molded *plastic* structures, I disagree. Nothing in the ’993 Patent – neither its claims nor its specification – discusses the material composition of its purportedly inventive structures, much less limits those to plastic materials. Further, nothing in the prosecution history of the ’993 Patent demonstrates that PO intended to narrow its “integrally molded” claims in this manner.

24. In my opinion, “integrally molded” simply means “molded together as a single structure,” as construed by the Board. I do not believe that “molded” refers to a particular material composition in these claims.

B. SUPPLEMENTAL OPINIONS AS TO THE PRIOR ART REFERENCES

1. Guoxin

25. I have previously discussed Registered Utility Model Publication Number CN2447417Y to Guoxin (EX1015, Certified Translation at EX1016, “Guoxin”).

26. I understand PO is not challenging the status of this printed publication as prior art.

27. I have also reviewed the Certified Translation of Guoxin provided by Patent Owner (EX2007). To the extent that the page/line citations to EX1016 are inconsistent with the page/line citations in EX2007, I have herein referred to EX2007 for the convenience of the reader.

28. I have previously opined that a POSITA would understand that the water supply line 403 of Guoxin is connected to an overflow tube, as is conventional in the art. *See* EX1004, ¶120; ¶¶148–149.

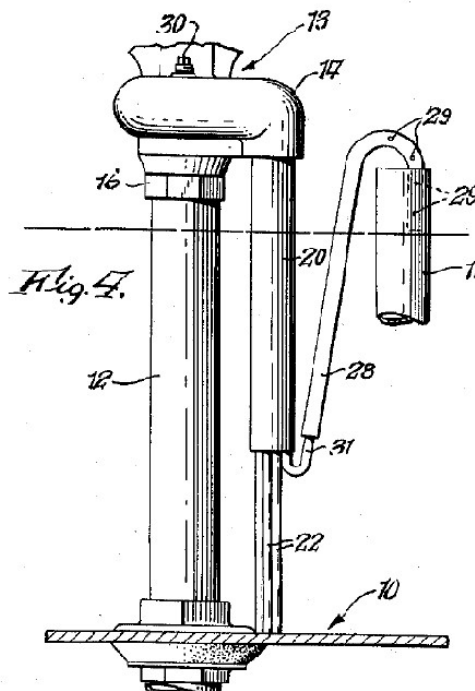
29. I still hold this opinion, which is based on the prior art references that I specifically discussed in my prior declaration. Those prior art references confirm that overflow tubes are conventional in toilet design. *See, e.g.*, EX1004, ¶83; ¶¶86–87; ¶307.

30. Moreover, although I did not explicitly use the word “overflow,” I also confirmed this in my deposition. EX2008, 85:6–13 (“Q. How does [water] go into the bowl? A. Through a tube.”).

31. I also previously identified prior art that confirms that it is conventional for the first tube that is attached to a water flow regulator to be connected to a second, separate, overflow tube to allow for the discharge of water into the bowl. *See, e.g.*, EX1004, ¶84 (citing Brown (EX1021) at 4:20–44, which discusses Fig. 4, as shown below):

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

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



32. For all of these reasons, I am still of the opinion that Guoxin discloses a tube (water supply line 403) that is conventionally connected to an overflow tube.

33. I note that Guoxin only provides a partial illustration of water supply line 403 in Fig. 2, and does not otherwise specify the configuration or terminus point of water supply line 403.

