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(54) **Toilet tank and device for aerating and disinfecting a toilet tank and for perfuming a room**

Toilettentank und Vorrichtung zum Belüften und Desinfizieren eines Toilettentanks und zum
Desodorieren eines Raumes

Reservoir de toilette et dispositif pour l'aération et la désinfection d'un réservoir de toilette et pour la
désodorisation d'un espace

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Description

[0001] The object of the invention is a toilet tank and a device for aerating and disinfecting a toilet tank and for perfuming a room. Said device allows elimination of unpleasant odours, perfuming of a room and disinfection of a toilet bowl even from the inner side.

[0002] When a toilet is used, a problem of elimination of unpleasant odours, perfuming of a room and disinfection of a toilet bowl even from the inner side appears. A yet more significant problem appears in toilets with no forced aeration and of course in windy and cold days when open windows can cause draught and higher consumption of heating etc.

[0003] The hitherto known solutions solve the mentioned problem by parts and do not offer an integral solution and a more efficient yield on the basis of synergies of functioning of the entire system. Some solutions are designed in a way to eliminate unpleasant odours from the toilet bowl by direct extraction of air from the bowl and then by conducting the air into the bowl syphon trap and into the ambient. Yet other solutions include various connectors attached to a flush valve and flush pipes as interface elements, the task of which is to inhibit discharge of unpleasant odours into the environment. Further, there are solutions that mask unpleasant odours by spraying air freshener by way of forced pushing of air, i. e. by a fan, into the ambient.

[0004] In US patent No. 5125119 a toilet tank and a device for aerating and disinfecting the toilet tank and for perfuming a room is disclosed, the device comprising a first and a second tube, a chamber with a fan and a charcoal filter. During flushing action the water with a disinfecting agent gets discharged from the first tube into the water and the fan extracts the air and pushes it through the filter. The disinfecting agent is not provided in the first tube and no holder for the float for closing the first tube is provided.

[0005] In US patent No. 2736039 a toilet tank with a detergent dispenser is disclosed (a tube for holding an agent). Said dispenser is closed by a float but the dispenser is for liquid only and it is not intended to allow water to enter the dispenser in order to dissolve the agent.

[0006] The task and goal of the present invention is such functioning of the system that is simple for installation, allows safe operation and simple maintenance without more significant intervention into the system - it is user friendly and simple to use. Stability and regular operation over a longer period of time are also important.

[0007] This is solved in a way that a user, after the system has been installed and is operable, only lifts a cover of the toilet tank and either adds a disinfecting tablet or changes a charcoal filter if needed.

The user has no other contact with the toilet tank and the bowl. The solution is

The invention will be described by way of an embodiment and drawings which show

Figure 1: cross-section of a toilet tank,

Figure 2: detail of ventilation,

Figure 3: detail of a tube in a lower part

[0008] The device of the invention has a first tube 4, into which a disinfecting agent can be inserted from an upper side, lateral openings 12, a mesh 19 in a bottom part that prevents a disinfecting agent from falling out of the tube 4, and a chamber 10 provided with a fan 6 and a charcoal filter 11 is arranged in the upper part of the toilet tank, wherein the fan 6 extracts the air through a second tube 7 and pushes it through the filter 11, lateral openings 12 and an opening 14 into the room.

[0009] The tank 1 is filled with water through a fill valve 2 up to a predefined height. While water is filled, a holder 3 of a float 17 closes the disinfectant tube by means of the float 17, so that approximately 10 ± 5 ml of water remains in the tube 4. The water partially dissolves the disinfecting agent, preferably a tablet, which is inserted into the disinfectant tube 4 by lifting a cover of the tank 5, inserting the disinfecting agent into the disinfectant tube 4 and re-placing the cover 5. When the water is flushed from the tank, the partially dissolved disinfecting agent gets discharged into the water because the proper weight of the float holder 3 opens the tube 4; the float holder 3 sinks and the disinfecting agent gets flushed with the water into the toilet bowl. In this way disinfection of the bowl upon each use even from the inner side is solved.

