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Flush water unit for a toilet bowl

The invention concerns a flush water unit for a toilet bowl with several outlet openings ending into the bowl interior of a bowl body, through which flush water enters into the flusher bowl below the upper bowl edge from the rear of the bowl body.

From DE 20 204 019 425 U1, a toilet bowl is known with a toilet seat that can be positioned at its upper edge and with a supply of flush water essentially revolving in a guide channel around the upper edge of the bowl, whereby at least a part of the design of the guide channel is designed as movable bowl edge that can be lifted off the bowl and the guide channel is formed jointly by the bowl wall and a guide surface of the bowl edge that can be lifted, whereby the flush water guide channel has a revolving U-shaped cross section that is open toward the bottom. The entry of water into the bowl interior takes place by means of a single inflow and is delivered in various directions because of the water distributor located in the bowl interior.

From DE 201 20 693 U1, a flush water distributor unit for toilet bowls with a spring mechanism for fixation below the toilet edge is known, in which a base body is designed cylindrically and partially closed toward the front with a deflector, a revolving, partially interrupted edge surrounds the base body and on both sides, a tapered flush water channel is provided that is open toward the front.

From DE 33 15 926 A1, a water distributor for water closets is known. It is designed as insert made of plastic for installation into the single flush pipe connection

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of the water closet from the interior for distribution of the flush water. At the same time, at a housing having the form of a cylinder, centrically revolving sealing lids, a guide surface, stop dogs, outlet openings and a guide surface, as well as guide ribs are located.

DT-OS 1 817 631 concerns closet bowls with an intake port leading at an incline from the rear and/or from the top to a distributor provided with lateral flush channels and flush openings, which intake port has a partition wall, whereby a separation of the flush flow takes place to lateral flush channels in the distributor and in a lower flush flow, to the middle flush openings in the distributor.

DT-PS 1 658 261 reveals a flush water distributor consisting of a hollow body for installation into a water closet bowl with a central main outlet nozzle toward the bottom and lateral of such, two diverging flow branches for running underneath the bowl edge with respective flow outlet at the end, whereby the lateral flow branches are provided with smaller water outlet openings at their underside and whereby their flow through cross section becomes steadily smaller with increasing distance from the main outlet nozzle. Here too, the flush water supply occurs by means of a single flush water inlet of the bowl.

GB 2 431 937 A shows and describes a water closet bowl, which has a circumferential edge on the upper side. Via a single water inlet, the flush water is delivered through various openings and channels into the ceramic bowl body toward the bottom, as well as also in the region of the bowl edge into the interior of the bowl.

From DE 86 19 584 U1, a water closet is known with a closet pot that can be connected by means of a flanged socket to a water supply, for example, to a water tank,

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the lateral border of which is provided at the upper interior edge with a flush water guide that is provided with a flush water outlet, and has a fold-away toilet seat, whereby at the upper interior edge of the side border of the closet pot, a hollow profile body with a hollow chamber can be supported that forms the flush water guide, which can be connected with a flanged socket, into which the flush water outlet openings end. As a result of this hollow body profile, the production effort and installation effort is relatively high.

It is the object of the present invention to provide a flush water unit of the type mentioned at the beginning, which ensures effective flushing as a result of its simpler design and easier installation at low flow resistance and low water consumption.

This object is, for example, essentially solved thereby, that the outlet openings are designed at the respective front end of separate, preferably essentially straight inflow pipes, which are insertable from the outside through at least one installation recess in the rear wall of the bowl body and project into the interior of the bowl. The supply pipes can be simple, straight commercial pipes, which can be comfortably inserted with the front ends from the rear through at least one installation recess extending up to the bowl interior and can be fixated sealingly at the rear wall of the bowl body. The actual water distribution to the various outlet openings thus takes place outside of the bowl body and is not subject to the danger of contamination. As a result of this, hygiene is significantly improved.

Terms such as "front", "back", "above", "below", "upstream", "downstream", or "rear wall" refer to the installation or use position of the flush water unit and the toilet bowl. Thus, the rear wall is, for example, a rear wall in installation position that can be designed for mounting at a

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wall element or similar. The invention thereby concerns a flush water unit by itself, i.e. essentially the pipes without a toilet bowl, as well as the toilet bowl itself and a combination of the flush water unit with a toilet bowl. Preferably, the toilet bowl is a wall-mounted deep-flusher.

