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BEFORE THE PATENT TRIAL AND APPEAL BOARD

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*Ex parte* SHINICHI YAGI, TOMOYASU ICHIKI, HIROAKI AMEMORI,  
AYUMU UMEMOTO, YO MOROTOMI, and  
MASAHIRO YAMAMOTO

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Appeal 2017-002765  
Application 13/624,026  
Technology Center 1700

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Before ROMULO H. DELMENDO, LINDA M. GAUDETTE, and  
MICHAEL P. COLAIANNI, *Administrative Patent Judges*.

GAUDETTE, *Administrative Patent Judge*.

DECISION ON APPEAL<sup>1</sup>

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<sup>1</sup> This Decision includes citations to the following documents: Specification filed Sept. 21, 2012, as amended (“Spec.”); Final Office Action dated Feb. 11, 2016 (“Final”); Appeal Brief filed July 11, 2016 (“Br.”); and Examiner’s Answer dated Oct. 20, 2016 (“Ans.”).

Appellant<sup>2</sup> appeals under 35 U.S.C. § 134(a) from the Examiner's decision finally rejecting claims 1–4, 7, 8, 13–16, 18, 21, 23–25, 27, 28, 30–33, and 37. An oral hearing was held before this Board panel on January 17, 2019. We have jurisdiction under 35 U.S.C. § 6(b).

We REVERSE and enter two new grounds of rejection.

According to the Specification, residual water on surfaces of water area equipment, such as washing stands, evaporates to form water scale that is difficult to remove. Spec. ¶ 2. Water scale based on silicic acid is adhered more easily and involves more difficulties for removal than water scale based on magnesium and calcium. *Id.* The inventors are said to have discovered “that water scale can be reduced by inhibiting polymerization of silicic acid.” *Id.* ¶ 13. Exemplary inhibitors “are aqueous solutions having a high acidity, more specifically aqueous solutions that can adjust the acidity of residual water to pH 1.5 to 5.5, preferably pH 2.0 to 5.0.” *Id.* ¶ 18. The inhibitor may be added to water supplied to water area equipment to allow the inhibitor to exist in the residual water. *Id.* Alternatively, the inhibitor may be supplied to the water area equipment before or after formation of residual water on the surface thereof. *Id.*

Independent claims 1 and 13 are representative of the claimed invention, and are reproduced below.

1. A water area equipment utilizing common tap water comprising: a water area equipment body having an external surface, the water area equipment body being configured to be connected to a supply source of common tap water such that common tap water from the supply source may be selectively applied to the external surface of the water area equipment body and deposited as residual water; and *a unit which adds an inhibitor for silicic acid polymerization to the common*

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<sup>2</sup> The Appellant is the Applicant, Toto Ltd., also identified as the real party in interest. Appeal Br. 1.

*tap water deposited as residual water on the external surface of the water area equipment body,*

wherein the water area equipment is selected from the group consisting of wash basins, sinks, bathroom vanities, bidet devices and groin washing devices in a bathroom, washing devices in a bathroom, and inner walls of a bathroom, and

wherein the external surface of the body is a glaze layer.

13. A method for inhibiting water scale formation and minimizing effects of water scale formed on an external surface of a water area equipment body wherein the water area equipment body is connected to a supply source of common tap water and common tap water from the supply source of common tap water is applied to the external surface of the water area equipment body and deposited thereon as residual water, the method comprising the steps of: *adding an inhibitor for silicic acid polymerization to the common tap water from the supply source of common tap water, and applying the common tap water with added inhibitor to the external surface of the water area equipment body such that common tap water with added inhibitor is deposited as residual water on the external surface,*

wherein the water area equipment body is selected from the group consisting of wash basins, sinks, bathroom vanities, bidet devices and groin washing devices in a bathroom, washing devices in a bathroom, and inner walls of a bathroom, and

wherein the external surface of the water area equipment body is a glaze layer.

Appeal Br. 27–28 (emphasis added).

The Examiner maintains the following rejections under 35 U.S.C. § 103(a):<sup>3</sup>

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<sup>3</sup> The Examiner has withdrawn the rejections of claims 1–4, 7, 8, 13–16, 18, 21–28, and 30–37 under 35 U.S.C. § 103(a) based on Natsume. Ans. 8.

1. claims 1, 3, 13, 15, 21, 25, 30–33, 35, and 37 over Mizuno (JP 2000-265526 (A), pub. Sept. 26, 2000 (machine translation))<sup>4</sup> in view of Nishiyama (JP 2007-321371 (A), pub. Dec. 13, 2007 (machine translation));

2. claims 2, 4, 14, 16, 22, 26, 28, 34, and 36 over Mizuno in view of Nishiyama and Miki (JP 2006-325762 (A), pub. Dec. 7, 2006 (machine translation));

3. claims 7, 18, 23, and 27 over Mizuno in view of Nishiyama and Dubin (US 4,584,104, pub. Apr. 22, 1986); and

4. claims 8 and 24 over Mizuno in view of Nishiyama, Miki, and Dubin.

