

Urinal Flush Assembly

The disclosure is directed to a flush assembly for a plumbing fixture, the flush assembly configured to provide a highly efficient flush water flow profile during a flush cycle.

Background

Urinals typically are coupled to a flush valve mounted above the fixture, the flush valve configured to control a volume of flush water delivered to the urinal during a flush (flush cycle). A flush valve inlet may be fluidly coupled to a municipal water supply, and a flush valve outlet may be fluidly coupled to a sprayer body or spreader. A sprayer body may be coupled to an upper portion of a fixture wall and configured to "wash down" urine into a basin of the fixture containing a drain coupled to a waste line.

There is a need for a sprayer body that delivers flush water to a plumbing fixture during a flush cycle, and to provide a highly efficient flush water flow profile, so that the fixture remains clean after many uses.

Summary

Accordingly, disclosed is a flush assembly for a plumbing fixture, the assembly comprising a sprayer body, wherein the sprayer body comprises a bottom wall, a front wall, and a rear wall, the sprayer body is configured to be in fluid communication with a water source, and the sprayer body bottom wall comprises a first outlet through which flush water is delivered during a flush cycle.

In some embodiments, a sprayer body may comprise an arc shape. In certain embodiments, a first outlet comprises an arc shape corresponding to an arc shape of a sprayer body. In still other embodiments, a sprayer body bottom wall comprises a first outlet and a second outlet through which flush water is delivered during a flush cycle. First and second outlets may be positioned in a symmetric pattern along the bottom wall. In some embodiments, the sprayer body may comprise first, second, and third outlets through which flush water is delivered during a flush cycle. Second and third outlets may be positioned on opposing ends of

the first outlet. First, second, and third outlets may be positioned in a symmetric pattern along the bottom wall.

These and other embodiments are more fully described below.

Brief Description of the Drawings

The disclosure described herein is illustrated by way of example and not by way of limitation in the accompanying figures. For simplicity and clarity of illustration, features illustrated in the figures are not necessarily drawn to scale. For example, the dimensions of some features may be exaggerated relative to other features for clarity. Further, where considered appropriate, reference labels have been repeated among the figures to indicate corresponding or analogous elements.

Fig. 1A shows an exploded view of a flush assembly, according to an embodiment.

Fig. 1B provides a front view of a flush assembly, according to an embodiment.

Fig. 1C provides a bottom view of a flush assembly, according to an embodiment.

Fig. 1D shows a gasket of a flush assembly, according to an embodiment.

Fig. 2 shows a flush profile of a flush assembly in a urinal, according to an embodiment.

Detailed Description

Fig. 1A shows an exploded, top view of flush assembly **100**, according to one embodiment. Sprayer body **101** has bottom wall **102**, front wall **103**, and rear wall **104**. Sprayer body **101** comprises an arc shape, wherein rear wall **104** has a curved convex shape configured to conform to a curved concave shape of a urinal wall. Sprayer body **101** may be considered to have a curved-window-box-like shape. First outlet **105** has a curved slot, arc shape, and is substantially centered along a length of bottom wall **102**. Rear wall **104** contains inlet port **106**, in fluid communication with source water inlet **107**. Inlet port **106** is substantially centered along a length of rear wall **104**. Source water inlet **107** is configured to be coupled to a water source via a hose (not shown). In this embodiment, first outlet **105** has a width of about 1.5 mm and a length of about 61 mm, to provide an opening area of about 91.5 mm².

First outlet **105** and inlet port **106** are disposed in sprayer body chamber **108**, chamber **108** being defined by walls **102**, **103**, and **104**. Chamber **108** in this embodiment is defined

lengthwise by stops **109**. Gasket **110** is configured to couple to the top of spray body **101** and form a seal with stops **109**. Thus, chamber **108** is defined by walls, **102**, **103**, and **104** and by stops **109** and gasket **110**. Chamber **108** comprises a depth of about 13.5 mm. Bottom wall **102** further comprises second slot-shaped outlet **111**, and third slot-shaped outlet **112** positioned on opposing ends of first outlet **105**. Second and third outlets **111** and **112** are substantially equidistant from and in alignment with first outlet **105** along bottom wall **102**. Second and third outlets **111** and **112** are substantially a continuation of the arc shape of first outlet **105**, in other words, first, second, and third outlets **105**, **111** and **112** are a continuous arc shape interrupted by portions of bottom wall **102**. In this embodiment, second and third outlets **111** and **112** have a width of about 1.5 mm, a length of about 12 mm, and an area of about 18 mm².

