

DESCRIPTION

TITLE OF INVENTION CHEMICAL SOLUTION SUPPLY DEVICE

TECHNICAL FIELD

[0001] The present invention relates to a chemical solution supply device that is attached to a water storage tank of a toilet bowl having a tank body having a top with an opening and a lid body closing the opening of the tank body.

BACKGROUND ART

[0002] Conventionally, there are known chemical solution supply devices that are installed in a water supply tray for hand washing at the top of a water storage tank of a toilet and supply chemical solutions for cleaning, deodorization, and fragrance to the wash water in the water storage tank (for example, see Patent Literature 1). In addition, there is known a dispensing device that dispenses a gel-like chemical agent onto the inner surface of a toilet bowl to be adhered like a stamp (for example, see Patent Literature 2 and Patent Literature 3).

CITAION LIST

PATENT LITERATURE

- [0003] Patent Literature 1: JP 2013-79496 A
Patent Literature 2: JP 2016-124596 A
Patent Literature 3: JP 2017-218234 A

SUMMARY OF INVENTION

TECHNICAL PROBLEM

[0004] A chemical solution supply device as in Patent Literature 1 cannot be installed if a water supply tray for hand washing does not exist. In addition, even if there is a water supply tray, if there are circumstances such as a decorative item being placed on the water supply tray, the chemical solution supply device cannot be installed. On the other hand, when dispensing devices as in Patent Literature 2 and Patent Literature 3 are used, the amount of chemical agent that can be adhered on the inner side of the toilet bowl with a single stamp is limited, and there is also the risk that the chemical agent on the inner side of the toilet bowl will come off in a flash, thus failing to provide stable chemical agent supply.

[0005] An object of the present invention is to provide a chemical solution supply device that can easily secure an installation location and can stably supply a chemical solution to the entire interior of the toilet bowl (the area that comes into contact with flush water).

SOLUTION TO PROBLEM

[0006] A chemical solution supply device according to the present invention is a chemical solution supply device for attaching to a water storage tank of a toilet bowl having a tank body and a lid body. The tank body has a top with an opening. The lid body closes the opening of the tank body. The chemical solution supply device includes: a chemical solution container configured to house a chemical solution; a flexible tube configured to guide the chemical solution in the chemical solution container to the water storage tank; and an attachment member configured to support the tube and to be attachable to an edge of the opening of the tank body. The attachment member includes: a contact portion having a contact surface allowed to contact an outer surface of the tank body; a fixed portion straddling an edge of the tank body from the contact portion and extending downward along an inner surface of the tank body in an initial state; and a folded portion connected to an end of the fixed portion and folded back diagonally upward toward a side of the contact surface in an initial state, and the fixed portion and the folded portion are integrally formed of a flexible material.

[0007] In the chemical solution supply device, the fixed portion may be formed to be convex upward in an initial state so as to climb over the edge of the tank body.

[0008] In the chemical solution supply device, the tube may be supported along the fixed portion.

[0009] In the chemical solution supply device, a top of the contact portion may be provided with an installation surface on which an edge extending downward from an outer peripheral edge of the lid body is installed.

[0010] In the chemical solution supply device, the attachment member may include a receiving portion that is disposed above the contact portion and has a recess formed therein to receive the chemical solution discharged from the chemical solution container, the receiving portion, the contact portion, the fixed portion, and the folded portion are integrally formed of a flexible material, and the tube may be connected to the recess.

ADVANTAGEOUS EFFECTS OF INVENTION

[0011] The present invention can attach a chemical solution supply device to a water storage tank that is not provided with a water supply tray because of having an attachment member that is configured to be attachable to the edge of the opening of the tank body. In addition, the attachment member supports a flexible tube that guides the chemical solution in the chemical solution container to the water storage tank, and thus this tube allows the chemical solution in the chemical solution container to be stably supplied to the water storage tank.

BRIEF DESCRIPTION OF DRAWINGS

[0012] FIG. 1 is a perspective view of a chemical solution supply device according to an embodiment of the present invention.

FIG. 2 is an exploded side view of the chemical solution supply device of FIG. 1.

FIG. 3 is a sectional view of a water storage tank.

FIG. 4 is a perspective view of a chemical solution container.

FIG. 5 is a perspective view of a chemical solution guiding member.

FIG. 6 is a perspective view of a support body seen from the top.

