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(54) APPARATUS FOR CLEANING TOILET BOWLS

(57) An apparatus for cleaning toilet bowls (12) comprises a cistern (14) to collect water to rinse the bowl (12), a flushing pipe (16) that connects the cistern (14) and the bowl (12) and a flushing device (18) to determine

the emptying of the water from the cistern (14) of the bowl (12). The apparatus also comprises a receptacle (20) to contain a lubricating product and a device (22) to deliver the lubricating product.

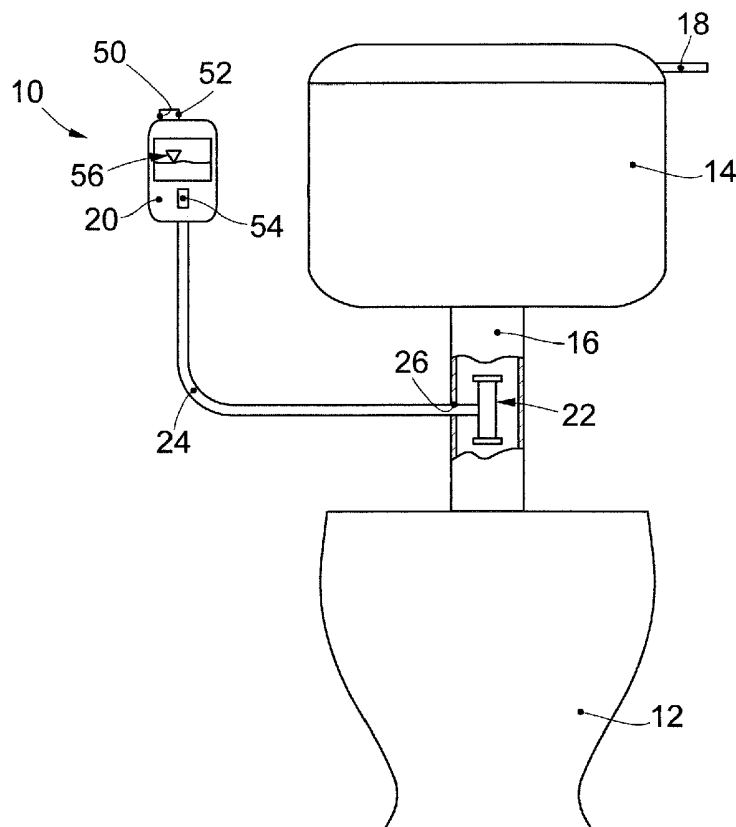


fig. 1

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Description

FIELD OF THE INVENTION

[0001] The present invention concerns an apparatus for cleaning sanitary units, in particular for cleaning toilet bowls. The apparatus can be integrated in association with the cisterns containing the water in already existing apparatuses, or can be made in direct association with new apparatuses.

[0002] The apparatus according to the invention can also be used both in domestic sanitary units and in public sanitary units, or on means of transport such as planes, trains, ships, campers or caravans.

[0003] In particular, the invention concerns toilet bowls for WCs, comprising both the pan-type and also those known as "squat toilets".

BACKGROUND OF THE INVENTION

[0004] Apparatuses for cleaning toilet bowls are known, hereafter also called bowls, both the pan-type and also those known as "squat toilets", comprising a cistern to collect the water, or other means to deliver the water for rinsing, a flushing pipe that connects the cistern or other delivery mean with the toilet bowl, and a flushing device, or flush, to cause the water in the cistern to empty into the toilet bowl, or to deliver water from the delivery mean, and to clean it after use.

[0005] However, the water delivered is not always sufficient to clean the toilet bowl after it has been used and therefore, to guarantee adequate cleaning of the toilet bowls, it may sometimes be necessary to flush the water several times, or to flush for longer, with a high water consumption.

[0006] In the case of public toilets, the toilet bowls are used frequently and by a large number of users, which can cause inadequate cleaning, and require maintenance operations and manual cleaning by an operator, with increased maintenance costs of the toilets.

[0007] Cleaning devices for toilets are known, which provide to use detergent or disinfectant products, for example in the form of capsules that can be attached to the lateral walls of the toilet bowl and come into contact with the rinsing water every time the rinsing water is delivered to sanitize the toilet bowl.

[0008] Substances are also known, based on gel, which can be delivered with suitable distribution devices on the lateral walls of the toilet bowl, with the same function as the capsules.

[0009] One disadvantage of these devices is that the intervention is limited to a small surface, and most of the time it is not a cleaning intervention but only sanitizing. Furthermore, the sanitizing interventions have a limited duration over time and are therefore effective only in toilet bowls in domestic toilets, which are used by few people.

[0010] In the case of public toilets, or on means of transport such as trains, planes or ships, where the toilets

are used frequently and by a large number of people, such cleaning devices or gel substances do not last long enough, and have to be replaced very frequently.

[0011] It is therefore necessary to have available a cleaning apparatus that allows to deliver a substance which is effective even in non-domestic toilets, which affects the whole surface of the toilet bowl and improves the cleanliness and overall hygiene thereof.