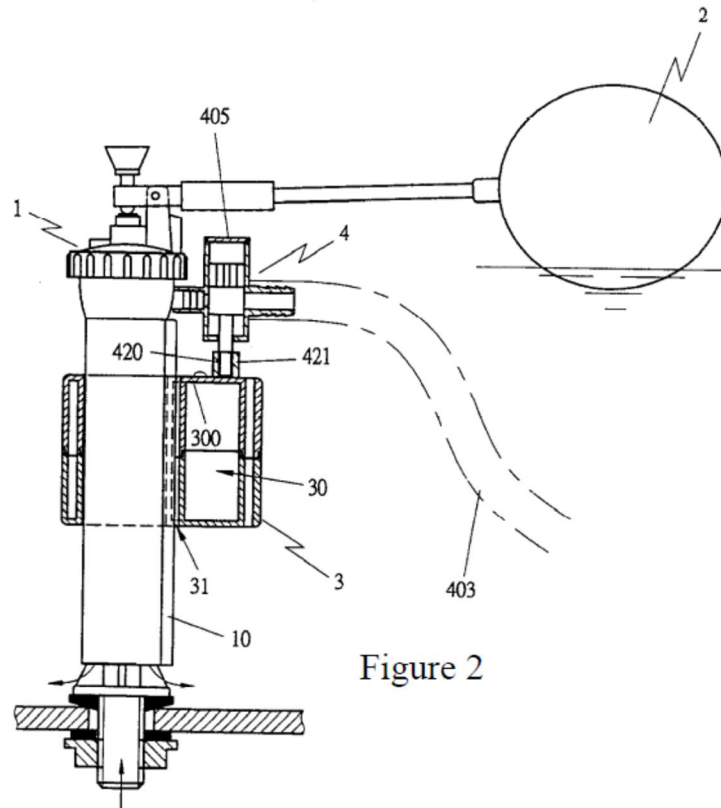


Figure 2

34. I do not attach any weight to the depiction of water supply line 403 descending from the point of attachment in Fig. 2. Line 403 is likely shown as descending simply to not clutter the depiction of the float. Regardless of the path and curvature of line 403, a POSITA would understand line 403 to terminate in the overflow tube so that that water can be directed to the bowl. Based on my review, the prior art confirms that it is possible for the water supply line 403 to take any number of configurations depending on the physical constraints of the toilet design

and a POSITA would understand that the water supply line 403 could ascend and descend past the point shown in Figure 2 before being connected to the overflow tube.

35. I also disagree that water supply line 403 in Fig. 2 must terminate at the bowl. Elsewhere, Guoxin teaches that “a portion of the water from the inlet device is directly supplied to the toilet bowl.” EX2007, 2:5–7. A POSITA would not understand that to mean that the water must go from the inlet to the toilet bowl without passing through any connections or parts. Consistent with this, Guoxin shows several intermediate connections between that inlet device and the bowl (including the switching mechanism 4).

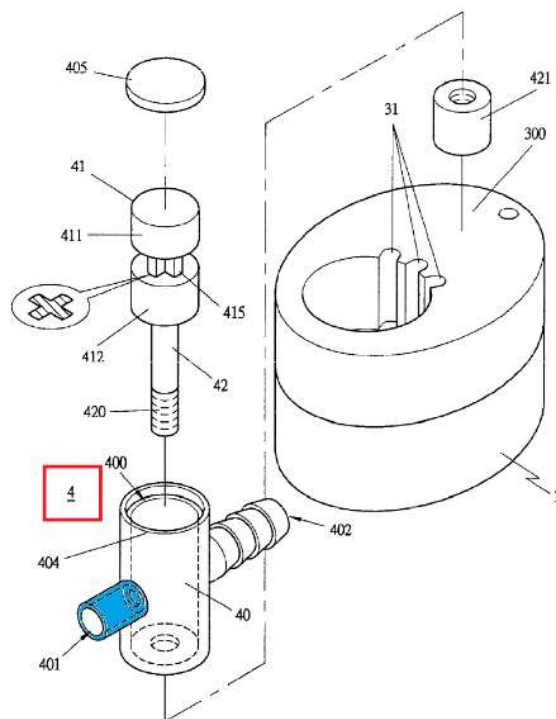
36. Similarly, Guoxin’s disclosure that the water supply line 403 “is directed to the toilet to directly provide water supply to the toilet,” (EX2007, 2:18–21) does not preclude the water going from water supply line 403 to though the overflow tube to the toilet, particularly when such a connection is conventional in the art.

37. I have also previously provided my opinion that Guoxin discloses an “extended portion” that is “integrally molded.” EX1004, ¶120 (annotating Guoxin Fig. 3 to show “an extended portion integrally molded with the body”) and ¶123 (annotating Guoxin Figs. 3 and 4 to show the extended portion).

39. Below, I have reproduced annotated Guoxin Fig. 3 from my original declaration, along with its annotations. I have now additionally annotated this Figure to illustrate the placement of water inlet 401 (blue):



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41. A POSITA would understand that the portion that I highlighted orange in Figure 4 is not shown in Figure 5 because it is integrally molded with the toilet fill valve rather than being a separate piece that is assembled as part of switching mechanism 4.

42. Furthermore, a POSITA would understand that in the system depicted in Guoxin, the protrusion is integrally molded with the body because there is nothing to indicate another connection. In addition, a POSITA would understand that including the short protrusion with the body of the fill valve would be insignificant in terms of manufacturing complexity, while manufacturing the protrusion separately brings drawbacks (such as additional costs, labor, and potential structural weaknesses along the connection points). A POSITA would understand that the part was formed as a single structure with the body of the fill valve. Forming the protrusion separately and adding an additional connection between the protrusion and the body would negatively impact the reliability of the connection and increase the cost, which also informs the understanding of a POSITA that the main body and protrusion are integrally molded in the absence of a depiction or explanation to the contrary.

