

AN URINAL CLEANING AGENT SUPPLY APPARATUS

The present invention relates to a new design of urinal cleaning agent supply apparatus, particularly a cleaning and sterilizing agent dilution and supply device for urinal.

Generally it is difficult to remove uric scale from a urinal. Existence of uric scale is not healthy, and also damages the neat environment. Though a deodorizer placed in the urinal may eliminate bad odour, it can't prevent the formation of uric scale. There are kinds of button operated and automatic flushing devices for urinal cleaning and sterilization purposes which may also use a deodorizer for deodorizing purposes, in general they have some defects, as follows:

(1) The deodorizer normally used in a urinal is dissolved slightly by warm urine to eliminate bad odour, but flushing with water results in a lowering of the temperature which adversely affects the deodorizing effect. Moreover, its use spoils the urinal's nice appearance.

(2) Prolonged immersion of a cleaning/sterilizing agent in a water reservoir of a urinal results in high concentration of the agent, which means an unnecessary waste.

It is desirable to have an apparatus which can be used with a conventional flushing device of a urinal to maintain the urinal clean without placing any object in the urinal and without the need for major alteration to the urinal.

According to the present invention, an apparatus for supplying cleaning agent to the flush water supply of a urinal, comprises a reservoir which, in use, contains a cleaning agent, and which has a port, and an inlet via which the cleaning agent can be replenished; a closure member capable of providing a seal with the inlet of the reservoir; a guide pipe, which, in use, is substantially horizontal, one end of the guide pipe being fixed and sealed to the port, the other end having an opening which,

in use, is fitted into a water supply pipe of the urinal so that it collects and directs along the guide pipe to the reservoir a fraction of the water flowing in the supply pipe during flushing; and means for adjusting the level of the port with respect to the reservoir.

This provides a urinal cleaning agent supply apparatus in which water from the water supply pipe is guided to the cleaning agent reservoir for mixing with the cleaning agent therein and, after water flow from the water supply pipe has stopped, the mixture of cleaning agent and water flows back through the guide pipe and supply pipe to clean and sterilize the urinal.

The volume of water which can flow into the reservoir and dilute the cleaning agent is controlled by the means for adjusting the level of the port with respect to the reservoir.

Preferably the seal between the closure member and inlet reservoir and/or the seal between the guide pipe and port is/are air tight.

Preferably the means for adjusting the level of the port is a substantially L-shape metering pipe press fitted through and sealed with a hole in the reservoir, one end of the L-shape pipe being open to the guide pipe, and the other end providing the port; wherein the level of the port is adjusted by swivelling the pipe within the hole.

The urinal cleaning agent supply apparatus is a practical and elegant device to maintain the urinal clean without placing any object in the urinal and without the need for major alteration to the urinal. It has a simple structure which can be installed in any common flushing device for the best cleaning and sterilization effect.

The cleaning agent, which may be a liquid or a gel and is preferably highly concentrated is kept in the reservoir which can be replenished periodically.

An apparatus constructed in accordance with the present invention will now be described by way of example with reference to the annexed drawings, in which:

Fig. 1 is a perspective fragmented view of the apparatus;

Fig. 2 is a sectional view of the apparatus;

Fig. 3 is a perspective view of the apparatus; and, Fig. 4 illustrates an application of the apparatus.

As shown in Figs. 1 and 2, the urinal cleaning agent supply apparatus comprises a guide pipe 1, a pipe connector 2, a cleaning agent reservoir 3, and a metering pipe 4. The structure of the water supply pipe 5 connected to the urinal is not to be described here because it is a common water pipe, but its connection to the apparatus described below will be described hereafter.

The guide pipe 1 is a straight pipe with a screw threaded section 11 of smaller diameter at one end and an opening 12 extending from the end of the pipe along a part of the circumference of the section 11.

The pipe connector 2 is composed of two gland nuts 21 and 22 of the same shape but of different size, the sleeves having internal screw threads, two sealing rings 23 and 24, and a pipe 25 with a ball-head 251 at one end and an externally screw threaded pipe 252 at the other end. The smaller sleeve 21 has a hole at one end with a diameter corresponding to the outer diameter of the guide pipe 1 and an internal screw thread 212. The sealing ring 23 is provided in the smaller sleeve 21. The larger sleeve 22 has a tapered bore with a diameter decreasing gradually towards one end corresponding to the outer diameter of the ball head 251, and an internal screw thread 222 at its wider end. The sealing ring 24 is provided in the larger sleeve 22.