[0012] Apparatuses for cleaning sanitary units are also known from documents DE-A-42.19.323, GB-A-643.888 and DE-C-420.682, provided with a delivery device configured to deliver a substance into the water cistern. However, these apparatuses provide to deliver the substance directly into the water contained in the cistern and this can cause an incorrect homogenization of the substance in the water. Indeed, it is known that lubricant and/or detergent substances are difficult to mix homogeneously with water and, most times, they remain in suspension above it. This leads to an ineffective sanitization and cleaning of the toilet bowl.

[0013] At least in the solutions described in DE-A-42.19.323 and GB-A-643.888, it is also a disadvantage that the delivery of the substance takes place while the water cistern is being filled. The water, with the substance in suspension, is distributed in the toilet bowl only when the flush is driven, that is, only after the toilet bowl has been used. Therefore, if the sanitary unit is not used for a prolonged period, this solution can cause both a deterioration in the substance in suspension on the water, and also the possible formation of incrustations in the cistern or in the components contained in it.

[0014] Other embodiments of known sanitary units are described in documents GB-A-2.067.083 and BE-A-555.406, but these have similar disadvantages to those of the known technical solutions described above.

[0015] One purpose of the present invention is to obtain a cleaning apparatus for sanitary units that improves the cleaning and hygiene of sanitary units, of both the domestic and non-domestic type.

[0016] Another purpose of the present invention is to obtain a cleaning apparatus for sanitary units that is automatic and that sanitizes the toilet bowl every time the rinsing water is delivered.

[0017] Another purpose of the present invention is to provide a cleaning apparatus for sanitary units that reduces the effects of the limescale and increases the working life of the toilet bowls.

[0018] Another purpose of the present invention is to obtain a cleaning apparatus that allows to reduce water consumption for cleaning sanitary units.

[0019] Another purpose of the present invention is to obtain a cleaning apparatus for sanitary units that is simple and economical and that allows to reduce maintenance interventions by operators and reduces the use of detergents and cleaning agents.

[0020] Another purpose of the present invention is to obtain a sanitary unit that allows to deliver a lubricant product homogeneously and uniformly into the toilet

bowl.

[0021] Another purpose of the present invention is to obtain a sanitary unit in which the cleaning and sanitization of the lubricant product delivered is preserved over time even if the sanitary unit is not used for a long time.

[0022] The Applicant has devised, tested and embodied the present invention to overcome the shortcomings of the state of the art and to obtain these and other purposes and advantages.

SUMMARY OF THE INVENTION

[0023] The present invention is set forth and characterized in the independent claims, while the dependent claims describe other characteristics of the invention or variants to the main inventive idea.

[0024] In accordance with the above purposes, an apparatus for cleaning toilet bowls comprises a cistern to collect water, or other delivery mean, to rinse the bowl, a hydraulically connected flushing pipe between the cistern and the bowl and a flushing device, or flush, to determine the emptying of the water from the cistern by passage of the water from the latter, through the flushing pipe and into the toilet bowl, to rinse the latter.

[0025] According to one aspect of the present invention, the apparatus also comprises a receptacle to contain a lubricating product and a delivery device to deliver the lubricating product into the toilet bowl.

[0026] According to one aspect of the present invention the delivery device is positioned in the flushing pipe, in an intermediate position between the cistern and the bowl, and comprises an oblong body, sliding in a guide body to assume a reloading condition of said lubricating product, wherein the oblong body is configured to receive from the receptacle a measured quantity of lubricating product, and a delivery condition of the lubricating product in which, when the water passes from the cistern to the bowl, the oblong body delivers the lubricating product into the flushing pipe.

[0027] The delivery device cooperates with the receptacle and/or with the flush, so as deliver a determinate quantity of the lubricating product into the rinsing water of the bowl every time the flush is activated. The delivery device therefore intervenes every time the flush is activated, rendering the delivery automatic and not determined by man.

[0028] The lubricating product can be silicone based and contain one or more of a cleaning agent, a detergent, a deodorant. The action of the lubricating product is to create a slippery coating on the surface of the bowl with which it comes into contact, making any discontinuities uniform. In particular the lubricating product, mixed with water, can close the micro-pores of the ceramic of the bowls and therefore lubricate the surfaces thereof.

[0029] The slippery coating prevents organic waste from adhering to the surfaces of the bowl, thus promoting its discharge.

[0030] Moreover, the action of the lubricating product

allows to reduce the quantity of water for rinsing and allows to obtain the desired cleaning with only one rinse, limiting the consumption and waste of water.

[0031] To increase the saving of water, it can be provided that the cistern of water is positioned at a height higher than that in the state of the art, for example about 50 cm higher. This allows the water to flow more quickly and to therefore exploit this speed to use less water.

[0032] Moreover, the use of the cleaning apparatus, in the case of sanitary units on means of transport, allows to load a smaller quantity of water to rinse the toilet bowls, reducing the overall weight to be transported.

[0033] Furthermore, the automatic delivery of the lubricating product at every rinsing action renders the bowl self-sanitizing, since the more it is used the more lubricating product is deposited on the surfaces, increasing the overall cleaning each time it is used.

[0034] Moreover, the lubricating product also acts on the flushing pipes downstream of the toilet bowl, improving the overall cleaning of the sanitary units. This is particularly advantageous especially in sanitary units in condominiums, hospitals, hotels, prisons, where the flushing pipes are very extensive.

[0035] According to some embodiments, the receptacle of the lubricating product is outside the cistern containing the water and the delivery device is disposed in the flushing pipe which connects the cistern and the bowl, and is connected to the receptacle by means of a connection pipe.