FIG. 7 is a perspective view of the support body seen from the bottom.

FIG. 8 is a side view of an attachment member.

FIG. 9 is a perspective view of the attachment member seen from the top.

FIG. 10 is a perspective view of the attachment member seen from the back.

FIG. 11 is a side view showing an example of attaching the chemical solution supply device to the water storage tank.

FIG. 12 is a side view showing a method of attaching the chemical solution supply device to the water storage tank.

FIG. 13 is a side view showing a method of attaching the chemical solution supply device to the water storage tank.

FIG. 14 is a side view showing a method of attaching the chemical solution supply device to the water storage tank.

FIG. 15 is a side view showing a method of attaching the chemical solution supply device to another water storage tank.

FIG. 16 is a side view showing a method of attaching the chemical solution supply device to another water storage tank.

FIG. 17 is a side view showing a method of attaching the chemical solution supply device to another water storage tank.

FIG. 18 is a side view showing a method of attaching the chemical solution supply device with a fixed portion formed linearly to the water storage tank.

FIG. 19 is a side view showing a method of attaching the chemical solution supply device to another water storage tank.

FIG. 20 is a side view showing a method of attaching the chemical solution supply device to another water storage tank.

FIG. 21 is a side view showing a method of attaching the chemical solution supply device to another water storage tank.

FIG. 22 is a side view showing a method of attaching the chemical solution supply device to another water storage tank.

FIG. 23 is a side view showing another method of attaching the chemical solution supply device to the water storage tank.

FIG. 24 is a side view showing a method of supplying a chemical solution in a chemical solution supply device different from the present invention.

FIG. 25 is a side view showing the supply of a chemical solution in the chemical solution supply device.

DESCRIPTION OF EMBODIMENTS

[0013] A chemical solution supply device according to an embodiment of the present invention will be described below with reference to the drawings. FIG. 1 is a perspective view of the chemical liquid supply device according to the present embodiment, FIG. 2 is an exploded side view of the chemical solution supply device of FIG. 1, and FIG. 3 is a sectional view of a water storage tank.

[0014] As shown in FIGS. 1 and 2, this chemical solution supply device is a device configured to supply a chemical solution to a water storage tank 1 of the toilet bowl, the device including: a chemical solution container 2 configured to house the chemical solution; a chemical solution guiding member 3 for discharging the chemical solution from the chemical solution container 2; a support body 4 configured to support the chemical solution container 2 and to receive the chemical solution; and an attachment member 5 for attaching the support body 4 to the water storage tank 1 of the toilet bowl.

[0015] As shown in FIG. 3, the water storage tank 1 to be targeted includes a tank body 11 configured to store flushing water and a lid body 12 configured to close the opening at the top of this tank body 11. The tank body 11 includes a first edge portion 121 extending downward at the outer peripheral edge of the lid body 12, and a second edge portion 122 installed at an interval inside the first edge portion 121. An edge 111 of the opening at the top of the tank body 11 is set to be fitted between the first edge portion 121 and the second edge portion 122 of the lid body 12. Thus, the lid body 12 is installed so as to be projected slightly outward from the outer circumferential surface of the tank body 11. The above-described attachment member 5 is attached so as to be fitted between the tank body 11 and the lid body 12. Hereinafter, each member of the chemical solution supply device will be described in detail.

[0016] <1. Chemical solution container>

FIG. 4 is a perspective view of the chemical solution container. As shown in FIG. 4, the chemical solution container 2 has a container body 21 formed in a transparent dome shape and having a flat bottom, and a chemical solution is housed in this container body 21. A discharge port 211 is formed at the bottom of the container body 21, and a cap 22 is attached on this discharge port 211 before use. This cap 22 is composed of an annular main body portion 221 and a thin film portion 222

configured to close a hole in the center, and in use, the thin film portion 222 is broken to discharge a chemical solution.

[0017] The chemical solution contains one or more elements selected from the group including cleaning agents, disinfectants, deodorants, and fragrances, and may also contain a coloring agent. The chemical solution is mixed with the flush water stored in the water storage tank, and the efficacy of the component contained in the chemical solution is provided within the toilet bowl or the toilet room. For example, if the chemical solution contains a cleaning agent and a disinfectant, the toilet bowl can be cleaned and disinfected, and if contains a deodorant and a fragrance, unpleasant odors can be deodorized in the toilet room and a pleasant aroma can be emanated.