The outlet openings for the flush water can thereby be positioned in the interior of the bowl because of the length of the respective supply pipe in such a way that an effective flush water flow is created in the interior of the bowl. Thus, it is provided in particular, that at least one central inlet pipe projects less far into the interior of the bowl than respectively at least one of the inlet pipes associated with the respective lateral wall of the bowl body. As a result of the separate supply, in addition to a central flush flow, a surface flushing of the interior wall surfaces of the bowl is created. Because of the converging lateral flush water flows, a powerful, targeted, upward-arching, stable, broad "water crest" is created for an effective flushing away of the matter to be flushed and for cleaning the interior walls of the bowl interior. In this manner, the water distribution takes place essentially outside of the toilet bowl at low interior flow resistance, as a result of which the danger of contamination is largely precluded.

The front ends of the inlet pipes can be designed slit or recessed on the bowl bottom side and/or on the side of the lateral walls of the bowl and/or be designed as outlet nozzle, in order to direct the flow relationships and to thus optimize them.

In the adaptation to the spatial situation and the form of the body of the bowl it is also possible that the inlet pipes have differing flow cross sections, preferably, a central inlet pipe has a smaller flow cross section than the two lateral inlet pipes.

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For a simple and safe installation it can be provided that the inlet pipes can be passed respectively through their own installation recess in the rear wall of the bowl body and can be sealed perfectly against the interior wall surface of the installation recess, whereby the sealing means simultaneously serve to securely position the inlet pipes in the installation recesses.

Installation on site can, for example, be simplified even further when the inlet pipes can be put together in one part or in several parts into a joint inlet piece or can be stacked into each other and/or are already stacked, which can be installed as a unit.

Thereby, the inlet piece can be equipped with sealing sleeves for sealing the inlet pipes against the interior wall surfaces of the installation recess(es).

In the process of the adaptation to the spatial relationships of the bowl interior, the front ends of the inlet pipes can additionally be formed by at least separate more or less long extensions, which (even still on site) can be exchanged with others having a different length.

In the flush water unit according to the invention, at least one inlet pipe is provided with a flexible section for adaptation of the inlet pipe to the curve of the bowl body. Preferably, the two lateral inlet pipes that project further into the bowl interior are respectively provided with at least one such flexible, shapeable section. In the further development of this inventive idea it is particularly preferred when these inlet pipes are first inserted straight into the interior of the bowl and a flexible section is provided only in the proximity of the outlet openings.

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For the purpose of supplying flush water, in the inlet pipes, a water distributor is attached that can be connected with the water supply, in particular a flush water tank. Thereby, the separate inlet pipes are preferably individually or jointly put together into the inlet piece, respectively capable of being connected to a separate water distributor or connected, which forms the connection to at least one flush water outlet of a perhaps conventional flush water tank with a single flush water outlet or to a separate water supply.

A particularly space-saving installation of the flush water unit in accordance with the invention can be achieved thereby, that the water distributor has an upstream connection for connecting with a water supply, a downstream branching section for separating the water flow into several partial flows, downstream of the branching section for each of the partial flows a diverting section for diverting the partial flows from a vertical flow direction in the installation position into a horizontal flow direction and has connections for connecting the diverting sections to the supply pipes. The branching into several partial flows thus takes place essentially in a vertical plane, for example, of a wall element. According to a preferred embodiment of the invention, the branching section has three pipe elements that are associated with the respective supply pipes that are fed by a larger, for example, by a pipe element that is associated with the flush water outlet of a flush water tank. These pipe elements can have various horizontal cross sections; in particular, the two lateral pipe elements associated with the lateral supply pipes are larger than the pipe element that is associated with the central supply pipe.

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Thereby, for further simplification, the flush water tank and/or the water distributor can be mountable at a preferably frame-like wall element, which is, for example, mountable on the wall of the building.

While the bowl body of the toilet bowl is conventionally made of ceramic material, the supply pipe(s) is/are and/or the inlet piece and/or the water distributor and/or the flush water tank, are made of plastic. If appropriate, they can be made available together with the wall element as well as at the installation site as construction set.

In addition to the steps taken previously, the bowl body can be made with a water ring insert made of plastic, in order to deflect the flush water flow from flowing out of the interior of the bowl.