[0036] According to a possible variant, the receptacle is inside the cistern.

[0037] According to a variant, not claimed, the delivery device is inside the cistern and is attached to the bottom or to a wall of the latter.

[0038] According to a possible variant, not claimed, the receptacle is inside the cistern and is positioned in correspondence to the upper part of the cistern. The lubricating product in this case can move down toward the rinsing water through the effect of gravity.

[0039] The receptacle of the lubricating product can also have a stopper for the insertion of the lubricating product and an indicator of the level.

[0040] In a possible solution, the oblong body has a groove on its periphery, configured to be filled with the lubricating product in the reloading condition.

[0041] According to the variant in which the delivery device is inside the flushing pipe between the cistern and the bowl, the action of the flush determines the passage of the water in the flushing pipe, which presses on the delivery device, making the oblong body slide in the guide body until the groove is outside the guide body, and the lubricating product is in contact with the water and mixed with it.

[0042] According to a variant embodiment, not claimed, if the delivery device is in the receptacle inside the cistern, the action of the flush, after the emptying of the cistern, causes the cistern to be filled. In this case a float can be provided which, as a function of the increase

in the quantity of water, determines a pressure on the guide body of the delivery device, pressing it outside the receptacle and taking the lubricating product into contact with the rinsing water.

[0043] In this way, thanks to the turbulence that is generated during the filling of the cistern, the lubricating product mixes with the rinsing water, and is ready for the next action of the flush.

BRIEF DESCRIPTION OF THE DRAWINGS

[0044] These and other characteristics of the present invention will become apparent from the following description of some embodiments, given as a non-restrictive example with reference to the attached drawings wherein:

- fig. 1 is a schematic view of a cleaning apparatus for sanitary units applied to a toilet bowl in accordance with embodiments described here;
- fig. 2 is an enlarged detail of fig. 1 in a first operating condition;
- fig. 3 is an enlarged detail of fig. 1 in a second operating condition;
- fig. 4 is a schematic view of a variant of a cleaning apparatus for sanitary units applied to a toilet bowl in accordance with embodiments described here;
- fig. 5 is an enlarged detail of fig. 4 in a first operating condition;
- fig. 6 is an enlarged detail of fig. 4 in a second operating condition.

[0045] To facilitate comprehension, the same reference numbers have been used, where possible, to identify identical common elements in the drawings. It is understood that elements and characteristics of one embodiment can conveniently be incorporated into other embodiments without further clarifications.

DETAILED DESCRIPTION OF SOME EMBODIMENTS

[0046] We shall now refer in detail to the various embodiments of the present invention, of which one or more examples are shown in the attached drawings. Each example is supplied by way of illustration of the invention and shall not be understood as a limitation thereof. For example, the characteristics shown or described insofar as they are part of one embodiment can be adopted on, or in association with, other embodiments to produce another embodiment. It is understood that the present invention shall include all such modifications and variants.

[0047] According to embodiments described here with reference to figs. 1-5, an apparatus 10 for cleaning toilet bowls 12, whether they are pan-type or are squat toilets, comprises a cistern 14 or other mean to deliver water, a flushing pipe 16 hydraulically connecting the cistern 14 and the bowl 12, and a flushing device 18, generally

called a flush, to empty the cistern 14 and hence cause the water to pass from the cistern 14 to the bowl 12 through the flushing pipe 16.

[0048] Here and hereafter in the description, the term "flushing device" or "flush" means a button, lever, chain or any other mean suitable to empty the cistern 14, or a tap, or other suitable mean, to allow to deliver the water in the flushing pipe 16 to the bowl 12.

[0049] According to possible embodiments, the cistern 14 can be positioned built into the wall, or above the bowl 12 itself.

[0050] According to one aspect of the invention, the apparatus 10 also comprises a receptacle 20 containing a lubricating product. According to possible solutions, the lubricating product can be silicone based and can contain one or more components chosen from detergent, disinfectant or deodorant.

[0051] The lubricating product, when delivered together with the water into the bowl 12, can create a coating on the surface, making uniform any possible discontinuities and making the surface slippery, so as prevent organic residues from adhering to it and hence facilitating the discharge thereof.

[0052] In particular, the lubricating product can fill the micropores of the surfaces of the bowls 12, preventing possible impurities from penetrating into them, preserving over time the hygiene and esthetic appearance of the bowl 12.

[0053] According to a possible solution described using fig. 1, the receptacle 20 can be outside the cistern 14, for example positioned adjacent to it.

[0054] According to a variant, shown by way of example in fig. 4, the receptacle 20 can be positioned inside the cistern 14, attached to it, or made in a single piece with it.

[0055] According to some embodiments, the apparatus 10 also comprises a delivery device 22, 122 which cooperates with the receptacle 20 and with the flush 18 and is configured to deliver a desired quantity of lubricating product automatically every time the flush 18 is activated.

[0056] According to some embodiments, the delivery device 22, 122 can intervene every time the flush 18 is activated, automatically delivering the lubricating product into the rinsing water.

[0057] According to some embodiments, the delivery device 22, 122 can comprise an oblong body 28, with a shape elongated in a longitudinal direction D parallel to the axis of the flushing pipe 16.

