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(71) **Applicant** *(for all designated States except US)*: **PAULEE CLEANTEC LTD.** [IL/IL]; c/o Hibel-Waldman-Dahan Law Office, 3 Hayetzira Street, 52521 Ramat Gan (IL).

(71) **Applicant** *(for SY only)*: **KLEIN, David** [US/IL]; 18 Menuha VeNahala Street, 76209 Rehovot (IL).

(72) **Inventors; and**

(75) **Inventors/Applicants** *(for US only)*: **SHOSEYOV, Oded** [IL/IL]; 50 Margalit Street, 60850 Shoham (IL). **HALPERIN, Oded** [IL/IL]; 8 Hamaalot Street, 53258 Givatayim (IL).

(74) **Agent**: **KLEIN, David**; 18 Menuha VeNahala Street, 76209 Rehovot (IL).

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[Continued on next page]

(54) **Title**: TOILET APPARATUS AND METHOD FOR DISPOSING AND STERILIZING WASTE

(57) **Abstract**: Toilet apparatus for disposing waste including a compartment containing an oxidizing agent that contacts waste and causes an exothermic reaction that results in water evaporation, sterilization, and bad odor elimination.

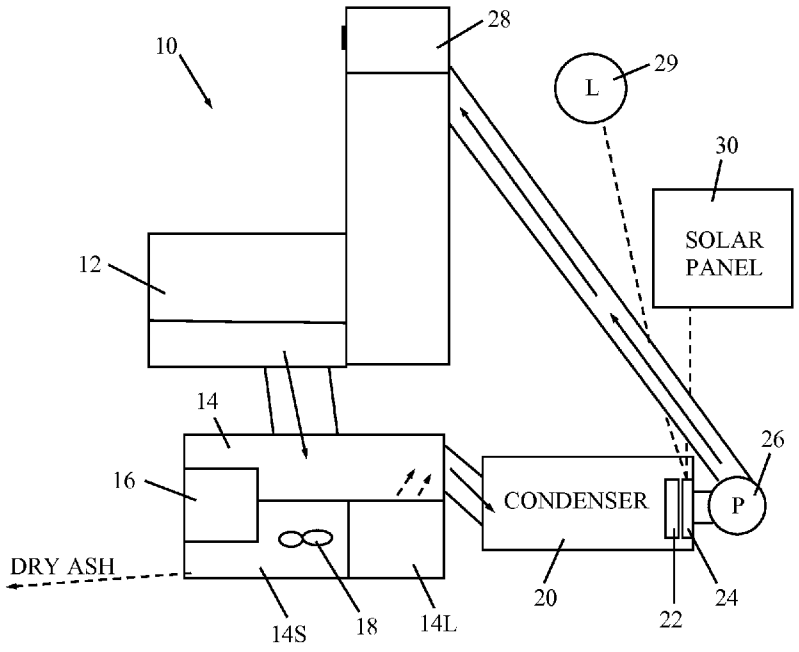


FIG. 1

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TOILET APPARATUS AND METHOD FOR DISPOSING AND STERILIZING WASTE

FIELD OF THE INVENTION

The present invention relates generally to a toilet apparatus for disposing of human waste and the like and more particularly to an improved apparatus and method by which human waste may be disposed without contaminating the soil and using minimal amount of water to sterilize the toilet apparatus.

BACKGROUND OF THE INVENTION

Incinerator toilets (http://www.storburn.ca/specs.html or http://www.incinolet.com/aboutus_2.htm) have been developed which sterilize organic waste, but typically end up with solids and liquids that require disposal in a central waste treatment system. US Patent 6455751 describes a gel composition containing oxidizing agents and thickening or gelling agents, which are used to detoxify chemical and biological agents by application directly to a contaminated area. The gelling agent is a colloidal material, such as silica, alumina, or alumino-silicate clays, which forms a viscous gel that does not flow when applied to tilted or contoured surfaces. Aqueous or organic solutions of oxidizing agents can be readily gelled with less than about 30% colloidal material. Gel preparation is simple and suitable for field implementation, as the gels can be prepared at the site of decontamination and applied quickly and uniformly over an area by a sprayer. After decontamination, the residue can be washed away or vacuumed up for disposal.