Chamber **108** contains baffles **113**. A bottom surface of gasket **110** does not form a seal with baffles **113**, thus source water is in fluid communication with outlets **111** and **112**. Baffles **113** are positioned between first outlet **105** and second outlet **111**, and between first outlet **105** and third outlet **112**. Baffles **113** are configured to modulate fluid flow through outlets **111** and **112** during a flush cycle.

Also shown in **Fig. 1A** is attachment/inlet portion **118**. Attachment/inlet portion **118** comprises shim gasket **114**, shim **115**, nut **116**, and source water inlet **107**, which components will be positioned behind a urinal wall upon installation of flush assembly **100** in a urinal. Sprayer body **101** will be positioned in front of and on a urinal wall upon installation.

Fig. 1B provides a front view of flush assembly **100**, according to an embodiment. Visible from the front are front wall **103** of sprayer body **101**. Gasket **110** is coupled to the top of sprayer body **101**. Visible also is shim gasket **114**.

Fig. 1C provides a bottom view of flush assembly **100**, according to an embodiment. Shown are first outlet **105**, second outlet **111**, and third outlet **112**, positioned in bottom wall **102** of sprayer body **101**. Visible are shim gasket **114**, shim **115**, nut **116**, and source water inlet **107**. Sprayer body **101** is coupled to face plate **117**.

Fig. 1D provides a front view of gasket **110**, according to an embodiment. Gasket **110** comprises curved bottom surface **110bs**, such that outer bottom surfaces **110obs** form a seal

with sprayer body bottom wall **102**. Gasket bottom surface **110bs** does not form a seal with baffles **113**, such that a space exists between gasket bottom surface **110bs** and a top of baffles **113**, allowing for fluid flow towards and through outlets **111** and **112**. Gasket bottom surface **110bs** does form a seal with stops **109** such that fluid flow is not permitted beyond stops **109**. Gasket **110** comprises lip **110l** around a perimeter thereof for forming a seal around a top of front wall **103**, rear wall **104** and the side edges of body **101**.

Fig. 2 shows urinal **200**, according to an embodiment. Flush assembly **100** is coupled to an upper portion of concave urinal wall **201** and conforms to and mates with concave wall **201**. Visible is flush profile **202** of dyed flush water from a water source during a flush cycle. As seen from flush profile **202**, flush water flows into basin **203** in a continuous flow and completely surrounds drain **204**. Continuous flow profile **202** is greater than 200 mm wide at widest point **205**, and is wider than flush assembly **100** at widest point **205**. Continuous flush profile **202** is about 1400 cm² in total area. Flush water does not spill over or out of basin **203** during a flush cycle. First outlet **105** directs flush water towards outer edges of urinal wall **201**, while second outlet **111** and third outlet **112** direct flush water in a substantially vertical flow path down wall **201**. The flow paths combine and interfere with each other, providing continuous flush profile **202**.

In some embodiments, a sprayer body may be coupled to a source water inlet configured to be in fluid communication with a source water and comprises one or more water outlets (openings) configured to be in fluid communication with a plumbing fixture, for example with a wall and a basin of a plumbing fixture. A source water fluid inlet may be coupled to a water source via a hose. In some embodiments, a sprayer body may comprise a sprayer body chamber comprising a water inlet port and one or more sprayer body fluid outlets. A sprayer body water inlet port may be in fluid communication with a source water inlet and the chamber. In some embodiments, during a flush cycle, source water will enter a sprayer body chamber through an inlet port and be discharged from a sprayer body chamber to the plumbing fixture via the one or more outlets.

In some embodiments, a sprayer body may comprise a rectangular box-like shape, not unlike a window box. In some embodiments, a sprayer body may comprise a curved-rectangular-box-like shape or curved-window-box-like shape, for instance having an arc shape. A sprayer body may comprise a bottom wall, a rear wall, and a front wall. A sprayer body may

comprise side walls on a left and right side. In some embodiments, a sprayer body may comprise a shape substantially corresponding to a shape of a plumbing fixture wall to which it may be attached. In other embodiments, a sprayer body may comprise a shape different than that of a plumbing fixture wall to which it may be attached. In some embodiments, a sprayer body rear wall may comprise a shape corresponding to a shape of a plumbing fixture wall to which it may be attached. In some embodiments, a sprayer body rear wall comprises a curved convex shape configured to correspond to and mate with a curved concave portion of a plumbing fixture wall to which it may be attached.