*The Applied Prior Art*

Mizuno discloses that removing silicic acid scale dirt from a ceramic product surface can be difficult. Mizuno ¶ 21. Mizuno discloses a method of preventing adhesion of silicic acid scale dirt to a ceramic toilet bowl surface by forming a stain-proof film on the ceramic surface. *Id.* ¶¶ 2, 17. Mizuno discloses that prior to forming the stain-proof film, any silicic acid scale dirt adhering to the ceramic surface must be removed by applying ammonium acid fluoride or hydrofluoric acid, followed by washing. *Id.* ¶ 13.

Nishiyama discloses an acid water generating device for delivering acid water at a pH of less than 6, more preferably less than 4, to a toilet bowl for the purpose of removing uroliths. Nishiyama ¶ 28.

Miki discloses applying a visible light type photocatalyst to the outer-most surface of a bathroom component. Miki, Abstract. Miki discloses that the photocatalyst is optically excited by the light of an intra-bathroom illumination and/or auxiliary illumination device to decompose contaminants on the surface. *Id.*

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<sup>4</sup> In the Final Office Action, the Examiner refers to Mizuno as “Masu.” *See, e.g.*, Final 8.

Dubin discloses “[a] method of inhibiting amorphous silica scale formation on surfaces in contact with industrial waters containing dissolved silicates.” Dubin, [57]. Dubin is primarily concerned with inhibiting amorphous silica scale formation on heat exchange surfaces in contact with alkaline industrial waters containing silica and having a pH greater than 5. *Id.* at 2:58–62. To inhibit scale formation, Dubin adds boric acid and/or its water-soluble salts, such as aluminum salts to the industrial waters. *Id.* at 2:62–64, 3:22.

*Rejection of claims 1, 3, 13, 15, 21, 25, 30–33, 35, and 37  
over Mizuno in view of Nishiyama*

The Examiner finds Mizuno discloses an apparatus as recited in independent claim 1 with the exception of “a unit which adds an inhibitor for silicic acid polymerization to the common tap water deposited as residual water on the external surface of the water area equipment body” (claim1). Final 8. The Examiner finds Mizuno discloses a method as recited in claim 13 with the exception of adding the inhibitor to water prior to applying the water to the external surfaces of the water area equipment. *Id.* at 10. The Examiner finds “Nishiyama . . . teaches an acid water generating device (i.e., a unit) which supplies acidic water to the external glazed surface of [a] toilet bowl.” *Id.* at 9; *see also id.* at 10. The Examiner finds one of ordinary skill in the art would have modified Mizuno’s apparatus and method by using Nishiyama’s acid water generating device (unit) such that the acidic solution is added to common tap water prior to application to the external surfaces of the toilet because Mizuno applies an acidic solution to remove scale and stains and Nishiyama teaches that acidic water dissolves uroliths which adhere to the surface of the toilet bowl. *Id.* at 9–10.

Appellant argues the Examiner reversibly erred in finding Mizuno discloses an apparatus and method that utilizes an inhibitor to prevent silica scale from forming. Br. 23. Appellant contends Mizuno removes already-formed silicic acid

scale on the surface of a toilet with ammonium acid fluoride or hydrofluoric acid, then removes uroliths with an acidic solution to reveal a new/clean surface. *Id.* at 9 (citing Mizuno ¶¶ 21, 22). Appellant argues that after these removal steps, Mizuno applies a layer of stain-proof, water-repellant agent to the new/clean surface. *Id.* (citing Mizuno Abstract, ¶¶ 12–20). Appellant argues the stain-proof, water-repellant agent is intended for long term use and, therefore, Mizuno has no reason to add an inhibitor to prevent silica scale. *Id.* at 22–23.

Appellant argues Nishiyama discloses preventing the deposit of uroliths, composed mainly of calcium phosphate, by supplying acid water to a toilet bowl while blocking the supply of washing water, thereby avoiding dilution of the acid water which would reduce its effectiveness. Appeal Br. 10 (citing Nishiyama Abstract, ¶ 70). Appellant argues one skilled in the art concerned with inhibiting the formation of silicic acid scale “would not find any solution in the Nishiyama reference which only discusses the uroliths from urine.” *Id.* at 24.