[0058] The oblong body 28 can be cylindrical, with a round or oval section, or prismatic, with a regular or irregular polygonal shape.

[0059] According to some embodiments, the oblong body 28 can slide in the longitudinal direction D inside a guide body 30.

[0060] The guide body 30 is provided with at least one guide seating 31, mating in shape and size with at least part of the oblong body 28.

[0061] In particular, it can be provided that the guide seating 31 has a shape and size of its cross section substantially identical to those of the oblong body 28, so as to allow a guided sliding of the oblong body 28 in the guide seating 31.

[0062] By sliding in the guide body 30, the oblong body 28 can assume a condition of reloading the lubricating product, in which it is configured to receive from the receptacle 20 a measured quantity of lubricating product, and a condition of delivering the lubricating product in which, when the water passes from the cistern 14 to the bowl 12, the oblong body 28 delivers the lubricating product into the flushing pipe 16.

[0063] According to a possible embodiment, the oblong body 28 is connected to the receptacle 20 by means of a connection pipe 24.

[0064] The connection pipe 24 can be connected in correspondence with at least one hole or fissure 46 made in the guide body 30 and put in communication with the oblong body 28 to deliver to it the lubricating product.

[0065] According to some embodiments, the guide body 30 can have a hollow 38 that develops in a ring and in correspondence with which the end of the connection pipe 24 is connected.

[0066] The hollow 38 is made in the guide seating 31 and in correspondence with the hole or fissure 46 in which the connection pipe 24 is connected. According to some embodiments, the oblong body 28 has on its periphery groove means 36 which, in the reloading condition, fill with the lubricating product fed by the connection pipe 24.

[0067] According to some embodiments, the groove means can be a groove 36 configured to contain the lubricating product, or can be connected to a pipe which contains the lubricating product.

[0068] According to embodiments described using figs. 1-6, in the reloading condition the groove 36 is inside the guide body 30, while in the delivery condition it is outside the guide body 30 and in contact with the rinsing water.

[0069] In the reloading condition of the delivery device 22, the groove means 36 are positioned in correspondence with the hollow 38, allowing to fill the groove means 36 with the lubricating product to be delivered.

[0070] In the delivery condition, the groove means 36 are positioned outside the guide body 30, that is, outside the guide seating 31 of the latter.

[0071] The guide body 30 and/or the oblong body 28, in this case the oblong body 28, can be provided with packings, positioned in the guide seating 31 at least in the reloading condition, and configured to prevent involuntary losses of lubricating product.

[0072] According to the solution described using fig. 1, the guide body 30 can be attached to, or made in a single body with, the connection pipe 24. According to a variant embodiment, the guide body 30 can be attached directly to the internal surface of the flushing pipe 16.

[0073] According to an embodiment described using figs. 1-3, the delivery device 22 is positioned inside the

flushing pipe 16, in an intermediate position between the cistern 14 and the bowl 12.

[0074] In particular, it can be provided that the guide body 30 is attached to the flushing pipe 16 by connection elements, such as rods positioned transverse to the oblong development of the flushing pipe 16.

[0075] According to the solution shown in figs. 2 and 3, the connection pipe 24 also functions as a connection element to support the guide body 30 inside the flushing pipe 16, for example in the predefined position.

[0076] According to a possible solution, the connection pipe 24 is inserted into a through hole 26 made in the lateral surface of the flushing pipe 16 in an intermediate position between the cistern 14 and the bowl 12. To prevent problems of water loss, packings can be provided to guarantee the watertight seal of the connection pipe 24 through the through hole 26.

[0077] Figs. 2 and 3 are used to show the delivery device 22 in two different operating conditions, in particular a first inactive condition, where the lubricating product is reloaded, and a second condition where the lubricating product is delivered into the rinsing water.

[0078] The oblong body 28 has an upper end 32a facing toward the cistern 14 and a lower end 32b facing toward the bowl 12.

[0079] Elastic means can be associated with the upper end 32a of the oblong body 28 and the guide body 30, in this case an elastic element 34, for example a spring, configured to limit the travel of the oblong body 28 inside the guide body 30 in its passage from the inactive and reloading condition (fig. 2) to the delivery condition (fig. 3) and to return it to the reloading condition.

[0080] According to possible solutions, it can be provided that the elastic means 34 are configured to keep the oblong body 28 normally in the reloading condition. That is, if the oblong body 28 is taken, due to the pressure of the water, to the delivery condition, when the water pressure finishes the elastic means 34 are configured to return the oblong body 28 to the reloading condition.

[0081] According to a possible solution of the present invention, the oblong body 28 is provided with an occlusion element 33 positioned transverse to the longitudinal direction D, bigger than the cross section of the oblong body 28. In particular the occlusion element 33 is configured to partly occlude the flushing pipe 16, but leaving a passage gap 35 between the flushing pipe 16 and the occlusion element 33.

[0082] The pressure of the water exerted on the occlusion element 33 causes the oblong body 28 to pass from the reloading condition to the delivery condition, in this way causing the lubricating product to mix with the water that is made to pass through.

[0083] The occlusion element 33 can be at least partly concave in shape, with its concavity facing toward the water cistern 14 during use. The concave shape not only increases the pressure exerted by the water during its passage through the flushing pipe 16, but also increases the turbulence of the water, facilitating the mixing therein

of the lubricating product.