[0018] <2. Chemical solution guiding member>

FIG. 5 is a perspective view of a chemical solution guiding member. The chemical solution guiding member 3 is a member for guiding a chemical solution discharged from the chemical solution container 2 to the support body 4. As shown in FIG. 5, this chemical solution guiding member 3 has a rectangular top surface portion 31 and a side surface portion 32 extending downward from the peripheral edge portion thereof. In addition, an annular recess 311 is formed in the center of the top surface portion 31, and the main body portion 221 of the cap 22 of the chemical solution container 2 is set to be fitted into this recess 311. In addition, inside the recess 311, there is installed a cylindrical communication tube 33 with the tip cut diagonally to be sharp. This communication tube 33 is set to pierce the thin film portion 222 of the cap 22 of the chemical solution container 2. Thereby, the chemical solution in the chemical solution container 2 flows through the communication tube 33 to the receiving portion 42 of the support body 4, which will be described later. In addition, a protrusion 34 is formed at an opposing location on the side surface portion 32.

[0019] <3. Support body>

Then, the support body 4 will be described. FIG. 6 is a perspective view of the support body seen from the top, and FIG. 7 is a perspective view of the support body seen from the bottom. As shown in FIGS. 6 and 7, the support body 4 has a housing 41 that is elliptical in plan view. The internal space surrounded by the housing 41 includes: a receiving portion 42 to which the chemical solution guiding member 3 is attached; a pair of support plates 43 disposed downward the receiving portion 42 and supporting the receiving portion 42; and a fixing plate 44 for fixing the attachment member 5.

[0020] The housing 41 has a pair of long walls 411 extending in the longitudinal direction and a pair of short walls 412 extending in the lateral direction and curved, and at the upper ends thereof, the chemical solution container 2 is supported. In addition, a plurality of openings 413 are formed in the housing 41, and the internal space of the housing 41 communicates with the outside via these openings 413. In some drawings, the opening 413 may be omitted.

[0021] The pair of support plates 43 are disposed at a predetermined interval in the internal space of the housing 41 and extend in the lateral direction. Both end portions of each support plate 43

communicate to the inner wall surface of the housing 41. A receiving portion 51 of the attachment member 5, which will be described later, is disposed between these support plates 43.

[0022] Both sides of the fixing plate 44 communicate to each support plate 43 and extend in the longitudinal direction between these support plates 43. In addition, the fixing plate 44 is disposed at not the center of the internal space in the lateral direction but one long wall side (hereinafter, referred to as the first long wall portion 411a, and the other long wall portion is referred to as the second long wall portion 411b) The receiving portion 51 of the attachment member 5, which will be described later, is set to be fitted between the second long wall portion 411b and the fixing plate 44. More specifically, the distance between the second long wall portion 411b and the fixing plate 44 is slightly shorter than the length of the receiving portion 51 in the lateral direction. Therefore, the flexible receiving portion 51 is set to be press-fitted between the second long wall portion 411b and the fixing plate 44.

[0023] At the top end of each support plate 43, there are installed engaging portions 45 configured elastically to deform and engage with the protrusions 34 on both sides of the chemical solution guiding member 3, and the receiving portion 42 configured to receive a chemical solution is disposed between these engaging portions 45. The receiving portion 42 is formed into a rectangular cup shape in plan view, and has a through hole 421 formed in the center of the bottom surface. The outer edge of the receiving portion 42 is set to fit inside the side surface portion 32 of the chemical solution guiding member 3. In addition, there is formed a guide plate 46 that extends downward from the bottom surface of the receiving portion 42, and the chemical solution that has passed through the through hole 421 flows downward along the guide plate 46. The guide plate 46 is disposed near the center of the housing 41 in the lateral direction, and faces the second long wall portion 411b.

[0024] <4. Attachment member>

FIG. 8 is a side view of the attachment member, FIG. 9 is a perspective view of the attachment member seen from the top, and FIG. 10 is a perspective view of the attachment member seen from the back. As shown in FIGS. 8 to 10, the attachment member 5 includes: a receiving portion 51 attached to the support body 4; a contact portion 52 connected to the lower end surface of the receiving portion 51; a fixed portion 53 extending from the contact portion 52 so as to climb over an edge 111 of the tank body 11; and a folded portion 54 extending from the end portion of the fixed portion 53 toward the contact portion 52 side, and these are integrally formed from flexible materials. In addition, a known flexible tube 6 is attached to this attachment member 5.

