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Amy C. Almon

METHOD AND DEVICE FOR
DISINFECTING A TOILET BOWL

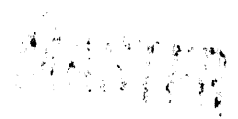
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METHOD AND DEVICE FOR DISINFECTING A TOILET BOWL

Inventors: Amy C. Almon
410 Waverly Drive
Augusta, Georgia 30909

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METHOD AND DEVICE FOR DISINFECTING A TOILET BOWL

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BACKGROUND OF THE INVENTION

1. Field of the Invention:

The present invention relates to methods and devices for disinfecting the bowl of a flush toilet. The United States Government
10 has rights in this invention pursuant to Contract No. DE-AC09-89SR18035 between the U.S. Department of Energy and Westinghouse Savannah River Company.

2. Discussion of Background:

Use of a flush toilet inevitably leads to the build up of bacteria
15 in the bowl. Periodic scrubbing of the bowl in combination with an antiseptic and antibacterial cleaner is a part of normal housekeeping. Cleaning agents are commercially available for installation in a toilet tank to reduce the rate of bacterial buildup between manual cleanings. These cleaning agents are usually installed in the tank and introduce
20 chlorine bleach directly into the bowl with each flushing. However, these chemicals are harsh. Furthermore, the cleaning agent must be replaced every ninety days or so and is relatively expensive.

Hydrogen peroxide is a well-known disinfectant. Furthermore, it is known that hydrogen peroxide can be generated by applying a
25 small voltage across two electrodes in water. See US 2,022,650 issued

to Dawsey in 1935 for a description of the use of peroxide so generated for sterilizing drinking water.

Also, measuring the change in the conductivity of the liquid in a toilet bowl to initiate a flushing automatically is described in Stiebel, Jr.'s patent, US 584,131, issued in 1897.

SUMMARY OF THE INVENTION

According to its major aspects, the present invention is a flush toilet, or a device for use with a flush toilet, and a method for disinfecting the bowl of a flush toilet. An electrocell is mounted in the tank of the toilet, with two wire mesh electrodes immersed in the water of the tank and a battery applying approximately one to two volts of electric potential to the electrodes. The battery is preferably carried in a water-proof case attached to the tank wall. The electrocell reduces a portion of the water in the tank to hydrogen peroxide, an antiseptic. Then, when the tank is flushed, the peroxide in it kills bacteria in the bowl.

The electrocell mounted in the tank is an important feature of the present invention. In the tank, the electrocell is not in view, does not interfere with the flushing action and is not in a position to trap bacteria itself in the wire mesh.

The use of hydrogen peroxide as an antiseptic is another feature of the present invention. Hydrogen peroxide is not

likely to harm the toilet tank or bowl and is not hazardous in the concentrations generated in the present invention.

The use of a small battery, such as a 1.5 volt battery, is another feature of the present invention. Use of a battery
5 eliminates an electrical cord and transformer from an AC source. Also, batteries of this voltage are readily available.

The use of metal mesh electrodes, preferably stainless steel mesh electrodes, is another feature of the present invention. Mesh provides a large surface area and steel mesh is
10 inexpensive.

These and other features of the present invention will be readily apparent to those skilled in the art of flush toilet disinfection from a careful reading of the detailed description herein accompanied by the following drawings.

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BRIEF DESCRIPTION OF THE DRAWINGS

In the drawings,

Fig. 1 is a side, cross-sectional view of a flush toilet according
20 to a preferred embodiment of the present invention; and

Fig. 2 is a front, cross-sectional view of the tank of a flush toilet according to a preferred embodiment of the present invention.

DETAILED DESCRIPTION OF A PREFERRED EMBODIMENT

Referring now to Figs. 1 and 2, the present invention is a device for use with a flush toilet that will kill bacteria in the bowl of the toilet with each flush. There is illustrated in Fig. 1 a side, cross-sectional view of a typical flush toilet 10, having a bowl 12 and a tank 14. Bowl 12 has an inlet 20, an outlet 22 and an opening 24 for receipt of wastes such as urine and feces. Tank 14 has an inlet 26 and an outlet 28 and is dimensioned to hold a quantity of water sufficient for flushing bowl 12. Inlet 26 receives make-up water following a flushing and water leaves tank 14 through outlet 28 and enters inlet 20 of bowl 12 where it is dispersed from the top of bowl 12 down its inside surface to outlet 22 and thence to a sewer or septic tank (not shown).

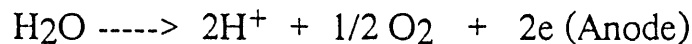
Flushing is usually manually initiated by pressing a lever 30 on tank 14 that opens a valve 32 that normally seals outlet 28. When tank 14 is emptied, valve 32 closes and tank 14 refloods with make-up water.

Carried by the wall of tank 14 is a case 34 containing an electrical battery 36 capable of producing at least one volt and preferably between one and two volts, such as a 1.5 volt battery, as are commercially available. Case 34 is preferably waterproof and is suspended from the rim of tank by a support 38 so that it remains above the water line. Two wires 40, 42 connect the terminals of battery 36 to a pair of spaced apart electrodes 44, 46 immersed in the water. Electrodes 44, 46 are preferably made of a metal mesh for

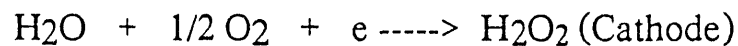
large surface area per unit weight and most preferably made of steel mesh for low cost.