[0084] According to some embodiments, the lower end 32b of the oblong body 28 can be umbrella-shaped, to define the occlusion element 33, with its concavity facing upward. The lower end 32b also has a much bigger diameter than that of the guide body 30 and therefore supplies an ample collection zone of the water in transit which, collecting therein, thrusts the oblong body 28 downward.

[0085] According to some embodiments, the lower end 32b can be made with a shape such that it generates turbulence in the water which, transiting along the flushing pipe 16, impacts against it, facilitating the mixing of the lubricating product in the water and thus guaranteeing that the lubricating product acts on most of the surface of the bowl 12.

[0086] The lower end 32b can also function as a positioning element, keeping the oblong body 28 inside the guide body 30 in the inactive and reloading condition. The lower end 32b in fact prevents the oblong body 28 from rising excessively inside the guide body 30 when subjected to the elastic force of the elastic element 34.

[0087] However, it is not excluded that in possible variant embodiments the occlusion element 33 can be associated with the upper end 32a of the oblong body 28.

[0088] When the flush 18 is activated, the water from the cistern 14 flows in the flushing pipe 16 and generates a pressure on the lower end 32b, that is, on the occlusion element 33, which is pressed downward. In this way, the groove 36 exits from the guide body 30, releasing the lubricating product contained in it into the rinsing water.

[0089] According to a possible solution of the present invention, the guide body 30 and the oblong body 28 have a cross section size with respect to the longitudinal direction D comprised between 5% and 25%, preferably between 5% and 20% of the cross section of the flushing pipe 16.

[0090] According to another solution, the passage gap 35 has a size comprised between 30% and 70%, preferably between 40% and 60% of the cross section of the flushing pipe 16.

[0091] By cross section of the flushing pipe 16 we mean the usable section for the passage of the water.

[0092] According to possible solutions of the present invention, the delivery device 22 is equipped with positioning means 34, 32b, configured to define the reciprocal positioning of the oblong body 28 with respect to the guide body 30, both in the reloading condition and in the delivery condition.

[0093] The positioning means can comprise the elastic means 34, described above, and the lower end 32b, and possibly also the upper end 32a.

[0094] According to some embodiments, the upper end 32a of the oblong body 28 can have a bigger extension than the guide body 30, so as to function as an end-of-travel element and prevent the oblong body 28 exiting too much from the receptacle 20.

[0095] According to a variant embodiment described

using figs. 4-6, the delivery device 122 is positioned in the receptacle 20, in turn disposed inside the cistern 14.

[0096] The elements present in figs. 5 and 6, which are common to those already described with reference to figs. 3 and 4, will be identified by the same numbers and will not be further specified in detail.

[0097] Figs. 5 and 6 are used to show the delivery device 122 in two different operating conditions, in particular a first inactive condition, where the lubricating product is reloaded, and a second condition where the lubricating product is delivered into the rinsing water.

[0098] According to said variant embodiment, the groove 36 of the oblong body 28 in the reloading condition (fig. 5) is positioned in the receptacle 20 and is filled with the lubricating product contained therein.

[0099] To allow to fill the groove 36, the guide body 30 can have one or more holes 46, or through fissures, which allow the lubricating product to pass from the receptacle 20 to the groove 36.

[0100] In the delivery condition (fig. 6), the oblong body 28 slides in the guide body 30 until the groove 36 is outside the receptacle 20, so as to deliver the lubricating product into the water contained in the cistern 14.

[0101] According to some embodiments, the lubricating product can be mixed with the water in the cistern 14 while the latter is being filled, exploiting the turbulence generated during the accumulation of the water to mix the lubricating product and make it homogeneous and ready for the subsequent activation of the flush 18.

[0102] According to a possible embodiment, the lubricating product can be delivered when a determinate level of water in the cistern 14 is reached.

[0103] According to this embodiment, the apparatus 10 can comprise a float element 40 inside the cistern 14, which remains on the surface of the water in the cistern 14 and moves in direction F depending on the quantity of water present.

[0104] According to some embodiments, the float element 40 can be a ballcock of a known type, usually present in cisterns 14, or can be a distinct float element 40.

[0105] The float element 40 can be connected by a constraint element 42 to the delivery device 122, so as to take it from the inactive and reloading condition to the delivery condition and vice versa.

[0106] According to some embodiments, the constraint element 42 can comprise a first segment 44a attached to the upper end 32a of the delivery device and a second segment 44b attached to the float element 40.

[0107] The first segment 44a and the second segment 44b are pivoted to each other by a pin 46.

[0108] According to possible solutions, the constraint element 42, in particular the second segment 44b, extends from the float element 40 inside the receptacle 20 through a through hole 48. To prevent problems of contamination between the lubricating product to be delivered and the water, packings can be provided to guarantee the watertight seal of the constraint element 42 in

the through hole 48.

[0109] When the water fills the cistern 14, the float element 40 rises and, by means of the constraint element 42, presses on the delivery device 122, so as to deliver a desired quantity of lubricating product into the water.

[0110] When the flush 18 is activated and the water flows from the cistern 14 to the bowl 12, the float element 40 descends, returning the delivery device to the reloading condition.

[0111] According to embodiments described using fig. 1, the receptacle 20 can comprise an aperture 50 through which the lubricating product is inserted. The aperture 50 can be selectively closed by a stopper 52.