[0025] The receiving portion 51 is formed into an octagonal block shape in plan view, and has a rectangular recess 511 formed in the center of the top surface. The bottom surface of this recess 511 is formed into a mortar shape, and a discharge hole 512 is formed at the lowest portion of the bottom surface. A rod-shaped member 513 having a through hole communicating with the discharge hole 512 is attached to a portion with the recess 511 formed in the lower surface of the receiving portion 51.

This rod-shaped member 513 is inserted into the upper end of the tube 6 so that the chemical solution collected in the recess 511 flows into the tube 6 through the discharge hole 512 and the through hole.

[0026] The contact portion 52 has a front plate 55 extending downward from the receiving portion 51 and a pair of side plates 56 connected to both sides of the front plate 55, and a front plate 55 is supported by a pair of side plates 56. The front plate 55 has: a first extending surface 551 extending downward from the outer circumferential surface of the water storage tank 1 side of the receiving portion 51; a curved surface 552 curving convexly downward from the lower end of the first extending surface 551; a second extending surface 553 extending obliquely upward from the curved surface 552; and a contact surface 554 extending downward from the end portion of the second extending surface 553. In addition, in each side plate 56, the edge portion of the water storage tank 1 side is formed along the first extending surface 551, the curved surface 552, the second extending surface 553, and the contact surface 554. On the other hand, in each side plate 56, the edge portion of the opposite side of the water storage tank 1 extends diagonally in a liner manner from the lower end of the receiving part 51 to the lower end of the contact surface 554.

[0027] In the front plate 55, a through hole 555 is formed in the curved surface 552, and a first groove 556 extending toward the water storage tank 1 side is formed in the second extending surface 553 so as to be continuous with the through hole 555. As described above, the tube 6 inserted into the rod-shaped member 513 is pulled out to the water storage tank 1 side through the through hole 555 and disposed along the first groove 556 of the second extending surface 553. The first groove 556 is formed in an arcuate cross-sectional shape, and is formed so as to fill 30% or more, preferably 50% or more of the cross-sectional area of the tube 6.

[0028] In addition, in the front plate 55, a plate-shaped guide member 557 is disposed on the back surface of the first extending surface 551. This guide member 557 extends upward from the upper edge of the through hole 555, and is disposed with a gap from the rod-shaped member 513. In addition, the edge of the guide member 557 extending from the rod-shaped member 513 to the through hole 555 is formed in an arc shape. Therefore, the tube 6 inserted into the rod-shaped member 513 is disposed along the edge of the guide member 557 and guided toward the through hole 555.

[0029] Then, the fixed portion 53 will be described. In the initial state, the fixed portion 53 is formed in a band-like shape having a curved portion 531 extending convexly upward from the upper end of the second extending surface 553 and an extending portion 532 extending downward from the tip of the curved portion 531. A second groove 533 that is continuous with the first groove 556 formed in the second extending surface 553 is formed in the fixed portion 53. The second groove 533 has the same cross-sectional shape as the first groove 556 and extends across the curved portion 531 and the extending portion 532. In addition, a retaining portion 534 is formed in the extending portion 532 so as to cover the second groove 533, and the retaining portion 534 covers the second groove 533 so that

the tube 6 fitted into the second groove 533 is not separated. The tube 6 has a length such that it extends further downward from the lower end of the extending portion 532.

[0030] A band-shaped folded portion 54 extending obliquely upward toward the contact surface 554 is connected to the lower end of the extending portion 532. The folded portion 54 is elastically deformable, and thus is moved closer to the extending portion 532 by applying force. That is, when the folded portion 54 is pressed, the angle formed between the folded portion 54 and the extending portion 532 becomes smaller.

[0031] The attachment member 5 configured as described above is integrally formed of a flexible material. The material constituting the attachment member 5 is not particularly limited, but can be formed from materials such as urethane rubber, styrene-butadiene rubber, silicone rubber, and fluororubber. In addition, the hardness (international rubber hardness) of the attachment member 5 is preferably 60 to 100 IRHD, more preferably 85 to 95 IRHD. International rubber hardness can be measured, for example, by a test specified in JIS K 6253-2 (ISO480).