43. Importantly, if the extended portion (orange) were not integrally molded, there would be no reason to have it there at all. Whatever connection was made between the extended portion and the fill valve could just as easily be made

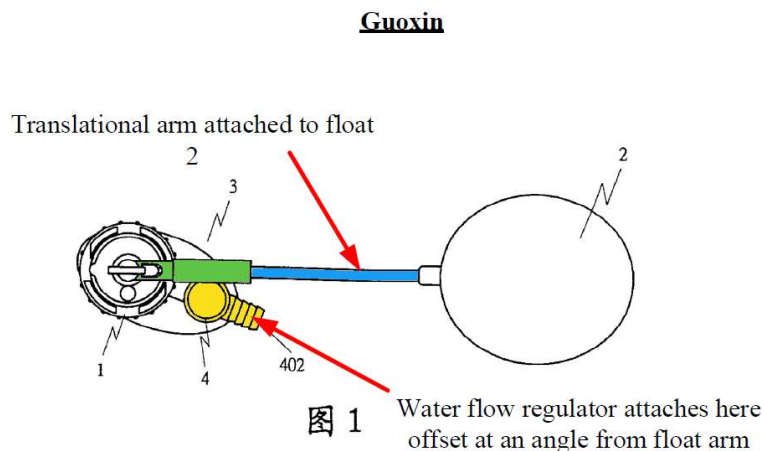
directly to the blue water inlet, making the extended portion superfluous. When asked about this at his deposition, Mr. Jobin had no answer as to why a POSITA would use the extended portion as a separate piece, rather than connecting the switching mechanism 4 to the water inlet device directly, and responded “Well, I don't have information in Guoxin which would provide an answer to that. What I'm saying is that what I'm presented with here in front of me in Guoxin doesn't provide me with enough information to determine the answer to that question.” EX1037, 80:15–22.

44. The reason that the extended portion exists in the first place and is integrally molded is to strengthen the area where the stress is likely to occur (at the junction between the protrusion and the body). If the extended portion were not integrally molded (to avoid a connection in an area where stress is likely to occur) it would serve no purpose (again because the blue water inlet could just be connected directly) and would just increase the cost unnecessarily.

45. I have also previously identified that Guoxin discloses “a float; and 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 water flow regulator and a translational stem that extends from the float to a free end of the actuating arm”. *See, e.g.*, EX1004, ¶¶187–188.¹

46. Below is a figure from my prior declaration (EX1004, ¶188) that identified the translational stem attached to float 2. For clarity, I have now provided additional annotations showing that this translational stem (blue) extends from the float to a free end of the actuating arm (green) and therefore couples the actuating arm to the float, and the actuating arm is angularly offset relative to the switching mechanism 4 (yellow):



47. To the extent that my prior testimony was unclear, I do not intend the above annotations to suggest that the water flow regulator attaches at water outlet 402 (which appears to be PO’s misinterpretation of my prior testimony). Rather, the lower red arrow in the above diagram is intended to point to switching mechanism 4 (yellow) as a whole, of which water outlet 402 is a part. *See* EX2007, 2:17–20

¹ I maintain that “bowl fill valve” in claim 5 lacks antecedent basis.

(“The switching mechanism 4 is equipped with a valve seat 40...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...”); *id.*, Fig. 5 (showing water outlet 402 as one of the components of switching mechanism 4).

48. The vertical movement of the float shown in Guoxin’s Figures 2 and 3 confirms, and does not contradict, my prior testimony. The actuating arm and the water flow regulator shown in these Figures are not on the same plane. Rather, Figure 1 confirms that switching mechanism 4 would project diagonally away from the toilet fill valve, while the actuating arm projects directly transverse.

49. This is also consistent with the stated goal of Guoxin. Figure 3 demonstrates Guoxin’s system during refilling (as evidenced by the water level being lower and the float being down). If Guoxin’s Figure 3 was showing the actuating arm of the float being impeded by switching mechanism 4 as PO suggests, then that would interfere with refilling and be inconsistent with the purpose of Guoxin to “thoroughly flush the toilet of waste.” EX2007 at 1:1–7. In my opinion, a POSITA reading Guoxin would therefore understand that the float is therefore attached to the translational stem in a manner that is angularly offset from the water flow regulator.