[0112] According to other embodiments, the receptacle 20 can comprise an indicator of the liquid level 54. The indicator of the liquid level 54 can provide a fissure of transparent material, through which the quantity of lubricating product in the receptacle 20 can be verified.

[0113] According to a possible variant, an indicator of the liquid level 54 of the optical type can be provided, as an alternative or in addition, for example activated according to data detected by a level sensor 56 located in the receptacle 20.

[0114] It is clear that modifications and/or additions of parts may be made to the apparatus for cleaning sanitary units as described heretofore, without departing from the field and scope of the present invention.

[0115] It is also clear that, although the present invention has been described with reference to some specific examples, a person of skill in the art shall certainly be able to achieve many other equivalent forms of apparatus for cleaning sanitary units, having the characteristics as set forth in the claims and hence all coming within the field of protection defined thereby.

Claims

1. Apparatus for cleaning toilet bowls (12) comprising:

- a cistern (14) to collect water to rinse said toilet bowl (12),
- a flushing pipe (16) that connects said cistern (14) and said toilet bowl (12),
- a flushing device (18) to determine the emptying of the water from said cistern (14) into said toilet bowl (12),
- a receptacle (20) containing a lubricating product and
- a delivery device (22), cooperating with said receptacle (20) and with said flushing device (18) and configured to deliver a desired quantity of said lubricating product into the rinsing water of said bowl (12) every time said flushing device (18) is driven, **characterized in that** said delivery device (22) is positioned in the flushing pipe (16), in an intermediate position between said cistern (14) and said bowl (12), and comprises

an oblong body (28), sliding in a guide body (30) to assume a reloading condition of said lubricating product, wherein said oblong body (28) is configured to receive from said receptacle (20) a measured quantity of said lubricating product, and a delivery condition of the lubricating product wherein, when said water passes from said cistern (14) to said bowl (12), said oblong body (28) delivers said lubricating product into said flushing pipe (16).

2. Apparatus as in claim 1, **characterized in that** said oblong body (28) has an oblong development in a longitudinal direction (D) parallel to the axis of said flushing pipe (16), and is provided with an occlusion element (33) positioned transverse to said longitudinal direction (D), being bigger than the cross section of said oblong body (28) and configured to partly occlude said flushing pipe (16), the pressure of the water exerted on said occlusion element (33) determining the passage of said oblong body (28) from said reloading condition to said delivery condition.
3. Apparatus as in claim 1 or 2, **characterized in that** said oblong body (28) has groove means (36) on its periphery, cooperating with at least one hollow and/or hole (38; 46) disposed in the guide body (30) and connected to said receptacle (20) to receive said lubricating product, in said reloading condition said groove means (36) being located in correspondence with said hollow and/or hole (38; 46) and, in said delivery condition of the lubricating product, said groove means (36) being located outside said guide body (30), and in said flushing pipe (16).
4. Apparatus as in any claim hereinbefore, **characterized in that** said oblong body (28) is connected to said receptacle (20) by means of a connection pipe (24).
5. Apparatus as in claim 4, **characterized in that** said connection pipe (24) is inserted in a through hole (26) made in the lateral surface of said flushing pipe (16) in an intermediate position between the cistern (14) and the bowl (12).
6. Apparatus as in any claim hereinbefore, **characterized in that** said receptacle (20) is outside said cistern (14).
7. Apparatus as in any claim hereinbefore, **characterized in that** said receptacle (20) is inside said cistern (14).
8. Apparatus as in any claim hereinbefore, **characterized in that** said delivery device (22) is equipped with positioning means (34, 32b) configured to define the reciprocal positioning of said oblong body (28)

with respect to said guide body (30), both in said reloading condition and in said delivery condition.

9. Apparatus as in any claim hereinbefore, **characterized in that** said delivery device (22) comprises elastic means (34) configured to maintain said oblong body (28) normally in said reloading condition. 5
10. Method for cleaning toilet bowls (12), comprising: 10
- collecting water in a cistern (14) to rinse said toilet bowl (12);
 - driving a flushing device (18) to determine the emptying of the water from said cistern (14) into said bowl (12) through a flushing pipe (16); 15
 - filling a receptacle (20) with a lubricating product;
 - feeding said lubricating product to a delivery device (22) and
 - delivering a desired quantity of said lubricating product into said rinsing water every time said flushing device (18) is driven, **characterized in that** it provides to position in the flushing pipe (16), in an intermediate position between said cistern (14) and said bowl (12), said delivery device (22) which comprises an oblong body (28), sliding in a guide body (30), and **in that** said oblong body (28) assumes at least a reloading condition of said lubricating product, in which to receive a measured quantity of said lubricating product from said receptacle (20) and, when said water passes from said cistern (14) to said bowl (12), a delivery condition of the lubricating product in which said oblong body (28) delivers said lubricating product into said flushing pipe (16). 20 25 30 35