[0032] <5. Method for assembling and method for using chemical solution supply device>

Then, a method for assembling and method for using the chemical solution supply device with each member configured as described above will be described. First, the chemical solution guiding member 3 is attached to the support body 4. That is, the chemical solution guiding member 3 is attached so as to cover the receiving portion 42 of the support body 4. At this time, the protrusion 34 of the chemical solution guiding member 3 engages with the engaging portion 45 of the support body 4, whereby the chemical solution guiding member 3 is fixed to the support body 4.

[0033] Then, the attachment member 5 is attached to the support body 4. At this time, the method for attaching the attachment member 5 differs depending on the position of the lid body 12 of the water storage tank 1. For example, when the lid body 12 protrudes laterally from the tank body 11 as shown in FIG. 3, it is necessary to prevent the support body 4 from interfering with the lid portion 12. Therefore, the receiving portion 51 is fitted into the support body 4 so that the surface of the front plate 55 side of the receiving portion 51 of the attachment member 5 is in contact with the second long wall portion 411b of the support body 4. As a result, as shown in FIG. 11, the second long wall portion 411b of the support body 4 and the first extending surface 551 of the attachment member 5 are approximately flush with each other, thereby suppressing interference between the support body 4 and the lid body 12.

[0034] In addition, the receiving portion 51 of the attachment member 5 is disposed at a position offset from the center of the lateral direction of the housing 41 of the support body 4, and thus directly below the guide plate 46, the discharge hole 512 of the receiving portion 51 is not disposed, but the mortar-shaped bottom surface of the recess 511 of the receiving portion 51 is disposed. Therefore, the chemical solution flowing along the guide plate 46 is dripped onto the bottom surface in a mortar shape.

[0035] Then, the attachment member 5 is attached to the water storage tank. First, the lid body 12 is shifted from the tank body 11 to expose the upper edge 111 of the tank body 11. Then, as shown in FIG. 12, the fixed portion 53 is attached so as to straddle over the edge 111 of the tank body 11. At this time, the contact surface 554 of the attachment member 5 contacts the outer surface of the edge 111 of the tank body 11, and the inner wall surface of the edge 111 is pressed by the folded portion 54. Therefore, the edge 111 of the tank body 11 is sandwiched between the contact surface 554 and the folded portion 54, thereby fixing the attachment member 5 to the tank body 11. Subsequently, as shown in FIG. 13, when the lid body 12 is attached to the tank body 11, the fixed portion 53 is disposed between the first edge portion 121 and the second edge portion 122 of the lid body 12. In addition, the first edge portion 121 presses around the curved surface 552 and second extending surface 553 of the attachment member 5 (this portion constitutes the installation surface of the present invention). However, the tube 6 is fitted into the first groove 556, and thus the entire tube 6 is prevented from being pressed by the first edge portion 121.

[0036] After the attachment member 5 is attached to the water storage tank 1 in this manner, the chemical solution container 2 is attached to the support body 4 as shown in FIG. 14. The communication tube 33 of the chemical solution guiding member 3 is inserted into the thin film portion 222 of the cap 22 of the chemical solution container 2, whereby the chemical solution flows into the receiving portion 42 of the support body 4 through the communication tube 33. Then, this chemical solution flows downward from the through hole 421 of the receiving portion 42 along the guide plate 46. The chemical solution is dripped from the lower end of the guide plate 46 into the recess 511 of the receiving portion 51 of the attachment member 5. At this time, the lower end of the guide plate 46 falls not into the discharge hole 512 of the recess 511 but onto the mortar-shaped bottom surface, and enters the discharge hole 512 while flowing along the bottom surface. The chemical solution that has entered the discharge hole 512 flows into the tube 6 and is supplied from the tube 6 to the cleaning water stored in the water storage tank 1.

[0037] Thus, the chemical solution stored together with the cleaning water in the water storage tank 1 exhibits an aromatic deodorizing effect due to aromatic components thereof. In addition, the toilet bowl is cleaned by the chemical solution poured into the toilet bowl from the water storage tank 1 during flushing, and an aromatic deodorizing effect can also be obtained. After attaching the chemical solution container 2 to the support body 4, the chemical solution supply device can also be attached to the water storage tank 1.

[0038] <6. Feature>

In the chemical solution supply device configured as described above, the following effects can be obtained.