In some embodiments, a bottom wall, rear wall, and front wall may be a continuous wall, which may or may not have one or more sharp box-like edges. For instance, edges may be rounded. In other embodiments, a sprayer body may have a basket- or bowl-like shape, and still be considered to have a bottom wall, a rear wall, and a front wall, wherein the walls are “sections” of a continuous bowl-like wall.

In some embodiments, a sprayer body chamber may have a depth of from any of about 5.0 mm, about 5.5 mm, about 6.0 mm, about 6.5 mm, about 7.0 mm, about 7.5 mm, about 8.0 mm, about 8.5 mm, or about 9.0 mm, to any of about 9.5 mm, about 10.0 mm, about 10.5 mm, about 11.0 mm, about 11.5 mm, about 12.0 mm, about 12.5 mm, about 13.0 mm, about 13.5 mm, about 14.0 mm, about 14.5 mm, about 15.0 mm, about 15.5 mm, about 16.0 mm, about 16.5 mm, about 17.0 mm, about 17.5 mm, about 18.0 mm, about 18.5 mm, about 19.0 mm, about 19.5 mm, about 20.0 mm, about 20.5 mm, about 21.0 mm, about 21.5 mm, about 22.0 mm, about 22.5 mm, or more. A sprayer body chamber depth may be measured from a top edge of a front or rear wall to a chamber bottom inner surface.

In some embodiments, an open top section of a sprayer body may be coupled to a gasket. In some embodiments, a sprayer body chamber is defined by a sprayer body bottom wall, rear wall, front wall, and gasket. A sprayer body chamber may be in fluid communication with one or more outlets and an inlet port.

In some embodiments, a bottom wall comprises a first outlet substantially centered along a length of the bottom wall. In some embodiments, an inlet port may be positioned in a rear wall of a sprayer body and substantially centered along a length of the sprayer body. In some

embodiments, a first outlet may comprise a shape substantially corresponding to a shape of the sprayer body bottom wall. In some embodiments, a first outlet may comprise an arc shape.

In some embodiments, a first outlet may comprise a slot shape or a curved slot shape. In some embodiments, a first outlet may comprise a width of from any of about 0.5 mm, about 0.7 mm, about 0.9 mm, about 1.1 mm, about 1.3 mm, about 1.5 mm, about 1.7 mm, or about 1.9 mm to any of about 2.1 mm, about 2.3 mm, about 2.5 mm, or more. In some embodiments, a first outlet may have a length of from any of about 25 mm, about 30 mm, about 35 mm, about 40 mm, about 45 mm, about 50 mm, about 55 mm, about 60 mm, or about 65 mm, to any of about 70 mm, about 75 mm, about 80 mm, about 85 mm, about 90 mm, or more. In some embodiments, a first outlet may comprise a total opening area of from any of about 70 mm², about 75 mm², about 80 mm², about 85 mm², about 90 mm², about 95 mm², or about 100 mm², to any of about 105 mm², about 110 mm², or about 115 mm², or more.

In the case of a curved slot shape, a length refers to the total length, for example a total arc length. A width may be measured at any one point. In general, a slot shape may comprise a substantially uniform width over its length.

In some embodiments, a sprayer body chamber may comprise a first outlet and a second outlet. In some embodiments, a sprayer body may comprise a first outlet and a second outlet having substantially a same size and opening area. A first and a second outlet may be positioned along a length of a sprayer body bottom wall, so that a left and a right side of the bottom wall are substantially mirror images of each other.

In some embodiments, a second outlet may be, or appear as, substantially a continuation of the first outlet interrupted by a portion of the bottom wall. In this embodiment, a second outlet may be aligned with the first outlet across a width of the bottom wall. For example, a first outlet may have an arc shape, and a second outlet may appear as a continuation of the first outlet arc shape, being interrupted by a portion of the bottom wall.