In the presence of the voltage applied by battery 36 to electrodes 44, 46, a portion of the water molecules in tank 14 are chemically
5 reduced to hydrogen peroxide. When tank 14 is flushed, hydrogen peroxide leaves tank 14 and enters bowl 12.

The reactions that takes place are:



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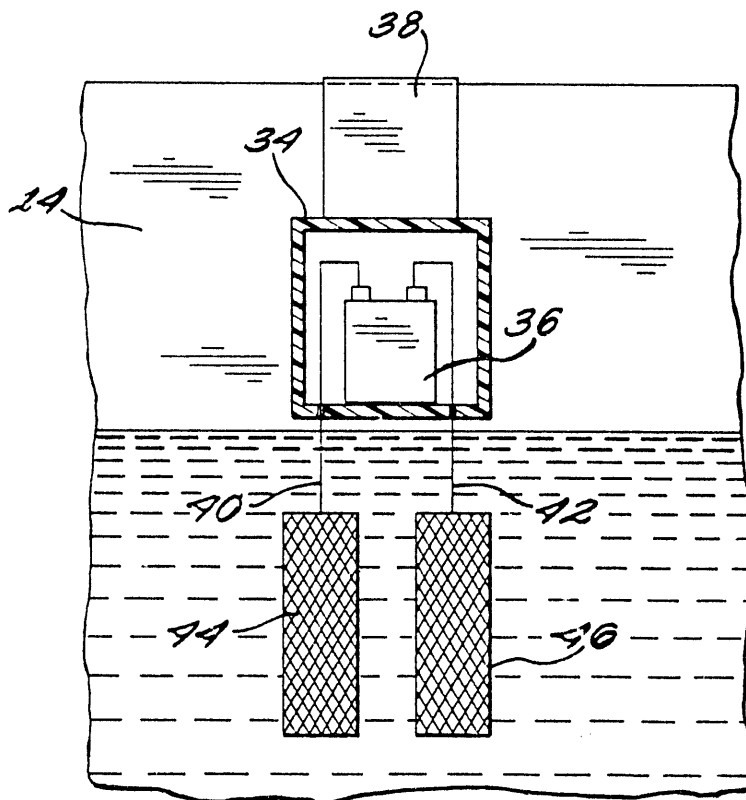
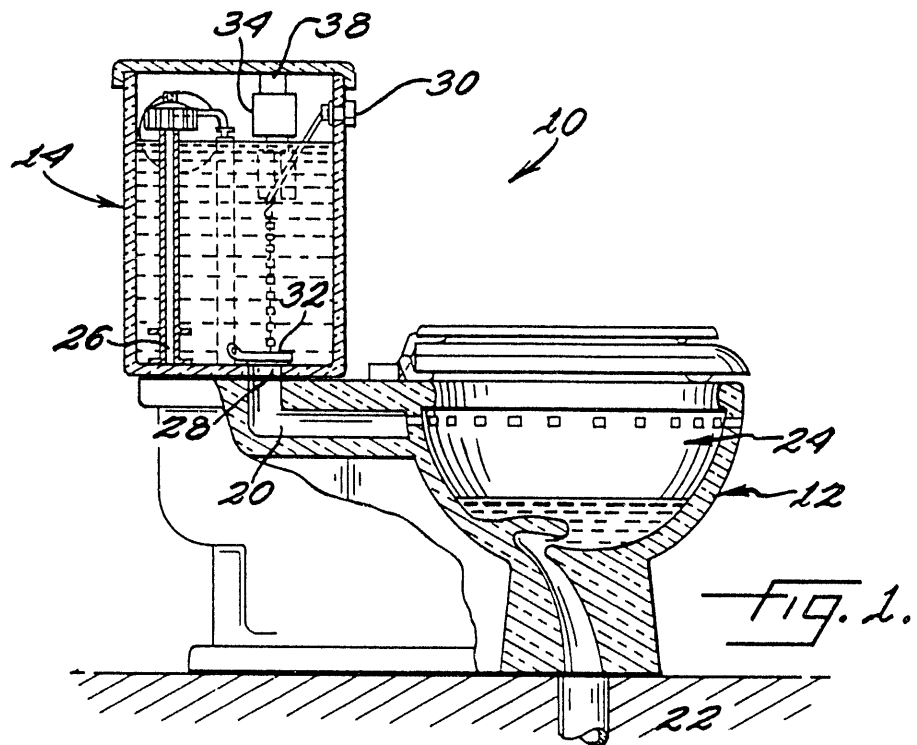
Since the peroxide is generated from the water in the tank itself, no additional chemicals are required.

15 In use, case 34 is suspended from tank 14 by support 38 so that electrodes 44, 46 are immersed in the water and, preferably case 38 is above it. Battery 36 is placed in case 38 and connected electrically to wires 40, 42. Then, toilet 10 is periodically flushed to send the hydrogen peroxide generated by the applied voltage to the inside
20 surface of bowl 12.

It will be apparent to those skilled in the art that many changes and substitutions can be made to the preferred embodiment herein described without departing from the spirit and scope of the present invention as defined by the appended claims.

ABSTRACT OF THE DISCLOSURE

Method and device for disinfecting a flush toilet. The device is an electrocell mounted in the tank of the toilet, with
5 two wire mesh electrodes immersed in the water in the tank and
a battery applying approximately one to two volts of electric
potential to the electrodes so that they chemically reduce a
portion of the water in the tank to hydrogen peroxide. Then,
when the tank is flushed, the peroxide is carried into the bowl
10 where it can kill bacteria.



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