[0010] The mechanism can function because the tube 4 is provided at its bottom part by a special mesh 19 that prevents the disinfecting agent from falling out of the tube 4 when flushing is actuated. The mesh 19 is conically shaped and must adapt to the shape of the disinfectant valve 18. The openings in the mesh have a size of 5 ± 2 mm. Tilt of a conical side of the mesh 19 is $35 \pm 10^\circ$. The mesh 19 is arranged at a height of 9 ± 1 mm from a sealing edge of the float holder 3. In combination with the closing travel of the float holder 3, which is 25 ± 1 mm, closing is performed in a way that 10 ± 5 ml of water remain in the tube 4 after the filling of water into the tank is completed. Of course other ratios of said values can be set. Two things are crucial: the quantity of water, 10 ± 5 ml, which remains in the disinfecting system after completion of filling of water into the tank, and sealing, which must be sufficient to prevent the disinfecting agent from freely discharging into the water in the tank. Tests have proved that this is the quantity of the water that allows adequate dissolving and duration of the disinfecting agent. The remaining portion of the disinfecting agent that is not submerged in the water emits a pleasant odour intended to perfume the room.

[0011] Another function of the disinfecting agent is releasing a pleasant odour into the area between the lower part of the toilet tank 1 and the cover 5 through lateral openings 12 on the disinfectant tube 4 and through the upper opening 14, where the disinfecting agent is inserted. As the cover is intentionally provided with lateral slots 13, the scent of the disinfecting agent automatically

reaches the room. When a system for eliminating unpleasant smells is turned on, the scent of the disinfecting agent is forced into the room. The process of perfuming the room is herewith accelerated. The size of the slot 12 on the disinfectant tube 4 must be smaller than the height of the charcoal filter and must be arranged in parallel with direction of air flow from the filter. The number of lateral openings must be at least 2, it can be higher. The air flow that flows from the charcoal filter towards an exit, i.e. lateral slots 13, from the toilet tank is important. The air passage must be within a plane of $180 \pm 30^\circ$. A vertical passage of the air through the cover, i.e. the upper opening 14, of the toilet tank depends on the mode of installation. The opening 14 can also be closed.

[0012] The device for extracting unpleasant odours from the toilet tank through the tube 7, disinfecting the toilet tank and perfuming the room is based on an embodiment of the housing / chamber 10 of the device as a whole unit. The chamber 10 must be sealed and arranged into the toilet tank in a way which enables the sealing and a closed area between the fan 6 and the charcoal filter 11. A slot 15 for insertion of the charcoal filter 11 has a transitional tolerance area of adjustment depending on the dimensions of the charcoal filter 11 and can be adjusted to a toilet tank type. The filter 11 must be replaceable and exhibit the sealing function.

[0013] Direction of the air originating from the toilet bowl through the fan 6 is defined by the shape of the chamber 10 and the shape of the filter 11 and the fan 6. The chamber 10 can be semicircular; in this case the charcoal/carbon filter 11 can be arranged perpendicularly to the fan 6. The air forced through the fan 6 is guided over the entire input surface of the carbon filter 11. At a later stage, this air pushes the fragrance of the disinfecting agent through in parallel arranged openings on the disinfectant tube 4 into the room through slots 13 and upper opening 14.

[0014] Another applicable variant is a horizontal arrangement of the charcoal filter 11 above the fan 6. In this case, the chamber 10 is curved in a semi-circular way on the carbon filter 11, such that the air is directed through the lateral openings 12 on the disinfectant tube 4.

Claims

1. A toilet tank and a device for aerating and disinfecting a toilet tank and for perfuming a room, wherein the interior of the toilet tank is accessible from the outside, the device comprising a first tube (4), a second tube (7), a float (17) with a holder (3), a chamber (10) with a fan (6) and a charcoal filter (11), wherein the first tube (4) has an upper side for insertion of a disinfecting agent, lateral openings (12) and a mesh (19) on a bottom part for preventing the disinfecting agent from falling out of the first tube (4), wherein the holder (3) in use closes the first tube (4) by means of the float (17) in such a way that 10 ± 5 ml of water

remains in the first tube (4), wherein, in use, during flushing action, the water with the disinfecting agent gets discharged from the first tube (4) into the water because the own weight of the float holder (3) and of the float (17) opens the tube (4), and wherein an upper part of the tank is provided with the chamber (10), wherein the fan (6), in use, extracts the air along a the second tube (7) and pushes it through the filter (11), the lateral openings (12) and the upper opening (14) into the room.