50. I understand that PO is arguing that Guoxin does not render obvious claims 19 and 20 of the ’993 Patent.

51. PO argues that Guoxin’s T-shaped nut discloses a mechanism to adjust “when the flow of water through the switching mechanism is discontinued,” but “does nothing to impact the flow rate of the water passing through the switching valve.” POR, 49 (underlined emphasis added, italics in original). PO also argues that loosening Guoxin’s T-shaped nut causes the switching mechanism to close earlier in the fill cycle, but “[a]lthough this reduces the total amount of water that enters the toilet bowl, it does nothing to impact the flow rate of the water passing through the switching valve. *Id.*, (citing EX2013, ¶196). PO also argues that tightening the T-shaped nut causes the switching mechanism to close later in the tank fill cycle and that “[a]gain, this increases the total amount of water which enters the toilet bowl but similarly does not have any impact on the flow rate of water passing through the switching valve.” *Id.*, (citing EX2013, ¶197).

52. PO’s arguments do not change my analysis or conclusion. I agree with PO that loosening or tightening the T-shaped nut in Guoxin reduces or increases the total amount of water that enters the toilet bowl. I note that this was also its expert’s written testimony. *See, e.g.*, EX2013, ¶¶196–197.

53. I agree with PO’s expert that flow rate is generally understood as the volume of water through a conduit over a period of time. *See* EX1037, 69:4–6.

54. Thus, in my view, the relevant rate of water flow is the amount of water that leaves the bowl fill valve during refilling of the toilet tank divided by the time it takes to complete a flush cycle (the time it takes for the tank to return to full).

55. This is consistent with the specification of the '993 Patent, which discusses the amount of water leaving the switching valve means during the time the tank is refilled. *See* EX1001, 4:43–53 (“Ultimately during use of the toilet that includes the toilet fill valve 100 and the toilet tank 143, a user flushes the toilet and a predetermined flow of water exits the bowl fill valve outlet 116 and is directed into the toilet bowl. The amount of water supplied by the bowl fill valve in the time it takes to refill the toilet tank should be approximately equal to the amount of water needed to fill the toilet bowl.”).

56. The specification also describes how adjustments to “the setting of the handle 119” determines “the precise flow rate of the water that flows out the bowl fill valve outlet 116,” and “refills the toilet bowl of the respective toilet.” EX1001, 3:10–23.

57. Nothing in the claim language of the '993 Patent requires that the flow through the bowl fill valve cannot change during the fill cycle, as PO seems to suggest. The flow through the bowl fill valve can be changing or intermittent (as is the case with many valves), including changing between relatively large, relatively small and no flow conditions. Similarly, in the '993 Patent, the toilet fill valve does

not change from closed to fully open instantaneously, and so the flow through the toilet fill valve will change as that valve opens.

58. In the case of Guoxin, the switching mechanism 4 reduces and then eliminates water flow to achieve a particular desired flow rate (amount of water exiting the bowl fill valve per the time to return the toilet to full). This flow rate is changeable by altering the setting of the T-shaped nut. *See* EX2007, 2:31–41.

59. Adjusting the T-shaped nut in Guoxin in this way does not materially change the time it takes to return the tank to full. Any pressure drop from opening the switching mechanism 4 will typically be negligible in a well-designed plumbing system with adequate supply pressure, and in any event it would not be sufficient to negate the change in flow rate (amount of water exiting the switching mechanism 4 and entering the toilet bowl per the time to return the toilet to full) that occurs from adjusting the T-shaped nut.

60. PO's argument that Guoxin does not disclose adjusting the flow rate is thus incorrect. Adjusting the T-shaped nut in Guoxin adjusts the flow rate because, as is undisputed, the adjustment of the T-shaped nut of the switching mechanism 4 changes the amount of water that exits the switching mechanism 4 of Guoxin and enters the bowl, divided by the time it takes the tank to return to full (which stays relatively constant).

61. As explained in Guoxin, “[b]y simply turning the T-shaped nut, the length of the valve stem can be altered, thus changing the position at which the switching valve’s stem is driven by the secondary ball float.” EX2007, 2:34–36. This means that Guoxin’s switching mechanism 4 will change from closed to open (and open to closed) at a different particular height of water in the tank (the open position is shown in Figure 3 where water is also delivered to the bowl while the closed position is shown in Figure 2 where water is not being delivered to the bowl). For example, when the T-shaped nut is turned so that it is moved further down, the switching mechanism 4 will both open later and close earlier. Opening later and closing earlier both reduce the amount of water that exits switching mechanism 4 to be delivered to the toilet bowl. Turning the nut, therefore, does alter (in this case decreases) the amount of water exiting switching mechanism 4 and delivered to the bowl during the time it takes to refill the bowl (and hence in this case decreases the flow rate).