In some embodiments, a sprayer body may comprise a second outlet and a third outlet. In some embodiments, a second and a third outlet may be positioned in a bottom wall on either side of a first outlet. A second and a third outlet may be positioned substantially equidistant from a first outlet. In some embodiments, a second and a third outlet may be aligned with a first

outlet, for example, aligned across a width of a bottom wall. In other embodiments, a second and a third outlet may not be aligned with a first outlet across a width of a bottom wall, but may be spaced from a first outlet across a width of a bottom wall. In some embodiments, first, second, and third outlets may be positioned in a bottom wall so that a left and a right side of the bottom wall are substantially mirror images of each other.

In some embodiments, second and third outlets may be, or appear as, substantially a continuation of the first outlet interrupted by portions of the bottom wall. In this embodiment, second and third outlets are aligned with the first outlet across a width of the bottom wall. For example, a first outlet may have an arc shape, and a second and a third outlet may appear as a continuation of the first outlet arc shape, being interrupted by portions of the bottom wall.

In some embodiments, second and third outlets may comprise a width of from any of about 0.5 mm, about 0.7 mm, about 0.9 mm, about 1.1 mm, about 1.3 mm, about 1.5 mm, about 1.7 mm, or about 1.9 mm to any of about 2.1 mm, about 2.3 mm, about 2.5 mm, or more. In some embodiments, a second and third outlets may have a length of from any of about 5 mm, about 6 mm, about 7 mm, about 8 mm, about 9 mm, or about 10 mm, to any of about 11 mm, about 12 mm, about 13 mm, about 14 mm, about 15 mm, about 16 mm, about 17 mm, about 18 mm, about 19 mm, about 20 mm, or more. In some embodiments, second and third outlets may comprise a total opening area of from any of about 8 mm², about 10 mm², about 12 mm², about 14 mm², about 16 mm², about 18 mm², or about 20 mm², to any of about 22 mm², about 24 mm², about 26 mm², or about 28 mm², or more.

In some embodiments, a first outlet, a second outlet, a third outlet, and one or more further outlets may have a length of from any of about 5 mm, about 6 mm, about 7 mm, about 8 mm, about 9 mm, or about 10 mm, to any of about 11 mm, about 12 mm, about 13 mm, about 14 mm, about 15 mm, about 16 mm, about 17 mm, about 18 mm, about 19 mm, about 20 mm, about 21 mm, about 22 mm, about 23 mm, about 24 mm, or more. In some embodiments, a first outlet, a second outlet, a third outlet, and one or more further outlets may have a length of from any of about 25 mm, about 30 mm, about 35 mm, about 40 mm, about 45 mm, about 50 mm, about 55 mm, about 60 mm, or about 65 mm, to any of about 70 mm, about 75 mm, about 80 mm, about 85 mm, about 90 mm, or more.

In some embodiments, first, second and third outlets may comprise substantially a same length, width, and opening area. In other embodiments, a first outlet is larger than a second and a third outlet. In some embodiments, a first outlet opening may be from any of about 2 times, about 3 times, about 4 times, or about 5 times, to any of about 6 times, about 7 times or about 8 times larger than second and third outlet openings, by area. In other embodiments, a second and third outlet openings may be larger than a first outlet opening, for example by the same or similar ratios.

In some embodiments, a sprayer body chamber may comprise one or more baffles, for example two or more baffles, configured to direct and modulate flush water out of the chamber through the one or more outlets in a desired flow path and/or pattern. For example an outlet may comprise a baffle positioned on either side of it on the bottom wall. In another embodiment, a bottom wall may comprise a first outlet and a second outlet, wherein a baffle is present at an outer edge of each opening. In some embodiments, a bottom wall having a first and second outlet may have a baffle in between the outlets and one at each opening outer edge (3 baffles). In yet another embodiment, a bottom wall having a first outlet, a second outlet, and a third outlet may have a baffle on either side of the first outlet, which may be configured to direct and modulate fluid flow through the second and third outlets.

In some embodiments, a sprayer body having an open top section (like a window box), may be coupled to a gasket, the gasket being at least partially disposed in a sprayer body chamber. A gasket may form a seal with bottom wall outer sections of a chamber (where no outlets are present). In some embodiments, a gasket is configured to not form a seal with one or more baffles, so that flush water may flow over a top of a baffle towards an outlet. In other words, a chamber may comprise individual chambers separated by baffles, the individual chambers fluidly connected via a space between a top of a baffle and a bottom of a gasket.