Appellant has argued persuasively that the Examiner relies on improper hindsight reasoning in finding one of ordinary skill in the art would have been motivated to add Nishiyama’s acid generating unit to Mizuno’s device to achieve the claim 1 apparatus. The evidence of record fails to support the Examiner’s finding that Mizuno is concerned with providing acid to the surface of a toilet to *prevent* silicic acid polymerization. It follows that there is no evidentiary support for the Examiner’s further finding that the ordinary artisan would have modified Mizuno’s device to include Nishiyama’s acid water generating device in order to render Mizuno’s device capable of providing a silicic acid polymerization inhibitor to common tap water deposited as residual water on the external surface of a toilet. For these reasons, we also are persuaded that the Examiner reversibly erred in finding the ordinary artisan would have modified Mizuno’s method to add an

inhibitor for silicic acid polymerization to the common tap water prior to adding the inhibitor to the external surface of a toilet as required by claim 13.

Accordingly, we do not sustain the rejection of independent claims 1 and 13, and their dependent claims 3, 15, 21, 25, 30–33, 35, and 37.

*Rejections of claims 2, 4, 14, 16, 22, 26, 28, 34, and 36 over Mizuno in view of Nishiyama and Miki; claims 7, 18, 23, and 27 over Mizuno in view of Nishiyama and Dubin; and claims 8 and 24 over Mizuno in view of Nishiyama, Miki, and Dubin*

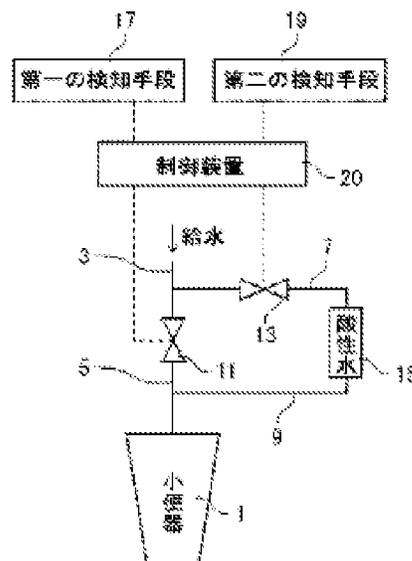
The Examiner's rejections of dependent claims 2, 4, 7, 8, 14, 16, 18, 22–24, 26–28, 34, and 36 are based on the same erroneous findings discussed above in connection with the rejection of independent claims 1 and 13. *See* Final 11–14. Accordingly, we likewise do not sustain the rejections of these claims.

*New grounds of rejection*

Pursuant to 37 C.F.R. § 41.50(b), we enter the following new grounds of rejection of claims 1 and 13:

*New ground of rejection 1*—Claims 1 and 13 are rejected under 35 U.S.C. § 102(b) as anticipated by Nishiyama.

Nishiyama Figure 1 is reproduced below.



Nishiyama Figure 1 is a schematic diagram illustrating a toilet bowl washing station. Nishiyama ¶ 8. The toilet bowl washing station includes chamber pot 1 (water area equipment<sup>5</sup>), control device 20, and acid water generating device 15. *Id.* Nishiyama discloses that the toilet bowl washing station is configured to be connected to a supply source of tap water via service pipe 3. Nishiyama ¶ 9 (“[T]he service pipe (feed water flow path) 3 with which water is supplied to tap water etc. is connected to the chamber pot 1 . . .”). Feed valve 11 connects service pipe 3 to wash water feeding passage 5 (*id.*), whereby, when feed valve 11 is open, “tap water . . . [is] supplied from the service pipe 3 . . . [to] chamber pot 1 via the wash water feeding passage 5 as wash water (*id.* ¶ 10). Valve 13 connects service pipe 3 to the inlet to acid water generating device 15 (*id.* ¶ 9), whereby, when valve 13 is open, “tap water . . . [is] supplied from the service pipe 3 . . . to the acid water generating device 15 via the branching channel 7” (*id.* ¶ 10). Feed valve 11 and valve 13 are electromagnetic valves, and each is automatically opened and closed in response to a signal from control device 20. *Id.* Acid water generated in acid water generating device 15 is supplied to chamber pot 1 via wash water feeding passage 5, connected to acid water feeding passage 9, which, in turn, is fed by acid water generating device 15. *Id.* ¶¶ 9–10. Nishiyama discloses that, in operation, first detection means 17 detects that chamber pot 1 was used and control device 20 initiates “wash water supply mode” wherein valve 13 is closed and feed valve 11 is opened to supply tap water from service pipe 3 to chamber pot 1. *Id.* ¶¶ 26–27. When second detection means 19 reaches a specified value, control device 20 initiates “acid water supply mode” wherein feed valve 11 is closed and valve 13 is

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<sup>5</sup> We note that Appellant does not dispute that a toilet falls within the scope of a water area equipment body as recited in the penultimate wherein clause of each of claims 1 and 13.

opened. *Id.* ¶ 26. In “acid water supply mode,” feed water from service pipe 3 is fed to acid water generating device 15 from the service pipe 3, acid water is generated, and then supplied to chamber pot 1. *Id.* ¶ 28. Thus, Nishiyama’s acid generating device 15 (a unit) is capable of adding acid water, when in “acid water supply mode,” to tap water deposited as residual water on the surface of chamber pot 1 after completion of “wash water supply mode.”