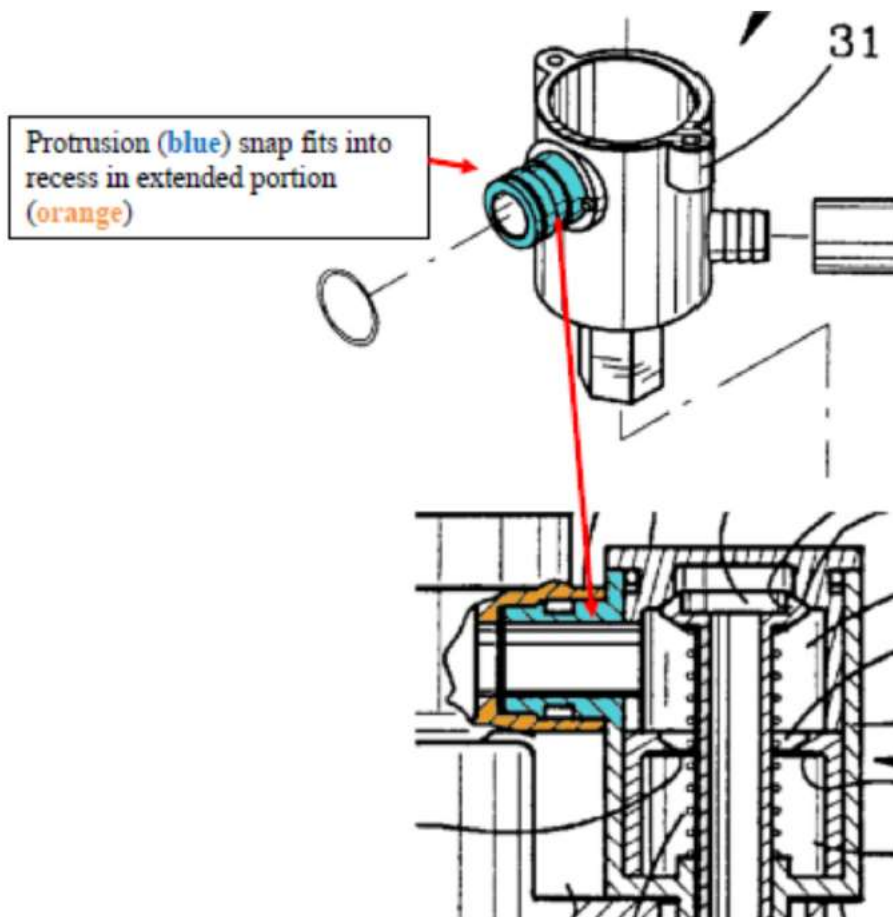
62. I note that in his deposition, Mr. Jobin appears to have contradicted his earlier opinions, as well as PO’s position. Specifically, Mr. Jobin testified that adjusting the T-shaped nut does not impact the volume delivered. *See* EX1037, 54:25–56:25. To the extent that Mr. Jobin is now arguing (contrary to PO’s assertions) that tightening or loosening the T-shaped nut in Guoxin does not impact the volume of water delivered to the bowl, I disagree for the reasons set forth above.

2. Ho

63. I have previously discussed U.S. Patent No. 5,862,538 to Ho (EX1022, “Ho”).

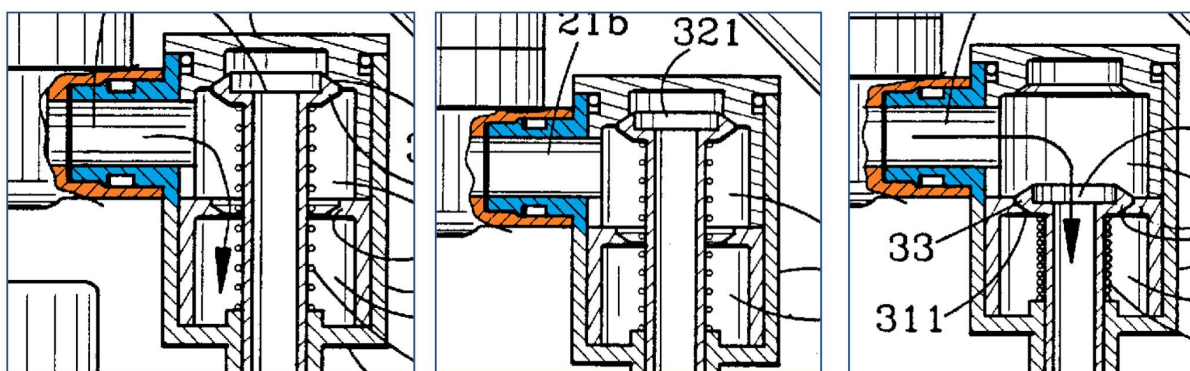
64. I understand PO is not challenging the status of this printed publication as prior art.