2. Toilet tank and the device according to claim 1 **characterized in that** the chamber (10) is sealed and the area between the fan (6) and the charcoal filter (11) is closed.

Patentansprüche

1. Toilettenspülkasten und Vorrichtung zum Belüften und Desinfizieren eines Toilettenspülkastens und zur Beduftung eines Raumes, wobei das Innere des Toilettenspülkastens von außen zugänglich ist, wobei die Vorrichtung ein erstes Rohr (4), ein zweites Rohr (7), einen Schwimmer (17) mit einem Halter (3), eine Kammer (10) mit einem Lüfter (6) und einen Aktivkohlefilter (11) umfasst, wobei das erste Rohr (4) eine Oberseite zum Einleiten eines Desinfektionsmittels, seitliche Öffnungen (12) und ein Netz (19) an einem Unterteil umfasst, das das Herausfallen des Desinfektionsmittels aus dem ersten Rohr (4) verhindert, wobei der Halter (3) in Gebrauch das erste Rohr (4) mittels des Schwimmers (17) derart verschließt, dass in dem ersten Rohr (4) 10 ± 5 ml Wasser verbleiben, wobei während des Spülvorgangs das Wasser mit dem Desinfektionsmittel aus dem ersten Rohr (4) in das Wasser abgeleitet wird, da sich durch das Eigengewicht des Schwimmerhalters (3) und des Schwimmers (17) das Rohr (4) öffnet, und wobei ein oberer Teil des Tanks mit der Kammer (10) versehen ist, wobei der Lüfter (6) in Gebrauch die Luft entlang des zweiten Rohres (7) absaugt und sie durch den Filter (11), die seitlichen Öffnungen (12) und die obere Öffnung (14) in den Raum presst.
2. Toilettenspülkasten und Vorrichtung nach Anspruch 1, **dadurch gekennzeichnet, dass** die Kammer (10) abgedichtet ist und der Bereich zwischen dem Lüfter (6) und dem Aktivkohlefilter (11) geschlossen ist.

Revendications

1. Réservoir de chasse d'eau de toilettes et dispositif d'aération et de désinfection d'un réservoir de chasse d'eau de toilettes et de parfumage d'une pièce,

l'intérieur du réservoir de chasse d'eau de toilettes étant accessible depuis l'extérieur, le dispositif comprenant un premier tube (4), un deuxième tube (7), un flotteur (17) avec un support (3), une chambre (10) avec un ventilateur (6) et un filtre à charbon actif (11), le premier tube (4) ayant un côté supérieur prévu pour l'insertion d'un agent désinfectant, des ouvertures latérales (12) et une maille (19) sur une partie inférieure pour empêcher l'agent désinfectant de tomber du premier tube (4), le support (3), lors de l'utilisation, fermant le premier tube (4) au moyen du flotteur (17) de telle sorte que 10 ± 5 ml d'eau restent dans le premier tube (4), tandis que lors de l'utilisation, pendant le fonctionnement de la chasse d'eau, l'eau avec de l'agent désinfectant est évacuée du premier tube (4) dans l'eau étant donné que le propre poids du support du flotteur (3) et du flotteur (17) ouvre le tube (4), et une partie supérieure du réservoir étant dotée de la chambre (10), le ventilateur (6), lors de l'utilisation, extrayant l'air le long du deuxième tube (7) et le poussant à travers le filtre (11), les ouvertures latérales (12) et l'ouverture supérieure (14) dans la pièce.

2. Réservoir de chasse d'eau de toilettes et dispositif selon la revendication 1 **caractérisé en ce que** la chambre (10) est fermée hermétiquement et la zone entre le ventilateur (6) et le filtre à charbon actif (11) est fermée.