A present plumbing fixture may be coupled to a flush valve, which flush valve may be manually operated or automatically operated, for example via use of a presence sensor. A flush cycle may be defined as from when a flush valve is actuated to initiate fluid flow into the flush assembly, then stopped to stop fluid flow to the flush assembly (a flush).

In some embodiments, during a flush cycle, flush water will form a continuous flow profile on the plumbing fixture wall. Continuous flow profile meaning a substantially unbroken

surface, film, or path of water on a plumbing fixture wall, that is, an entire section of wall is substantially completely covered with water during a flush cycle. In some embodiments, during a flush cycle, a present sprayer body may provide a continuous flow profile on the plumbing fixture wall into a plumbing fixture basin and surround a drain.

In certain embodiments, a continuous flow profile may be from any of about 150 mm, about 160 mm, about 170 mm, about 180 mm, or about 190 mm, to any of about 200 mm, about 210 mm, about 220 mm, about 230 mm, about 240 mm, about 250 mm, or more, at a widest point. In some embodiments, a continuous flow profile may be wider than the sprayer body at a flow profile widest point.

In some embodiments, a continuous flow profile may have a total area of from any of about 1000 cm², about 1100 cm², about 1200 cm², or about 1200 cm², to any of about 1300 cm², about 1400 cm², about 1500 cm², about 1600 cm², about 1700 cm², about 1800 cm², or more.

A continuous flow profile may be achieved regardless of flush volume. For example, in some embodiments, a continuous flow profile may be achieved for a flush volume during a flush cycle of from a pint to a gallon. For instance, from any of about 0.10 gal, about 0.12 gal, about 0.13 gal, about 0.15 gal, about 0.17 gal, about 0.20 gal, about 0.25 gal, about 0.30 gal, about 0.35 gal, or about 0.40 gal, to any of about 0.45 gal, about 0.50 gal, about 0.55 gal, about 0.60 gal, about 0.65 gal, about 0.70 gal, about 0.75 gal, about 0.80 gal, about 0.85 gal, about 0.90 gal, about 0.95 gal, or about 1.00 gal.

A large area, continuous flow profile is highly desirable towards providing a clean plumbing fixture over many uses. A present flush assembly provides a large area flow profile without flush water spilling over and out of a basin during a flush cycle. Municipal water lines may have varied water pressures, thus, a present flush assembly may be coupled to a water pressure adjustment screw in order to adjust the flush flow profile.

In some embodiments, the flush assembly may contain no spray nozzles.

According to the disclosure, an arc shape may be segment of a circle, and also includes other “curved line” shapes, for instance portions of other shapes including ellipse, oval, oblong, ovate, obovate, cuneate, deltoid, orbicular, and others.

Following are certain non-limiting embodiments of the disclosure.

In a first embodiment, disclosed is a flush assembly for a plumbing fixture, the assembly comprising a sprayer body, wherein the sprayer body comprises a bottom wall, a front wall, and a rear wall, the sprayer body is configured to be in fluid communication with a source water, and the sprayer body bottom wall comprises a first outlet through which flush water is delivered during a flush cycle.

In a second embodiment, disclosed is a flush assembly according to the first embodiment, wherein the sprayer body is configured to couple to a portion of a wall of the plumbing fixture, and wherein the sprayer body comprises a shape configured to substantially conform to a shape of the plumbing fixture wall portion.

In a third embodiment, disclosed is a flush assembly according to the second embodiment, wherein the sprayer body rear wall comprises a curved convex shape configured to substantially conform to a curved concave shape of the plumbing fixture wall portion.

In a fourth embodiment, disclosed is a flush assembly according to the second or third embodiments, wherein the first outlet comprises a shape substantially corresponding to the sprayer body shape. In a fifth embodiment, disclosed is a flush assembly according to any of the preceding embodiments, wherein the sprayer body substantially comprises an arc shape.

In a sixth embodiment, disclosed is a flush assembly according to any of the preceding embodiments, wherein the first outlet comprises a slot shape having a length and a width. In a seventh embodiment, disclosed is a flush assembly according to any of the preceding embodiments, wherein the first outlet substantially comprises an arc shape.

In an eighth embodiment, disclosed is a flush assembly according to any of the preceding embodiments, wherein the sprayer body comprises an inlet port in fluid communication with the water source. In a ninth embodiment, disclosed is a flush assembly

according to any of the preceding embodiments, wherein the sprayer body comprises an inlet port in fluid communication with the water source, wherein the inlet port is positioned in the sprayer body rear wall, and is substantially centered along a length of the rear wall.