65. I previously provided my opinion that Ho discloses an “extended portion” that is “integrally molded”. EX1004, ¶124 (discussing annotated Figs. 3 and 5, reproduced below; explaining a POSITA would understand that the protrusion in Fig. 5 (blue) slots into the extended portion (orange) as shown in Fig. 3):



66. Ho discloses an extended portion that is molded together as a single structure of the body of the toilet fill valve, consistent with the Board's construction. The drawings of Ho confirm this.

67. Specifically, when viewing Figure 3 (and Ho's other drawings, including Figures 7, 8, and 9), I would understand that each of these Figures shows a cross-sectional view of Ho's diverter valve means 30 attached to the body of the toilet fill valve. *See* EX1022, 2:15–44. I have provided additional annotated Figures 7–9 below, each showing the insertion of the protrusion of Figure 5 (blue) into the extended portion (orange) of the body of the toilet fill valve:



68. In each Figure above, the cross-hatching for the extended portion (orange) is different from the cross-hatching of the protrusion on Ho's diverter valve (blue). This signifies that each of these is a separate structure.

69. Further, the cross-hatching of the extended portion (orange) extends into the body of the toilet fill valve, signifying that this is a cross-section of the toilet fill valve itself and that the extended portion (orange) is molded as a single structure with the toilet fill valve.

70. Further, the wavy border on the left side of the extended portion (orange) also extends into the body of the toilet fill valve, which confirms that that the extended portion (orange) is molded as a single structure with the toilet fill valve.

71. Figure 5 confirms my understanding, because Figure 5 shows all the components of the water flow regulator (Ho's diverter valve means 30) that are not integral to the toilet fill valve – and while Figure 5 includes the protrusion (blue) show in Figs. 3, 7–9, it does not include the extended portion (orange). Therefore, a POSITA would understand that the extended portion (orange) is molded together as a single structure with toilet fill valve 1, which confirms my opinion that it is therefore “integrally molded” as construed by the Board.

72. Figure 2 does not alter my conclusions. If the extended portion in Figure 2 was not integral to the fill valve, it would be shown separately as with the components of the diverter valve means 30 that are shown in Figure 5. The fact that Ho does not separately label the extended portion in Fig. 2 or otherwise disclose its components or manner of connection with the body of the toilet fill valve confirms to me that it is integral with the fill valve itself and not attached separately. Moreover, a POSITA would understand that in the system depicted in Figure 2 of Ho, the protrusion is integrally molded with the body because there is nothing to indicate another connection. As with Guoxin, forming the extended portion of Ho as a single structure with the body of the toilet fill valve would be an insignificant step in terms

of manufacturing complexity, whereas manufacturing it separately and adding it as an additional connection to the body of the fill valve would negatively impact the reliability of the connection and increase the cost. This again confirms that the extended portion shown in Ho's figures is integrally molded with the body of the toilet fill valve, especially in the absence of a depiction or explanation to the contrary.

73. A POSITA would also understand the extended portion is formed as a single structure with the body of the toilet fill valve, absent a specific indication to the contrary, because if there was in fact any connection between the body and the extended portion, that would actually be better made with the restrictor itself (such that having the extended portion would be superfluous). For example, if Figure 2 in fact shows a separate connection between the fill valve and the extended portion, then the diverter valve means 30 of Ho could just connect directly with the toilet fill valve via a screw or other connection. Since that is explicitly what is not shown, a POSITA would understand that the extended portion is present specifically to allow a single connection to the restrictor, not to introduce an additional connection between the restrictor and the fill valve.

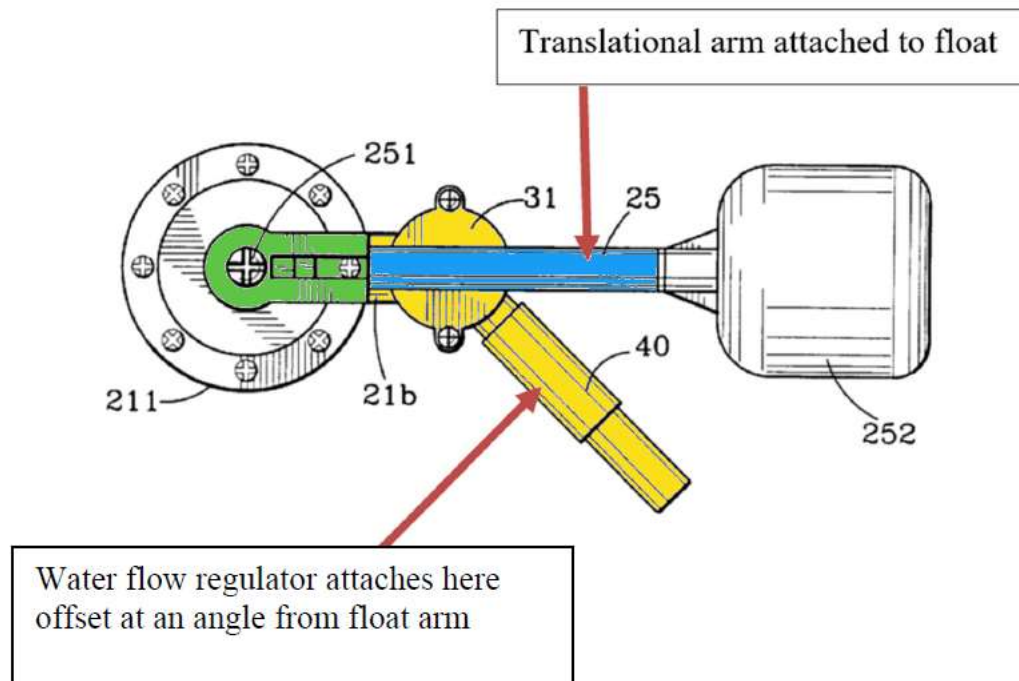
74. This all confirms my opinion that the extended portion of Ho is formed as a single structure with the body of the toilet fill valve and is therefore "integrally molded" as construed by the Board.