The reservoir 3 is a container to hold cleaning agent. It is composed of a cylinder 31, a sealing ring 32 and a cover 33. The cylinder 31 has a hole 311 through its side wall, and a concentric spigot 312 with an external screw thread extends from around the hole 311. A metering pipe 4 in the form of a L-like bent pipe is press-fitted into the hole 311. A fixing element 34 is provided at the outer wall of the cylinder 31. The fixing element 34 has a plurality of holes 341 for fixing to a wall by means of screws.

To assemble the apparatus, the front pipe section 11 of the guide pipe 1 is first inserted into the water supply

pipe 5 in a manner that its opening 12 at its tip is facing upwards, and it is secured by a nut 51. The other end of the guide pipe 1 is placed within the smaller inner threaded sleeve 21 and the ring 23 and inserted into the outer pipe 252 of the ball-headed pipe 25 in the pipe connector 2. The smaller sleeve 21 and the pipe 252 are then turned until the end of the pipe 252 is compressing the ring 23 so that the ring 23 seals the guide pipe 1 tightly. This allows the guide pipe 1 and the pipe connector 2 to move telescopically to compensate for any offset between the supply pipe 5 and the reservoir 3. Then, the ring 24 which has been placed to surround the ball-headed pipe 25 and the larger sleeve 22 are fixed and tightened on the pipe 312 extending from the cylinder 31 until the ring 24 seals the ball-head 251 tightly to complete the assembly, as shown in Fig. 3. The ball-head can be angularly offset within the concentric pipe 312 to compensate for any mis-alignment between the reservoir 3 and the pipe 1.

As shown in Fig. 4 the reservoir container 3 is tightly fixed to a wall by means of four bolts 6 passing through the holes 341 on the fixing element 34. The reservoir 3 is filled with cleaning agent, after opening the cover 33, to the level of the upper pipe opening 41 of the metering pipe 4. When the urinal's flushing button or automatic flushing device is operated, water from the water supply pipe is collected by the opening 12 and guided by the guide pipe 1 to the reservoir 3 to mix thoroughly with the cleaning agent. Since the reservoir 3 is sealed, the entry of the water will cause the pressure in the reservoir to rise. When the water supply from the water supply pipe 5 is stopped, a definite quantity of the mixture, driven by the pressure in the reservoir 3, and assisted by gravity, flows through the guide pipe 1 to the water supply pipe and then to the urinal for cleaning and sterilization purposes. The cleaning agent, preferably highly concentrated cleaning agent, in the reservoir 3 can be replenished periodically.

The size of space between the upper pipe opening 41 and the cover 33 can be adjusted by swivelling the L-shape pipe 4 to change the level of the opening 41. Thus, the amount of cleaning agent supplied to a urinal can be varied
5 from urinal to urinal depending on the flushing characteristics of each one.

CLAIMS

1. An apparatus for supplying cleaning agent to the flush water supply of a urinal, the apparatus comprising a reservoir which, in use, contains a cleaning agent, and which has a port, and an inlet via which the cleaning agent can be replenished; a closure member capable of providing a seal with the inlet of the reservoir; a guide pipe, which, in use, is substantially horizontal, one end of the guide pipe being fixed and sealed to the port, the other end of the guide pipe having an opening which, in use, is fitted into a water supply pipe of the urinal so that it collects and directs along the guide pipe to the reservoir a fraction of the water flowing in the supply pipe during flushing; and means for adjusting the level of the port with respect to the reservoir.
2. An apparatus according to claim 1, wherein the seal between the closure member and inlet reservoir and/or the seal between the guide pipe and port is/are air tight.
3. An apparatus according to claim 1 or claim 2, wherein the means for adjusting the level of the port is a substantially L-shape metering pipe press-fitted through and sealed with a hole in reservoir, one end of the L-shape pipe being open to the guide pipe, and the other end providing the port; wherein the level of the port is adjusted by swivelling the pipe within the hole.
4. An apparatus according to claim 3, wherein the one end of the guide pipe is connected to the reservoir via a ball head which is fitted within a spigot having a male screw thread and projecting from the side of the reservoir around the hole, retained by a gland nut screwed onto the male screw thread of the spigot, and sealed by a sealing ring between the spigot and the gland nut; whereby the pipe can



be angularly offset to accommodate any misalignment between the pipe and reservoir.

5. An apparatus according to any one of the preceding
5 claims, wherein the guide pipe is connected to the
reservoir via a connector, to which the guide pipe is
connected by a gland nut which engages a male screw thread
on the end of the connector and compresses a sealing ring
to seal the joint; whereby the pipe and connector are
10 capable of a limited relative axial movement to accommodate
any offset between the reservoir and the supply pipe.
6. An apparatus according to any one of the preceding
claims, wherein the apparatus includes means for fixing the
15 reservoir to a wall.
7. An apparatus substantially as described with reference
to the accompanying drawings.