(1) This chemical solution supply device has the attachment member 5 configured to be attachable to the edge 111 of the tank body 11, and thus the chemical solution supply device can be attached to the

water storage tank that is not provided with a water supply tray. In addition, the attachment member 5 supports a flexible tube 6 that guides the chemical solution in the chemical solution container 2 to the water storage tank 1, and thus this tube 6 allows the chemical solution in the chemical solution container 2 to be stably supplied to the water storage tank 1.

[0039] (2) The fixed portion 53 and the folded portion 54 are deformable, and thus the attachment member 5 can be attached to the edge 111 of the tank body 11 having various widths. The example of FIG. 14 described above shows an example in which the width of the edge 111 of the tank body 11 is narrow, that is, the width of the edge 111 is shorter than the distance between the contact surface 554 and the extending portion 532 of the fixed portion 53, but when the edge 111 of the tank body 11 is wide, the attachment member 5 can be attached as follows.

[0040] As shown in FIG. 15, when the edge 111 of the tank body 11 is slightly wide, the folded portion 54 is pressed by the edge 111, and the folded portion 54 comes into contact with the extending portion 532 of the fixed portion 53. Then, the edge 111 of the tank body 11 is sandwiched between the contact surface 554 and the folded portion 54. In this case, the edge 111 of the tank body 11 is generally sandwiched by the elastic force of the fixed portion 53. That is, if the width of the edge 111 of the tank body 11 is approximately the same as the distance between the extended portion 532 of the fixed portion 53 and the contact surface 554, such a sandwiching manner is used.

[0041] As shown in FIG. 16, if the edge 111 of the tank body 11 is wide, the curved fixed portion 53 is extended linearly, and the angle between the folded portion 54 and the extended portion 532 is widened, thereby setting the angle to approximately 90 degrees. Thereby, the edge 111 of the tank body 11 can be sandwiched between the contact surface 554 and the folded portion 54. That is, if the width of the edge 111 of the tank body 11 is longer than the distance between the extended portion 532 of the fixed portion 53 and the contact surface 554, such a sandwiching manner is used.

[0042] As shown in FIG. 17, if a flange 18 extending inward is formed on the edge 111 of the tank body 11, the curved fixed portion 53 is extended linearly and this portion is disposed along the upper surface of the flange 18. At this time, the folded portion 54 engages with the lower surface of the flange 18.

[0043] Thus, the attachment member 5 according to the present embodiment can be attached to the edge 111 of the tank body 11 having various widths.

[0044] (3) The fixed portion 53 has the upwardly convexly curved portion 531, and thus the fixed portion 53 can be disposed so as to climb over the edge 111 of the tank body 11. For example, as shown in FIG. 18, if the fixed portion 8 extends linearly, the lid body 12 may climb on the fixed portion 8, causing the lid body 12 to incline or the attachment member 5 to incline. On the other hand, forming the fixed portion 53 as described above causes the fixed portion 53 to be disposed so as to climb over the edge 111 of the tank body 11, thus allowing to suppress interference of the fitted portion between the tank body 11 and the lid body 12 with the fixed portion 53. As a result, it is possible to prevent the

lid body 12 from being inclined and disposed. In addition, it is possible to prevent the attachment member 5 from being inclined and disposed, and thus it is also possible to prevent the chemical solution container 2 from being inclined.

[0045] In addition to the water storage tank 1 of the form described above, the attachment member 5 can be attached to the following water storage tanks. In the example shown in FIG. 19, only a first edge 121 extending downward is provided on the outer peripheral edge of the lid body 12, and this first edge 121 and an edge 111 of the tank body 11 are in contact with each other. In this case, the fixed portion 53 is disposed so as to straddle the edge 111 of the tank body 11, and thus can be attached. In addition, the first edge 121 of the lid body 12 presses around the curved portion 531 of the fixed portion 53, and the tube 6 is embedded in the second groove 533, and thus the first edge 121 prevents the entire tube 6 from being pressed. Therefore, the flow of the chemical solution is prevented from being obstructed.

[0046] In the example of FIG. 20, the first edge 121 extending downward is provided to the outer peripheral edge of the lid body 12, and the width of this first edge 121 is wider than the edge 111 of the tank body 11. In addition, a protrusion 124 to be disposed on the inner surface of the edge 111 of the tank body 11 is formed at the lower end of the first edge 121. In this case as well, the fixed portion 53 is disposed so as to straddle the edge 111 of the tank body 11, and thus can be attached.