Volatile organic compounds are removed from contaminated soil by introducing one or both a water soluble peroxygen compound, such as a persulfate, and a permanganate into the soil, either in situ or ex situ, in amounts and under conditions wherein both the soil oxidant demand is satisfied and volatile organic compounds in the soil are oxidized (US Patent 6019548).

The following is believed to be representative of the prior art for disposal of organic waste: US Patents 955,908; 3,370,787; 3,986,744; 4,205,869; 4,272,116; 4,440,410; 4,875,729; 4,896,912; 5,134,974; 5,156,427; 5,394,833; 5,400,572; 5,511,682; 5,713,616; 6,227,149; 6,505,578.

SUMMARY OF THE INVENTION

The present invention seeks to provide improved toilet apparatus and methods for disposing human waste by means of oxidation, as described more in detail herein below.

BRIEF DESCRIPTION OF THE DRAWINGS

The present invention will be understood and appreciated more fully from the following detailed description, taken in conjunction with the drawings in which:

Fig. 1 is a block diagram illustration of toilet apparatus, constructed and operative in accordance with a non-limiting embodiment of the present invention.

DESCRIPTION OF EMBODIMENTS OF THE INVENTION

Reference is now made to Fig. 1, which illustrates toilet apparatus 10, constructed and operative in accordance with a non-limiting embodiment of the present invention.

Toilet apparatus 10 includes a toilet bowl 12, from which solid and liquid waste is conveyed to a waste compartment 14. The toilet apparatus may have separate solid 14S and liquid 14L (e.g., urine) receiving compartments.

An oxidizer is added to the solid waste from an oxidizing dispenser 16. A mixer 18 may be provided for mixing the oxidizer and the waste. Oxidation of organic matter can be accomplished by contacting a strong oxidizing agent, such as but not limited to, potassium permanganate. The exothermic reaction results in water evaporation, sterilization, bad odor elimination which is typically a result of reduced sulfur-containing compounds and even burning. The solid waste is oxidized into dry ash.

Any water evaporated during the reaction is collected by a condenser 20. Condenser 20 may include a thermoelectric device 22 (e.g., thermoelectric electrodes) that uses the Peltier effect and the temperature difference between warm and cold portions of the condenser to generate electricity to charge a battery 24 to operate a pump 26 or any other electrical device, such as but not limited to, a light 29 in the toilet stall. Pump 26 may direct the condensed water collected by condenser 20 to a water reservoir 28 for re-use in the toilet bowl 12. In addition, one or more solar panels 30 may be installed to assist in electric operation and sustainability of the toilet apparatus.

The dry ash is disposed on site or collected by a separate container. The urine is mixed with the oxidizer and then transferred to water reservoir 28, either together with the condensate or separately. The water in reservoir 28, which includes an effective amount of oxidizer, is utilized to wash and sterilize the waste collecting compartment 14 of toilet apparatus 10. The waste is separated again to solid and liquid receiving compartments and the cycle starts all over again.

Thus the present invention has several advantages. The water used in the system is recycled. The water in the solid waste is recovered and the water in the urine is sterilized and recovered. The toilet apparatus is sterile and free of bad odors. The solid ash, which may be collected in a removable canister, is in small amounts, sterile, and may be disposed on site.

In the present invention, toilet paper and the like can be used and thrown into the lavatory. The process of the invention will mix the solid waste (feces and paper) with the oxidizer in the same container, turning the solid waste into ash. There is no need for any sewerage or electricity infrastructures or connections. The oxidizer can be replenished in dispenser 16 perhaps once a month at a very low cost.

CLAIMS

1. Toilet apparatus (10) comprising:

a toilet bowl (12); and

a waste compartment (14) to which waste is conveyed from said toilet bowl (12;

characterised by an oxidizing dispenser (16) that dispenses an oxidizer to waste in said waste compartment (14), said oxidizer reacting with the waste to form an exothermic reaction that results in water evaporation, and a condenser (20) that collects water evaporated during the exothermic reaction.