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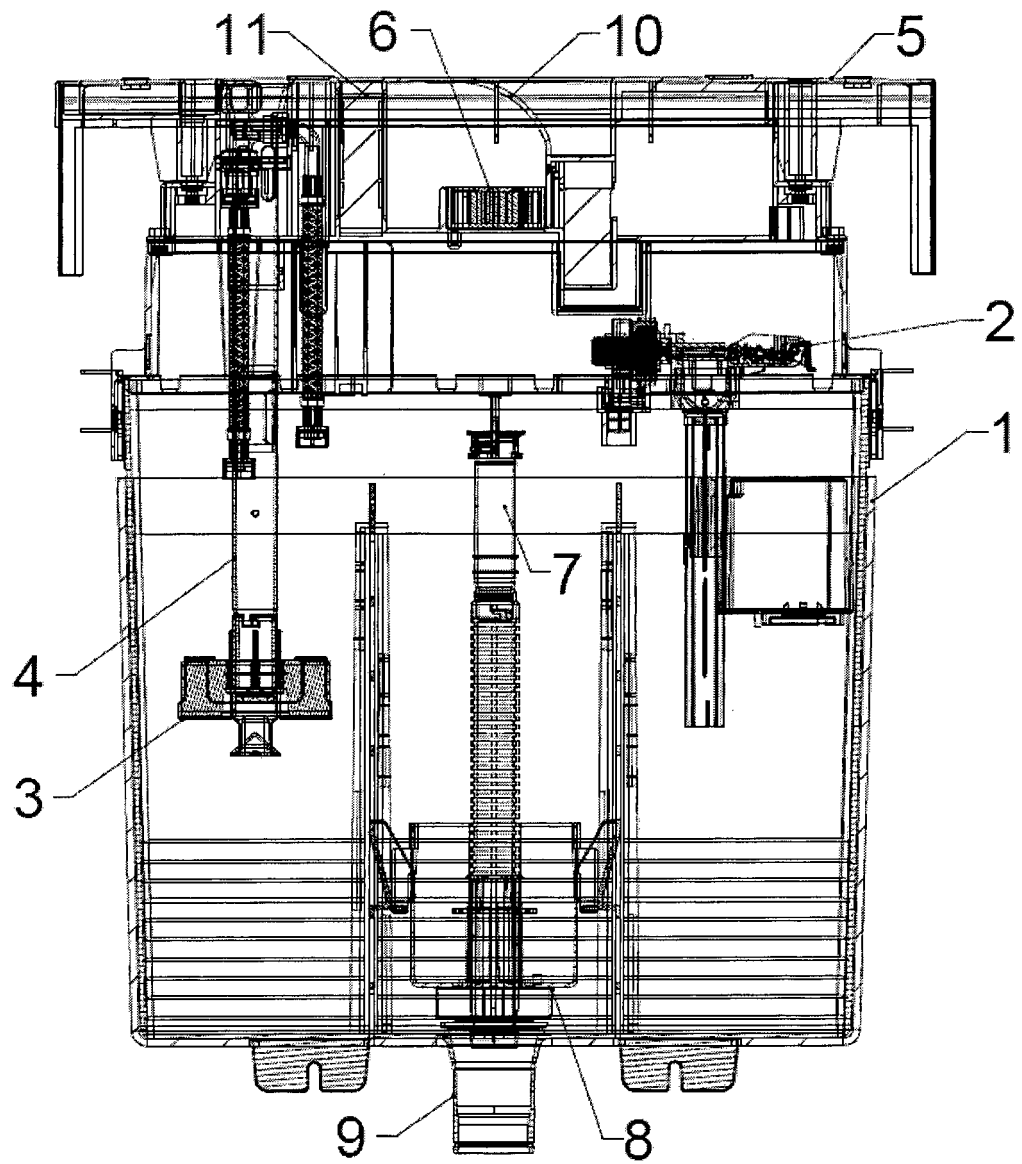