[0047] In the example of FIG. 21, the first edge 121 extending downward is provided to the outer peripheral edge of the lid body 12, and the width of this first edge 121 is wider than the edge 111 of the tank body 11. On the other hand, the protrusion 112 that protrudes upward is formed on the outside of the upper end surface of the edge 111 of the tank body 11. Further, a protrusion 125 to be disposed on the inner surface side of the edge 111 of the tank body 11 is formed at the lower end of the first edge 121, and this protrusion 125 is disposed inside the protrusion 112 of the tank body 11. In this case as well, the fixed portion 53 is disposed so as to straddle the edge 111 of the tank body 11, and thus can be attached.

[0048] In the example shown in FIG. 22, the first edge 121 extending downward is provided to the outer peripheral edge of the lid body 12. On the other hand, the protrusion 113 that protrudes upward is formed on the inside of the upper end surface of the edge 111 of the tank body 11. The first edge 121 is disposed on the outer surface side of the protrusion 113 of the tank body 11. In this case as well, the fixed portion 53 is disposed so as to straddle the edge 111 of the tank body 11, and thus can be attached.

[0049] Thus, the attachment member 5 according to the present embodiment can be attached to the water storage tank 1 of various aspects.

[0050] (4) In the above example, the lid body 12 protrudes from the tank body 11, and thus the receiving portion 51 of the attachment member 5 is fitted into the support body 4 so that the second long wall portion 411b of the support 4 body faces the fixed portion 53 of the attachment member 5.

This suppresses interference between the support body 4 and the lid body 12. On the other hand, if the side surface of the lid body 12 and the side of the tank body 11 are approximately flush with each other as shown in FIG. 23, the receiving portion 51 of the attachment member 5 is fitted into the support body 4 so that the first long wall portion 411a of the support body 4 faces the fixed portion 53 side of the attachment member 5. As a result, the first long wall portion 411a of the support body 4 protrudes further toward the water storage tank 1 side than the first extending surface 551 of the attachment member 5, and thus it is possible to prevent the support body 4 and the lid body 12 from being too far apart.

[0051] Thus, for the attachment member 5 and support body 4 according to the present embodiment, the orientation of the support body 4 with respect to the attachment member 5 can be changed depending on whether or not the lid body 12 protrudes. Therefore, interference between the lid body 12 and the support body 4 can be prevented, or the lid body 12 and the support body 4 can be disposed so that the distance between them is not too wide.

[0052] (5) The tube 6 is supported by the attachment member 5 so as to be located below the discharge hole of the receiving portion, and thus the following effects can be obtained. For example, as shown in FIG. 24, if a part of the tube is located above the discharge hole in the receiving portion, the chemical solution dripped from the discharge hole accumulates between the discharge hole and the portion located above the discharge hole in the tube, and thus there is a risk that the accumulated chemical solution will flow out all at once due to the siphon principle.

[0053] On the other hand, as shown in FIG. 25, if the tube 6 is located below the discharge hole 512 of the receiving portion 51, the chemical solution dripped from the guide plate 46 into the receiving portion 51 enters the tube 6 alternately with air, and thus the chemical solution can be supplied little by little into the water storage tank 1 from the tube 6.

[0054] (6) In the attachment member 5, a guide member 557 on which the tube 6 is disposed, the curved surface 552, the second extending surface 553, and the fixed portion 53 are formed of curved surfaces or flat surfaces, and thus do not have corners. Therefore, the tube 6 can be prevented from being bent. As a result, the occurrence of kinks in the tube 6 can be suppressed, and thus the chemical solution can flow smoothly into the tube 6.

[0055] (7) The guide plate 46 faces the second long wall portion 411b inside the housing 41 of the support body 4. Therefore, a part of the chemical solution flowing along the guide plate 46 evaporates on the guide plate 46. Therefore, the aromatic component flows to the outside from the opening 413 of the housing, thereby allowing to provide an aromatic effect.

[0056] (8) Directly below the guide plate 46 of the support body 4, the discharge hole 512 of the receiving portion 51 is not disposed, but the mortar-shaped bottom surface of the recess 511 of the receiving portion 51 is disposed. Therefore, the chemical solution flowing along the guide plate 46 does not directly enter the discharge hole 512, but is dripped onto the mortar-shaped bottom surface.