In a tenth embodiment, disclosed is a flush assembly according to any of the preceding embodiments, wherein the first outlet is substantially centered along a length of the bottom wall. In an eleventh embodiment, disclosed is a flush assembly according to any of the preceding embodiments, wherein the first outlet has a width of from about 0.5 mm to about 2.5 mm. In a twelfth embodiment, disclosed is a flush assembly according to any of the preceding embodiments, wherein the first outlet has a length of from about 40 mm to about 90 mm. In a thirteenth embodiment, disclosed is a flush assembly according to any of the preceding embodiments, wherein the first outlet has an area of from about 70 mm² to about 111 mm².

In a fourteenth embodiment, disclosed is a flush assembly according to any of the preceding embodiments, wherein the sprayer body walls define a sprayer body chamber configured to be in fluid communication with the water source and with the first outlet. In a fifteenth embodiment, disclosed is a flush assembly according to any of the preceding embodiments, wherein a sprayer body top section is coupled to a gasket, and wherein the walls and gasket define a sprayer body chamber configured to be in fluid communication with the water source and with the first outlet.

In a sixteenth embodiment, disclosed is a flush assembly according to any of the preceding embodiments, wherein the sprayer body bottom wall comprises a second outlet. In a seventeenth embodiment, disclosed is a flush assembly according to embodiment 16, wherein the second outlet is substantially aligned with the first outlet across a width of the bottom wall.

In an eighteenth embodiment, disclosed is a flush assembly according to embodiments 16 or 17, wherein the first outlet and second outlet comprise a baffle positioned therebetween.

In a nineteenth embodiment, disclosed is a flush assembly according to any of embodiments 16 to 18, wherein the second outlet has a slot shape having a length and a width. In a twentieth embodiment, disclosed is a flush assembly according to any of embodiments 16 to 19, wherein the second outlet comprises an arc shape.

In a twenty-first embodiment, disclosed is a flush assembly according to any of embodiments 16 to 20, wherein a left side and a right side of the sprayer body bottom wall are substantially mirror images of each other.

In a twenty-second embodiment, disclosed is a flush assembly according to any of the preceding embodiments, wherein the body bottom wall comprises a second outlet and a third outlet positioned on opposing sides of the first outlet through which flush water is delivered during a flush cycle. In a twenty-third embodiment, disclosed is a flush assembly according to embodiment 22, wherein the second outlet and third outlet are positioned on opposing sides of the first outlet, and wherein the second and third outlets are substantially equidistant from the first outlet.

In a twenty-fourth embodiment, disclosed is a flush assembly according to embodiments 22 or 23, wherein the second and third outlets are aligned with the first outlet along the sprayer body bottom wall. In a twenty-fifth embodiment, disclosed is a flush assembly according to any of embodiments 22 to 24, wherein the second and third outlets comprise a slot shape having a length and a width.

In a twenty-sixth embodiment, disclosed is a flush assembly according to any of embodiments 22 to 25, wherein the second and third outlets have a width of from about 0.5 mm to about 2.5 mm. In a twenty-seventh embodiment, disclosed is a flush assembly according to any of embodiments 22 to 26, wherein the second and third outlets have a length of from about 6 mm to about 18 mm.

In a twenty-eighth embodiment, disclosed is a flush assembly according to any of embodiments 22 to 27, comprising a first baffle and a second baffle positioned on opposing sides of the first outlet, the baffles configured to modulate fluid flow through the outlets during a flush cycle.

In a twenty-ninth embodiment, disclosed is a flush assembly according to any of embodiments 22 to 28, comprising a first baffle positioned between the second outlet and the first outlet, and a second baffle positioned between the third outlet and the first outlet, the baffles configured to modulate fluid flow through the second and third outlets during a flush cycle.

In a thirtieth embodiment, disclosed is a flush assembly according to any of embodiments 22 to 29, wherein the second outlet and third outlet each have an area of from about 9 mm² to about 27 mm². In a thirty-first embodiment, disclosed is a flush assembly according to any of embodiments 22 to 30, wherein the first outlet has an area that is from about 3 times to about 7 times larger than an area of the second or third outlet.

In a thirty-second embodiment, disclosed is a flush assembly according to any of the preceding embodiments, wherein the sprayer body is coupled to a water pressure adjustment screw.