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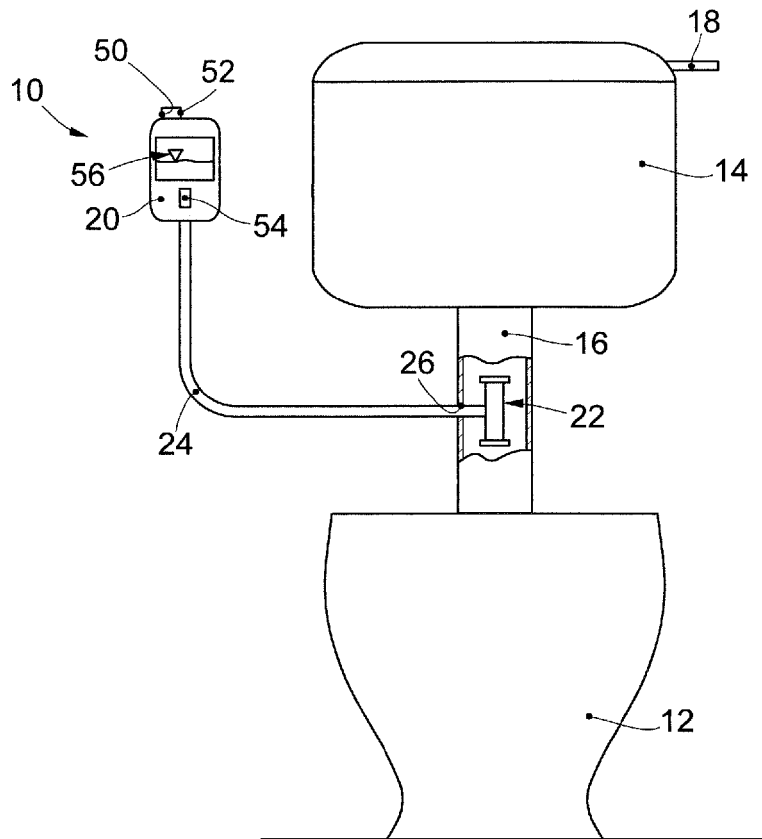