75. I also previously identified that Ho discloses “a float; and 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 water flow regulator and a translational stem that extends from the float to a free end of the actuating arm”. *See, e.g.*, EX1004, ¶¶187–188.²

76. Below is a figure from my prior declaration (at ¶188) that identified the translational stem attached to float 252. For clarity, I have now provided additional annotations showing that the translational stem (blue) extends from the float 252 to a free end of the actuating arm (green) and therefore couples the actuating arm to the float, and the actuating arm is angularly offset from Ho’s diverter valve means 30 (yellow):

² I maintain that “bowl fill valve” in claim 5 lacks antecedent basis.

Ho



77. I note that Ho confirms that the housing 30, transverse inlet pipe 21b, and the supply line 40 are all part of the diverter valve means 30 shaded in yellow above. *See* EX1022 at 3:12–17; *See* also Fig. 5 (showing transverse pipe 40 as one of the components of diverter valve means 30). Therefore, to the extent that my prior testimony was unclear, I do not mean to suggest that Ho’s water flow regulator attaches at supply line 40 (which appears to be PO’s misinterpretation of my prior testimony). Rather, the annotation at the lower red arrow above intends to convey that the water flow regulator (yellow) as a whole is attached to the toilet fill valve at an angle offset from the actuating arm, as shown by supply line 40 extending transversely away from the actuating arm.

78. Figure 2 of also illustrates the relationship between the actuating arm (green), the translational stem (blue) and the float 252:

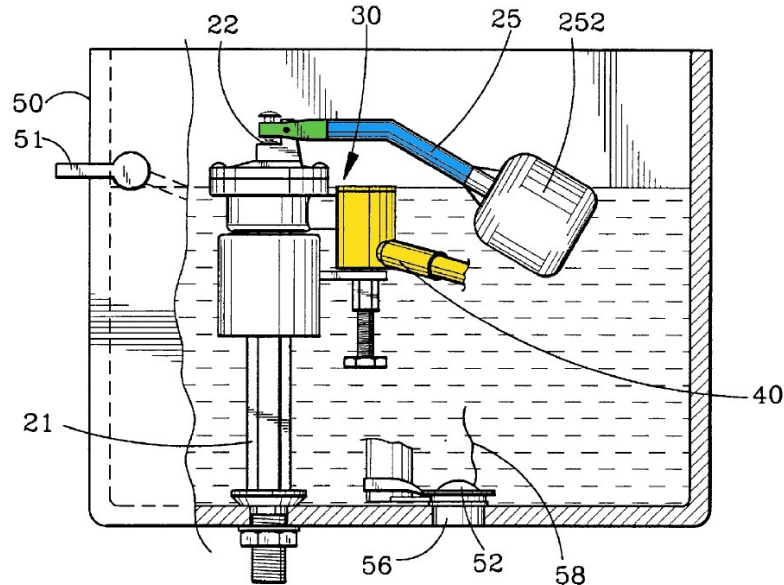


FIG.2

See also EX1022 at 2:59–60 (“A rod 25 connects the ball-cock valve 22 to a main float 252.”)

79. And Figures 7 through 10 of Ho confirm that there is no interference between the actuating arm and the water flow regulator (which is angularly offset).