2. The toilet apparatus (10) according to claim 1, further comprising a mixer (18) for mixing the oxidizer and the waste.

3. The toilet apparatus (10) according to claim 1, wherein said waste compartment (14) comprises separate solid and liquid compartments (14S, 14L).

4. The toilet apparatus (10) according to claim 1, further comprising a pump (26) that directs condensed water collected by said condenser (20) to a water reservoir (28) for re-use in said toilet bowl (12).

5. The toilet apparatus (10) according to claim 1, wherein said condenser (20) comprises a thermoelectric device (22) that uses a temperature difference between warm and cold portions of said condenser (20) to generate electricity.

6. The toilet apparatus (10) according to claim 5, wherein said thermoelectric device (22) charges a battery (24) to operate a pump (26) or a light (29).

7. The toilet apparatus (10) according to claim 1, further comprising one or more solar panels (30) to assist in electric operation of the toilet apparatus.

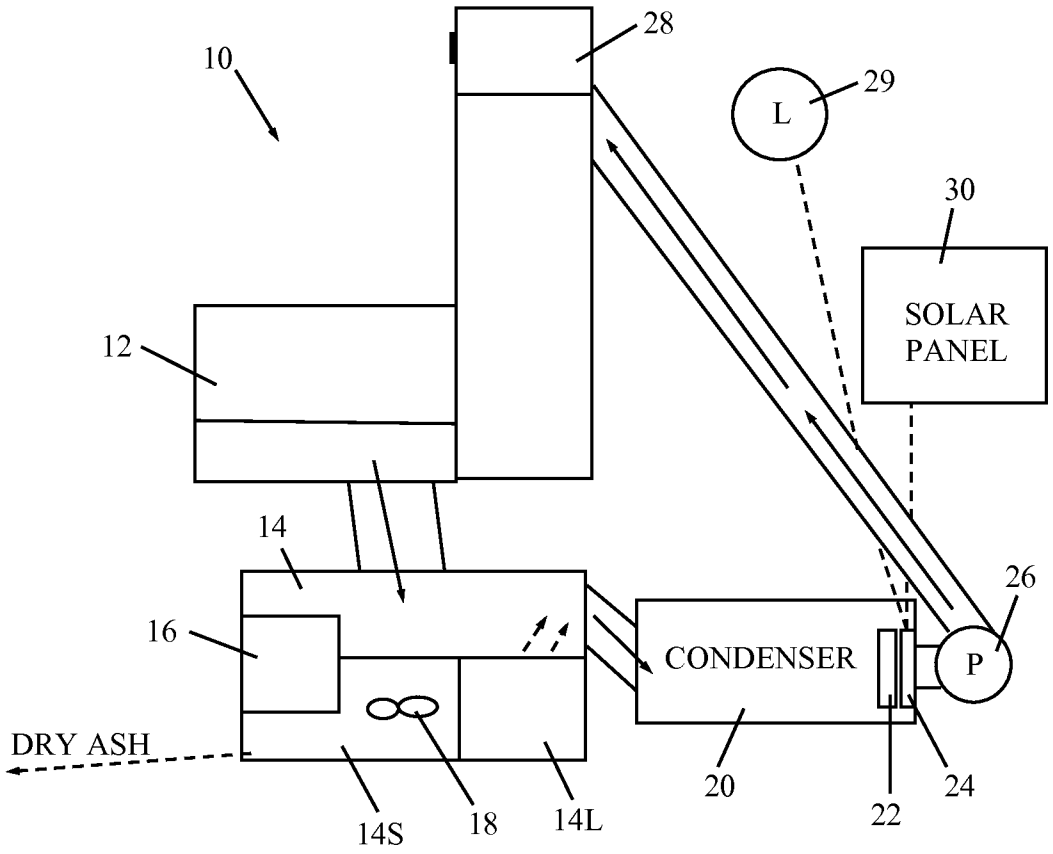

10
28
29
L
30
SOLAR
PANEL
12
14
26
16
CONDENSER
P
DRY ASH
20
22
24
14S
18
14L

FIG. 1