Nishiyama discloses that in one embodiment, acid water generating device 15 comprises storing section 55 wherein tap water is stored. *Id.* ¶ 24, Fig. 5. Acid water is generated by adding organic acid or inorganic acid (an inhibitor) to the stored water (common tap water). *Id.* Nishiyama discloses another embodiment of acid water generating device 15 wherein nitrogen oxide gas is generated and dissolved in tap water held in storing section 25 of acid water generating device 15 to generate a nitric acid solution. *Id.* ¶¶ 18–19, Fig. 2. Nishiyama discloses that acid water having a pH below 6, more preferably below 4, removes uroliths and prevents formation of uroliths in the drainage pipe connected to the downstream side of chamber pot 1. *Id.*; *see also id.* ¶ 14. Nishiyama fails to expressly disclose that the acid added to the common tap water is “an inhibitor for silicic acid polymerization” as recited in claims 1 and 13. However, Nishiyama’s acid water would inherently function in the claimed manner because Nishiyama discloses the use of an acid solution made in the same manner disclosed in Appellant’s Specification, and having a pH that substantially overlaps the pH of Appellant’s acid solution. *See Spec.* ¶ 20 (“[E]xamples of aqueous solutions for enhancing the acidity of the residual water include acidic waters produced by electrolysis.”); *id.* ¶ 19 (The aqueous solution for enhancing the acidity of the residual water is not limited as long as the acidity can be regulated. Examples of preferred aqueous solutions . . . include nitric acid . . . .”); *id.* ¶¶ 31, 33–34 (describing the addition of

nitric acid added to common tap water to adjust the pH of the tap water to 1 to 6, then testing water scale removing capability of the pH adjusted waters and an acidic electrolyzed water having a pH of 3.3 by dropping samples on a tile and allowing water scale to form by drying for 48 hours, and determining water scale was removable for the waters having a pH of 1.5 to 5.5).

*New Ground of Rejection 2*—Claims 1 and 13 are rejected under 35 U.S.C. § 103(a) as unpatentable over Nishiyama in view of Mizuno.

Nishiyama's disclosure is discussed in the rejection of claims 1 and 13 under 35 U.S.C. § 102(b). Nishiyama discloses the claim 1 apparatus and claim 13 method with the exception that Nishiyama fails to expressly disclose the use of an acid that is capable of acting as "an inhibitor for silicic acid polymerization," as recited in claims 1 and 13. Mizuno discloses that the hydroxyl group of a toilet bowl surface reacts with a constituent in tap water to form silicic acid scale dirt which is difficult to remove. Mizuno ¶ 3. Mizuno discloses that silicic acid scale dirt can be removed from a toilet surface by applying ammonium acid fluoride or hydrofluoric acid and then washing. *Id.* ¶ 13. One of ordinary skill in the art at the time of the invention would have been motivated to modify Nishiyama's acid water generation device to add ammonium acid fluoride or hydrofluoric acid to the stored tap water (*see* discussion of Nishiyama Figure 5 embodiment *supra* p. 9) to remove silicic acid scale dirt and inhibit silicic acid polymerization based on Mizuno's teaching that a build-up of silicic acid scale is difficult to remove. The ordinary artisan would have had a reasonable expectation of success in making this modification based on Nishiyama's teaching that its apparatus and method are capable of both removing uroliths and preventing their formation.

ORDER

We REVERSE the Examiner's decision to reject claims 1–4, 7, 8, 13–16, 18, 21, 23–25, 27, 28, 30–33, and 37.

Pursuant to 37 C.F.R. § 41.50(b), we enter two new grounds of rejection:

1. Claim 1 and 13 are rejected under 35 U.S.C. § 102(b) as anticipated by Nishiyama.

2. Claims 1 and 13 are rejected under 35 U.S.C. § 103(a) as unpatentable over Nishiyama in view of Mizuno.

37 C.F.R. § 41.50(b) provides that Appellants, WITHIN TWO MONTHS FROM THE DATE OF THE DECISION, must exercise one of the following two options with respect to the new grounds of rejection to avoid termination of the appeal as to the rejected claims:

*(1) Reopen prosecution.* Submit an appropriate amendment of the claims so rejected or new evidence relating to the claims so rejected, or both, and have the matter reconsidered by the examiner, in which event the proceeding will be remanded to the examiner. . . .

*(2) Request rehearing.* Request that the proceeding be reheard under § 41.52 by the Board upon the same record. . . .

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. §1.136(a)(1)(iv).

REVERSED;  
37 C.F.R. § 41.50(b)