fig. 1

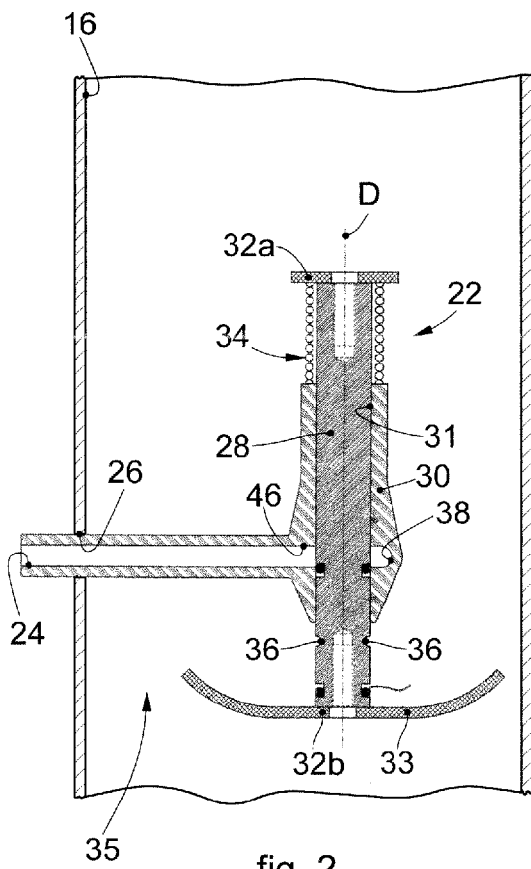


fig. 2

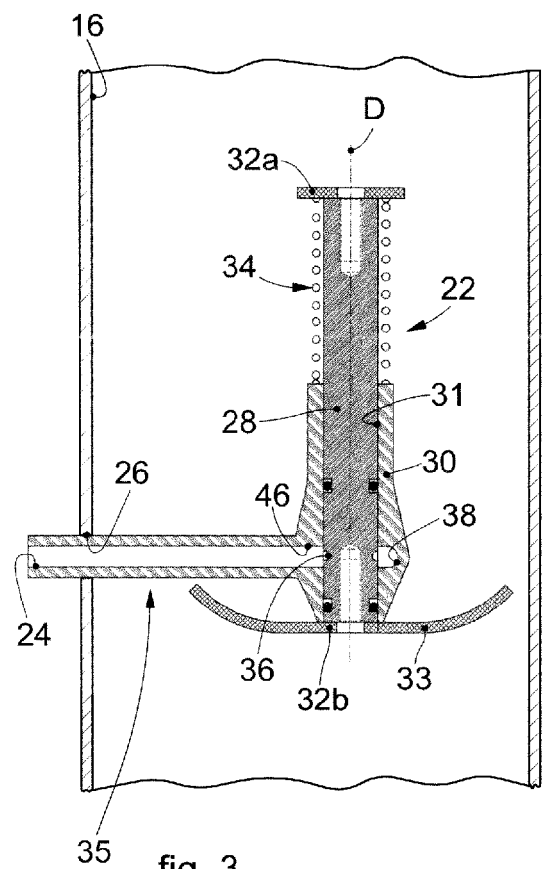


fig. 3

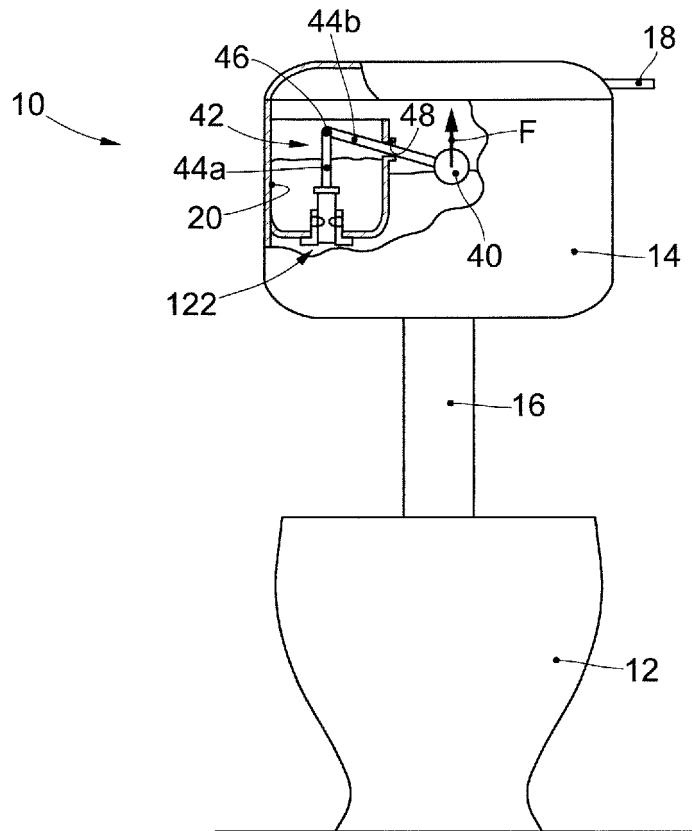


fig. 4

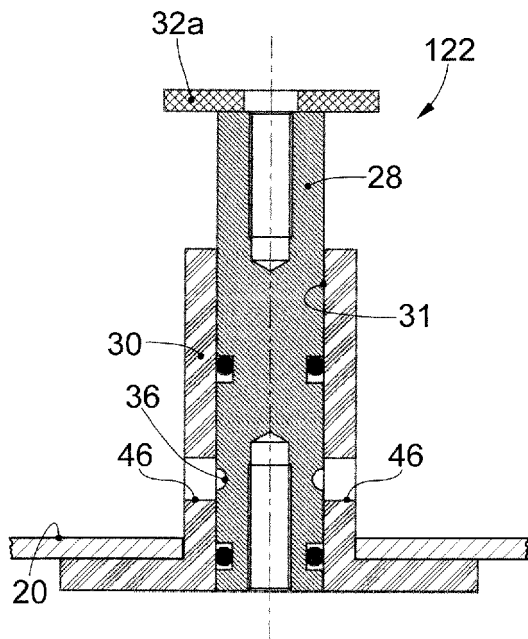


fig. 5

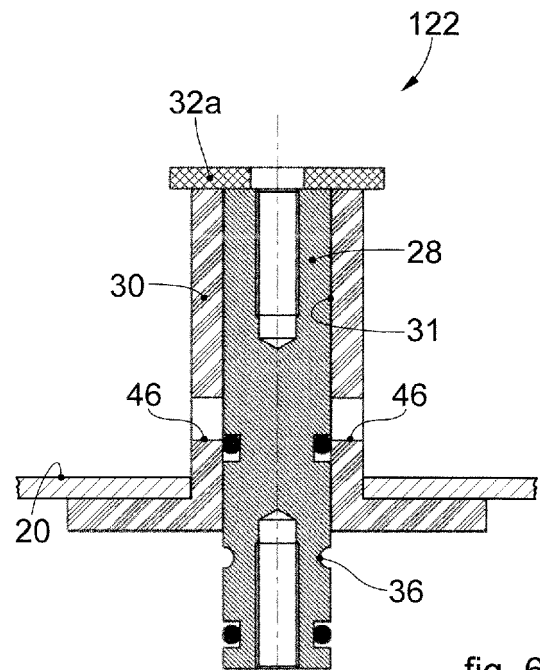


fig. 6



EUROPEAN SEARCH REPORT

 Application Number
 EP 16 19 3591

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DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	GB 150 107 A (JOSHUA AARON LEWIN; GEORGE PILCHER BARTLETT) 2 September 1920 (1920-09-02) * the whole document *	1,10	INV. E03D9/03
A	BE 555 406 A (VERBRAEKEN F) 15 March 1957 (1957-03-15) * figure 1 *	1,10	
A	GB 2 067 083 A (BROWN R G) 22 July 1981 (1981-07-22) * sentences 51-56 *	1	
A	DE 420 682 C (P POUSSIN & CIE SOC; FR SOC) 30 October 1925 (1925-10-30) * the whole document *	1,10	
			TECHNICAL FIELDS SEARCHED (IPC)
			E03D
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 13 March 2017	Examiner Leher, Valentina
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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ON EUROPEAN PATENT APPLICATION NO.**

EP 16 19 3591

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This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
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13-03-2017

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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
GB 150107	A	02-09-1920	NONE
BE 555406	A	15-03-1957	NONE
GB 2067083	A	22-07-1981	NONE
DE 420682	C	30-10-1925	NONE

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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- DE 4219323 A [0012] [0013]
- GB 643888 A [0012] [0013]
- DE 420682 C [0012]
- GB 2067083 A [0014]
- BE 555406 A [0014]