The invention further concerns a toilet bowl that can be equipped with a flush water unit of the type mentioned above. Thereby, the bowl body of the toilet bowl is preferably designed as a wall-mounted deep-flusher, in the rear wall of which a discharge opening, as well as several, in particular three, installation openings are provided. A particularly advantageous mounting of the toilet bowl can be achieved thereby, that in the rear wall of the bowl body, additional mounting openings for mounting the bowl body on a wall element or similar, are formed. For this purpose, preferably, the mounting openings are located in installation position above the discharge opening and below at least one of the installation openings, in particular, below the installation openings for the two lateral inflow pipes and approximately at the same height or below the installation opening for the smaller, central inflow pipe.

One (if appropriate more) measure for decreasing the flush water consumption can, in a toilet bowl of the type mentioned above, but also in other toilet bowls

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whose bowl body is equipped with a siphon in the discharge, can be achieved thereby, that the volume of the siphon is reduced with respect to the previous dimensions to less than 2 liters, preferably 1 liter. In this manner, the amount of water that remains standing in the bowl body is smaller and the energy required to put the amount of water in motion is smaller. As a result, the flushing of the water closet is simplified. For this reason, this measure can also be implemented in a flush water unit independent of the previously mentioned steps in accordance with the invention.

Additional goals, characteristics, advantages and possibilities of application of the invention result from the following description of examples of embodiments in conjunction with the drawing. At the same time, all described and/or pictorially illustrated characteristics by themselves or in any combination form the subject matter of the invention, even independent of their summary in the individual claims or their reference.

Figures 1 to 6 schematically illustrate the individual installation steps of a flush water unit in accordance with the invention in various slanted views.

Figure 1 illustrates an inlet piece 10, in which three separate supply pipes 6, 6', a central and two lateral pipes are put together, so that they, as can be seen in Figure 2, can be comfortably inserted from the rear into corresponding installation recesses 7, 7' in the rear wall 8 of the bowl body 2, and with the help of sealing sleeves 11, 11', can be positioned in such in a sealing manner. Below the installation recesses 7' for the two lateral supply pipes 6', two mounting openings are provided in the rear wall 8. The front ends 5' of the lateral supply pipes 6' are formed by extensions 12', which can be mounted

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exchangeable at inlet piece 10. At the front ends 5, 5' of the supply pipes 6, 6', slits 17, 17' (not shown) are provided that extend over a part of their length, which, positioned in the bowl interior 1, for example, can point in the direction of the bottom wall (supply pipe 6) or the lateral walls 9, 9' of the bowl interior 1.

As can be seen in Figure 3, the front outlet openings 3, 3' of supply pipes 6, 6' are located at a small distance below the upper bowl edge 4, whereby the lateral outlet openings 3' are further in the front of the bowl interior 1 than the central outlet opening 3. As a result of the positioning and the design of the perhaps nozzle-like outlet openings 3, 3', in addition to the central flushing on both sides of the interior wall surfaces of the bowl body 2, two surface flushes can be achieved, which arch up crest-like in the front section of the bowl interior 1, and ensure an effective removal of the matter to be flushed.

Figure 4 illustrates a frame-like wall element 16, at which a conventional flush water tank 15 with a lower flush water outlet 14 can be mounted. At the lower flush water outlet 14, a water distributor 13 is connected with a corresponding number of manifolds 18, 18', at the outlet openings of which – in the illustrated case three – can be stacked onto the rear ends of the guide pipes 6, 6' of inlet piece 10 in a sealing manner. The wall element 16, the flush water tank 15 and the water distributor 13 can be supplied as pre-assembled unit and can easily be installed on site into or onto the pertaining wall of the building.

Figure 5 illustrates the essential parts of the flush water unit in accordance with the invention including the bowl body 2 shortly before installation and Figure 6 after final installation.