In a thirty-third embodiment, disclosed is a plumbing fixture comprising a flush assembly according to any of the preceding embodiments, wherein the flush assembly is coupled to a portion of a wall of a plumbing fixture. In a thirty-fourth embodiment, disclosed is a plumbing fixture according to embodiment 33, wherein the plumbing fixture is a urinal comprising a wall, a basin, and a drain.

In a thirty-fifth embodiment, disclosed is a plumbing fixture according to embodiments 33 or 34, wherein during a flush cycle, flush water forms a continuous flow profile on the plumbing fixture wall. In a thirty-sixth embodiment, disclosed is a plumbing fixture according to any of embodiments 33 to 35, wherein during a flush cycle, flush water forms a continuous flow profile on the plumbing fixture wall and surrounding the drain.

In a thirty-seventh embodiment, disclosed is a plumbing fixture according to any of embodiments 33 to 36, wherein the continuous flow profile comprises a total area of from 1000 cm² to about 1600 cm². In a thirty-eighth embodiment, disclosed is a plumbing fixture according to any of embodiments 33 to 37, wherein the continuous flow profile is independent of a flush volume during a flush cycle.

In a thirty-ninth embodiment, disclosed is a flush assembly sprayer body according to any of embodiments 1 to 32. In a fortieth embodiment, disclosed is an assembly comprising a sprayer body according to any of embodiments 1 to 32 and a gasket configured to couple to a sprayer body top section, and wherein the sprayer body walls and gasket define a sprayer body chamber.

Features described in connection with one embodiment of the disclosure may be used in conjunction with other embodiments, even if not explicitly stated above.

The term "coupled" may mean that an element is "attached to" or "associated with" another element. Coupled may mean directly coupled or coupled through one or more other elements. An element may be coupled to an element through two or more other elements in a sequential manner or a non-sequential manner. The term "via" in reference to "via an element" may mean "through" or "by" an element. Coupled or "associated with" may also mean elements not directly or indirectly attached, but that they "go together" in that one may function together with the other.

The term "fluid communication" may be synonymous with "fluidly coupled" or "fluidly connected" or "flow communication" and may mean an element or feature may distribute or receive fluid to or from another element or feature. The term "associated with" may mean "coupled", i.e. "fluidly coupled".

The term "towards" in reference to a point of attachment or a location, may mean at exactly that location or point or, alternatively, may mean closer to that point or location than to another distinct point or location, for example "towards a center" means closer to a center than to an edge.

The term "like" means similar and not necessarily exactly like. For instance "ring-like" means generally shaped like a ring, but not necessarily perfectly circular.

The articles "a" and "an" herein refer to one or to more than one (e.g. at least one) of the grammatical object. Any ranges cited herein are inclusive. The term "about" used throughout is used to describe and account for small fluctuations. For instance, "about" may mean the numeric value may be modified by $\pm 0.05\%$, $\pm 0.1\%$, $\pm 0.2\%$, $\pm 0.3\%$, $\pm 0.4\%$, $\pm 0.5\%$, $\pm 1\%$, $\pm 2\%$, $\pm 3\%$, $\pm 4\%$, $\pm 5\%$, $\pm 6\%$, $\pm 7\%$, $\pm 8\%$, $\pm 9\%$, $\pm 10\%$ or more. All numeric values are modified by the term "about" whether or not explicitly indicated. Numeric values modified by the term "about" include the specific identified value. For example "about 5.0" includes 5.0.

The term "substantially" is similar to "about" in that the defined term may vary from for example by $\pm 0.05\%$, $\pm 0.1\%$, $\pm 0.2\%$, $\pm 0.3\%$, $\pm 0.4\%$, $\pm 0.5\%$, $\pm 1\%$, $\pm 2\%$, $\pm 3\%$, $\pm 4\%$, $\pm 5\%$, $\pm 6\%$,

$\pm 7\%$, $\pm 8\%$, $\pm 9\%$, $\pm 10\%$ or more of the definition; for example the term “substantially perpendicular” may mean the 90° perpendicular angle may mean “about 90° ”. The term “generally” may be equivalent to “substantially”.

Embodiments of the disclosure include any and all parts and/or portions of the embodiments, claims, description and figures. Embodiments of the disclosure also include any and all combinations and/or sub-combinations of embodiments.