Fig. 1

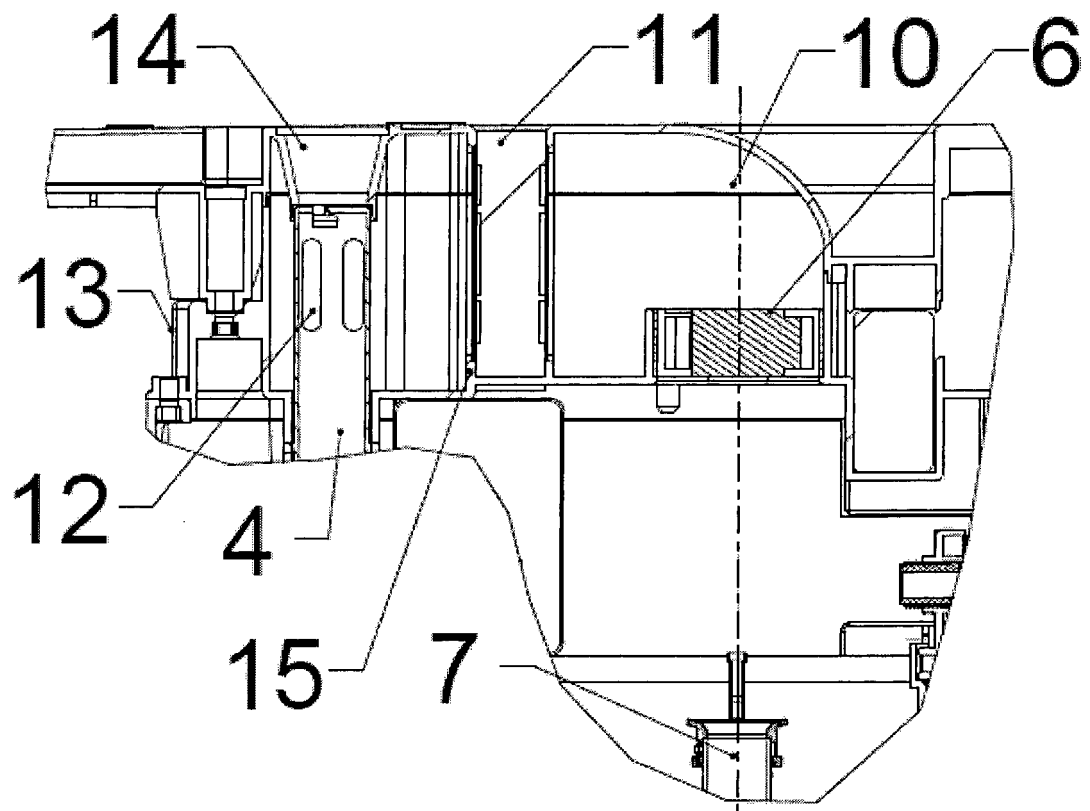


Fig. 2

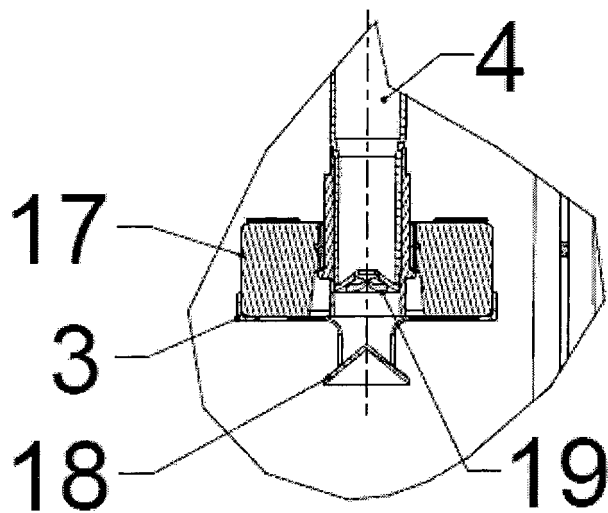


Fig. 3

REFERENCES CITED IN THE DESCRIPTION

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