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Reference numbers

- 1 Bowl interior
- 2 Bowl body
- 3, 3' Outlet openings
- 4 Bowl edge
- 5, 5' Front ends
- 6, 6' Supply pipes / inlet pipes
- 7, 7' Installation recesses
- 8 Rear wall
- 9, 9' Lateral walls
- 10 Inlet piece
- 11, 11' Sealing sleeves
- 12, 12' Extensions
- 13 Water distributor
- 14 Flush water outlet
- 15 Flush water tank
- 16 Wall element
- 17, 17' Slits
- 18, 18' Manifolds

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Claims

1. Flush water unit for a toilet bowl with several outlet openings (3, 3') ending in the bowl interior (1) of a bowl body (2) through which flush water enters below the upper bowl edge (4) into the bowl interior (1) from the rear of the bowl body (2), **characterized by**, that the outlet openings (3, 3') are designed at the respective front end (5, 5') of separate, preferably essentially straight supply pipes (6, 6') that are insertable from the outside through at least one installation recess (7, 7') in the rear wall (8) of the bowl body (2), which project up to the bowl interior (1)
2. Flush water unit according to Claim 1, **characterized by**, that at least one central supply pipe (6) projects less far into the bowl interior (1) than respectively one of the supply pipes (6') associated with the respective lateral wall (9, 9') of the bowl body (2).
3. Flush water unit according to claim 1 or 2, **characterized by**, that the front ends (5, 5') of the supply pipes (6, 6'), are slit on the bowl bottom side and/or bowl side wall side and/or recessed and/or designed as outlet nozzle.
4. Flush water unit according to one of claims 1 to 3, **characterized by**, that the supply pipes (6, 6') have various horizontal flow cross sections, preferably a central supply pipe (6) has a smaller horizontal flow cross section than the two lateral supply pipes (6').

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5. Flush water unit according to one of the previous claims, **characterized by**, that the supply pipes (6, 6') can be passed through respectively one dedicated installation recess (7, 7') in the rear wall (8) of the bowl body (2) and can be sealed against the interior walling of the installation recess (7, 7').
6. Flush water unit according to one of the preceding claims, **characterized by**, that the supply pipes (6, 6') are stacked together and/or can be stacked together in one or more parts to form a joint inlet piece (10).
7. Flush water unit according to one of the preceding claims, **characterized by**, that the inlet piece (10) is equipped with sealing sleeves (11) for sealing off the supply pipes (6, 6') with respect to the interior walling of the installation recesses (7, 7').
8. Flush water unit according to one of the preceding claims, **characterized by**, that the front ends (5, 5') of the supply pipes (6, 6') are formed at least by separate shorter or longer, preferably exchangeable extensions (12, 12').
9. Flush water unit according to one of the preceding claims, **characterized by**, that at least one of the supply pipes (6, 6') is provided with a flexible section for adapting the supply pipe (6') to the curve of the bowl body (2) and/or the bowl edge (4).
10. Flush water unit according to one of the preceding claims, **characterized by**, that the supply pipes (6, 6') have an associated water distributor (13) that can be connected with a water supply, in particular a flush water tank (15).

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11. Flush water unit according to Claim 10, **characterized by**, that the water distributor (13) has an upstream connection to the connection with a water supply, a branching section that is provided downstream of the connection for dividing the flow of water into several, in particular three partial flows and downstream of the branching section it has, for each of the partial flows, a deflection section for deflecting the partial flows from a vertical direction of flow in the installation position into a horizontal direction of flow.
12. Flush water unit according to one of the previous claims, **characterized by**, that the supply pipes (6, 6') individual, or combined into an inlet piece (10) can respectively be connected to a separate water distributor (13), which forms the connection to at least one flush water outlet (14) of a flush water tank (15) or to a different water supply.
13. Flush water unit according to one of the preceding claims, **characterized by**, that the flush water tank (15) and/or the water distributor (13) can be mounted on a preferably frame-like wall element (16).
14. Flush water unit according to one of the preceding claims, **characterized by**, that the supply pipes (6, 6') and/or the inlet piece (10) and/or the water distributor (13) and/or the flush water tank (15) are made of plastic.
15. Flush water unit according to one of the preceding claims, **characterized by**, that the bowl body (2) is equipped with a water ring insert made of plastic.

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16. Toilet bowl with a flush water unit according to one of claims 1 to 15, with an, in particular designed as a wall-mounted deep-flushing bowl body (2), in the rear wall (8) of which a discharge opening, as well as several, in particular three installation openings (7, 7') are formed, **characterized by**, that in the rear wall (8) of the bowl body (2) additional mounting openings for mounting the bowl body (2) at a wall element (16) or the like are formed, whereby the mounting openings are located in the installation position above the discharge opening and below at least one of the installation openings (7, 7').

17. Toilet bowl, in particular according to Claim 16, with a siphon in the discharge of the bowl body (2), **characterized by**, that the volume of the siphon is reduced to under 2 liters, preferably to approximately 1 liter.