3. Brown

80. I have previously discussed U.S. Patent No. 3,086,546 to Brown (EX1021, “Brown”).

81. I understand PO is not challenging the status of this printed publication as prior art.

82. I previously provided my opinion that Brown and Ho share a common function: “to accurately control the amount of water that flows from the toilet fill valve into the toilet bowl.” EX1004, ¶221. In my opinion, the connectors in Brown and Ho are interchangeable (*id.*) and can be substituted for one another to obtain predictable results. *Id.*, ¶222–223. Doing so would “simplify the operation of the valve and increase the ease with which the valve can be adjusted.” *Id.*, ¶248.

83. To clarify, the basis of my opinions regarding the interchangeability of Brown and Ho is that a POSITA would understand that the components within a toilet tank must be sized and oriented appropriately to work in conventional toilet designs. This necessarily means that there are only a finite number of well-known techniques for connecting flow components (as outlined in my prior declaration) and the designs of the connections between those flow components are predictable with no more than routine experimentation. Ultimately, a POSITA would be motivated to substitute Ho’s diverter valve means in Brown’s system in order to allow for adjustments “with the tube still connected to the valve,” which simplifies “the operation of the valve and increase[s] the ease with which the valve can be adjusted.” *See* EX1004, ¶248. In so doing a POSITA would configure the modified Brown system to work with conventional toilet designs.

84. This would extend to the consideration of physical constraints and required connections in conventional toilet tank systems when modifying Brown in

light of Ho. Specifically, it would extend to molding the extended portion of Brown as a single structure with the body of the toilet fill valve, in view of the advancements of molding techniques and in view of Ho's disclosure of an integrally molded extended portion, to allow for a more compact and robust design. It would also extend to molding the extended portion of Brown in view of Ho such that the extended portion extends radially from the longitudinal axis of the toilet fill valve, to again allow for a more compact and robust design.

85. I have previously articulated the shared common goal of Brown and Ho, "to accurately control the amount of water that flows from the toilet fill valve into the toilet bowl." EX1004, ¶221. In the end, both Brown and Ho control the overall flow rate – the amount of water delivered from the toilet fill valve to the toilet bowl during a flush cycle per the time to return the tank to full.

86. Moreover, I do not consider that Brown's discussion of its water silencing means precludes the use of Ho's valve. I have previously noted that Brown aims to eliminate water wastage by controlling water flow, as does Ho. *See* EX1004, ¶221. To be clear, my opinion is that a POSITA would maintain this overall goal of Brown even when modifying it in light of Ho.

87. Finally, I note that both Brown and Ho disclose conventional floats that shut off water to prevent overfilling. *See* above discussion of the float in Ho; *See* also EX1004, ¶293 (discussing the use of a conventional ball cock valve in

conjunction with a conventional float in Brown) (citing EX1021 at 2:52-71, Fig. 1). *See also* Brown (EX1021), 1:16–19 (“The vast majority of toilets, whether new or old, have an upstanding float operated ball cock valve assembly for controlling the flow of the incoming water into the flush tank and toilet bowl.”). Therefore, a POSITA would continue to maintain this functionality even when modifying Brown in light of Ho.

4. Schuster

88. I have previously discussed U.S. Patent No. 8,104,105 to Schuster et al. (EX1029, “Schuster”).

89. I continue to believe that Schuster anticipates at least Claims 1–18 of the ’993 Patent as the latter is not entitled to a priority date earlier than the filing date of the ’993 Patent.

90. I previously identified Schuster Figure 1 when discussing Claim 1[B]. *See* EX1004, ¶338 (citing EX1029 at 1:63–65). To be clear, Schuster discloses that the “water inlet 103” and the “water outlets 106” as arranged in the toilet fill valve shown in Figure 1 are also present in Figure 4 as well. *See* EX1029 at 4:49–52 (“With reference to Fig. 4...[t]he toilet fill valve 200 includes the same water inlet 103 and the water outlets 106 as the toilet fill valve 100 (FIG. 1).”). Thus, my prior analysis incorporates and equally applies with respect to Schuster’s Figure 4.

91. I also note that the discussion of Figure 4 in Schuster makes it clear that the extended portion 206 is “molded together as a single structure” with the body of the toilet fill valve. *See, e.g.*, EX1029, 6:1–10 (discussing Figure 4, and specifying that “the body 209 of the toilet fill valve 200 may be constructed with the bowl fill outlet port 206 using a molding process...”). This confirms that Schuster’s Figure 4 discloses an extended portion 206 that is integrally molded – *i.e.* molded as a single structure – with the body of the toilet fill valve, consistent with my prior opinion that Schuster discloses Claim 1[A]. EX1004, ¶336 (citing Fig. 4).

92. I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the results of these proceedings.

[SIGNATURE ON FOLLOWING PAGE]

Dated: March 19, 2025



Kimberly K. Cameron, Ph.D.