Therefore, a part of the chemical solution evaporates on this bottom surface, thereby allowing to provide the aromatic effect.

[0057] (9) Even if the lid body 12 is installed on the attachment member 5 and the tube 6 is pressed by the lid body 12, the tube 6 is accommodated in the groove at that location (installation portion), and thus is not completely crushed. Therefore, the chemical solution can flow smoothly into the tube 6. In addition, the attachment member 5 has flexibility, and thus when pressed by the lid body 12, the diameter of the groove is reduced. Thereby, the inner wall surface of the groove and the tube 6 come into close contact with each other, so that the tube 6 can be firmly fixed to the groove.

[0058] <7. Modification example>

One embodiment of the present invention has been described above, and the present invention is not limited to the above embodiment, and various changes can be made without departing from the spirit thereof. For example, the following changes are possible. In addition, the gist of the following modification examples can be combined as appropriate.

[0059] <7-1>

In the embodiment described above, the chemical solution guide member 3 and the support body 4 are provided, but if the chemical solution discharged from the chemical solution container 2 is supplied to the water storage tank 1 through the tube 6 and the chemical solution container 2 is directly or indirectly supported on the water storage tank 1 by the attachment member 5, the structure between the chemical solution container 2 and the attachment member 5 is not particularly limited.

[0060] <7-2>

In the embodiment described above, the fixed portion 53 of the attachment member 5 has the curved portion 531 that is convex upward, but as long as the fixed portion is configured to straddle the edge 111 of the tank body 11 from the contact portion 52, the configuration of the fixed portion 53 is not particularly limited. Therefore, the fixed portion 53 may be formed in a U-shape with an uncurved corner.

[0061] <7-3>

The tube 6 may be attached to any position on the attachment member 5, and may not be attached along the contact portion 52 and the fixed portion 53 as in the above embodiment. Therefore, a groove may not necessarily be formed.

[0062] <7-4>

The configuration of the contact portion 52 of the attachment member 5 is not particularly limited, and at least the contact surface 554 may be provided and the fixed portion 53 may be attached.

[0063] <7-5>

The receiving portion 51 is not necessarily required in the attachment member 5, and may be configured so that the chemical solution in the chemical solution container 2 can be supplied to the tube 6.

LIST OF REFERENCE NUMERALS

[0064]	1	Water storage tank
	11	Tank body
	12	Lid body
	2	Container
	5	Attachment member
	51	Receiving portion
	52	Contact portion
	554	Contact surface
	53	Fixed portion
	54	Folded portion
	6	Tube

CLAIMS

1. A chemical solution supply device for attaching to a water storage tank of a toilet bowl having a tank body and a lid body, the tank body having a top with an opening, the lid body closing the opening of the tank body, the chemical solution supply device comprising:
 - a chemical solution container configured to house a chemical solution;
 - a flexible tube configured to supply the chemical solution in the chemical solution container to the water storage tank; and
 - an attachment member configured to support the tube and to be attachable to an edge of the opening of the tank body, wherein
 - the attachment member includes:
 - a contact portion having a contact surface allowed to contact an outer surface of the tank body;
 - a fixed portion straddling an edge of the tank body from the contact portion and extending downward along an inner surface of the tank body in an initial state; and
 - a folded portion connected to an end of the fixed portion and folded back diagonally upward toward a side of the contact surface in an initial state, and
 - the fixed portion and the folded portion are integrally formed of a flexible material.
2. The chemical solution supply device according to claim 1, wherein the fixed portion is formed to be convex upward in an initial state so as to climb over the edge of the tank body.
3. The chemical solution supply device according to claim 1 or 2, wherein the tube is supported along the fixed portion.
4. The chemical solution supply device according to any one of claims 1 to 3, wherein a top of the contact portion is provided with an installation surface on which an edge extending downward from an outer peripheral edge of the lid body is installed.
5. The chemical solution supply device according to any one of claims 1 to 4, wherein
 - the attachment member includes a receiving portion that is disposed above the contact portion and has a recess formed therein to receive the chemical solution discharged from the chemical solution container,
 - the receiving portion, the contact portion, the fixed portion, and the folded portion are integrally formed of a flexible material, and
 - the tube is connected to the recess.