

Feb. 16, 1965

E. B. BLANKENSHIP
INCINERATOR TOILET

3,169,497

Filed Dec. 26, 1961

2 Sheets-Sheet 1

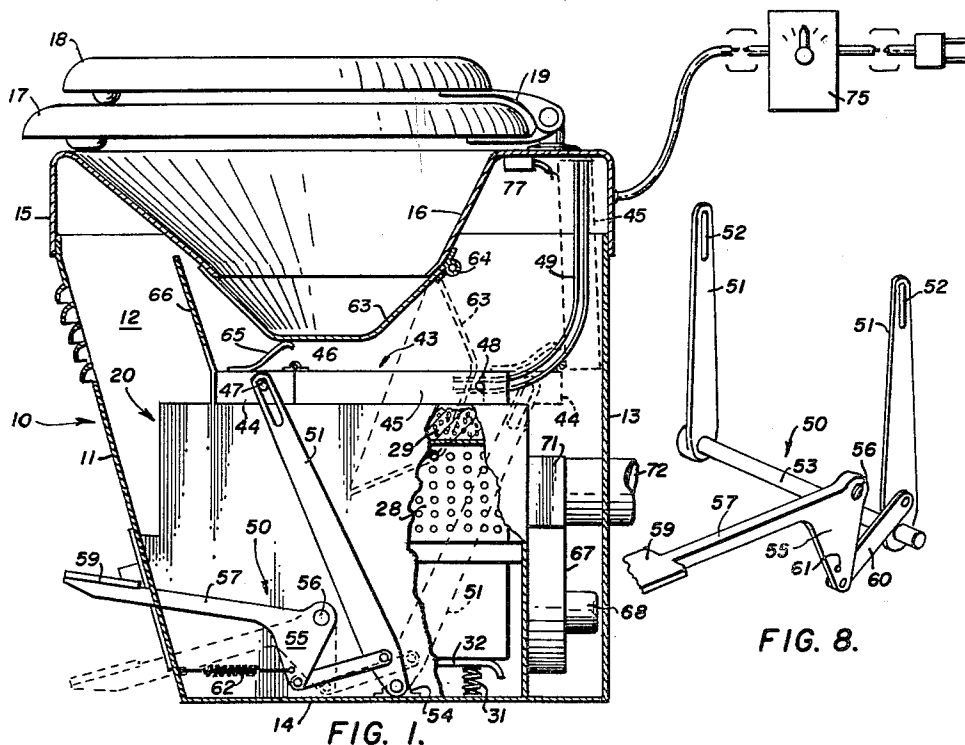


FIG. 1.

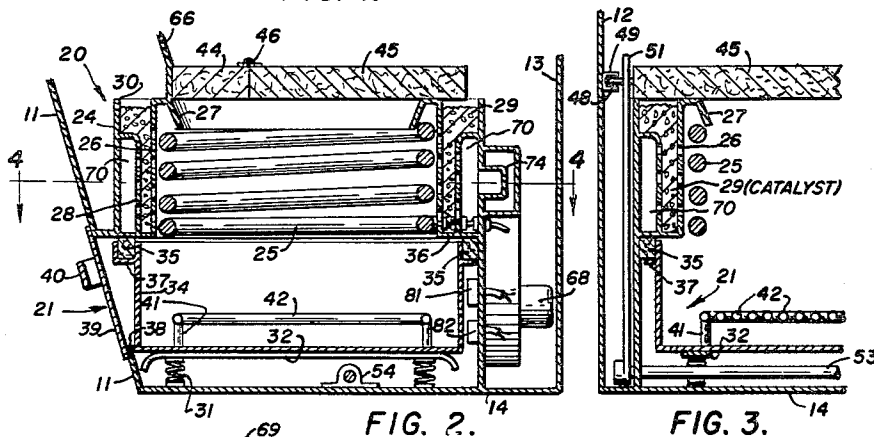


FIG. 2.

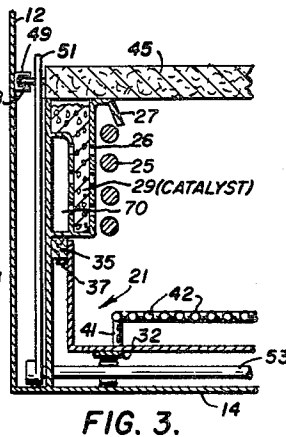


FIG. 3.

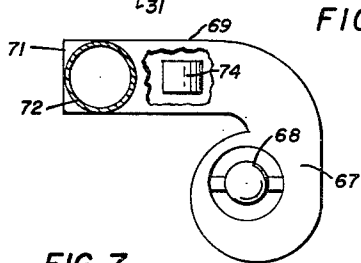


FIG. 7.

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2 Sheets-Sheet 2

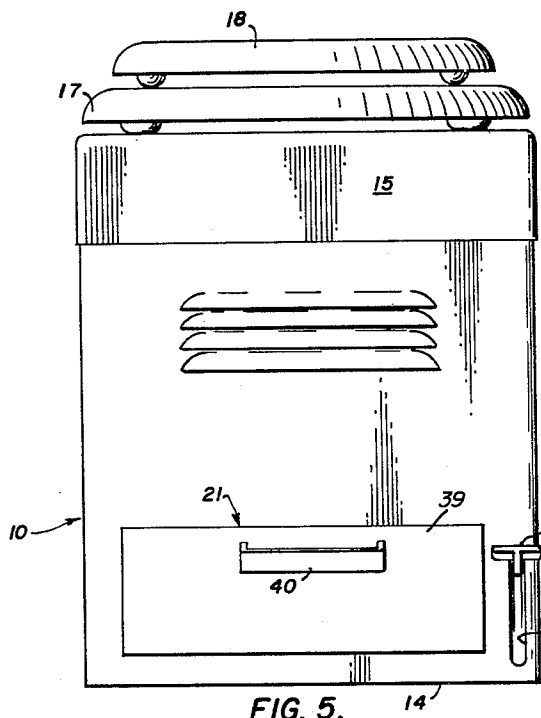


FIG. 5.

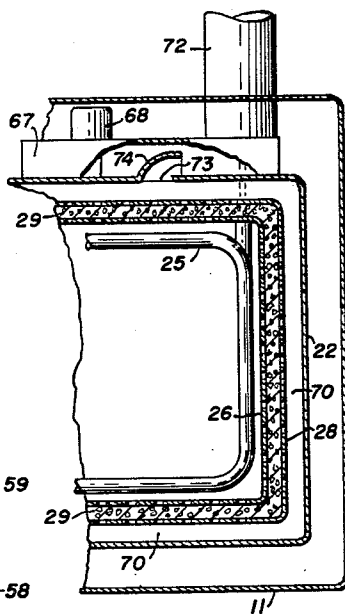


FIG. 4.

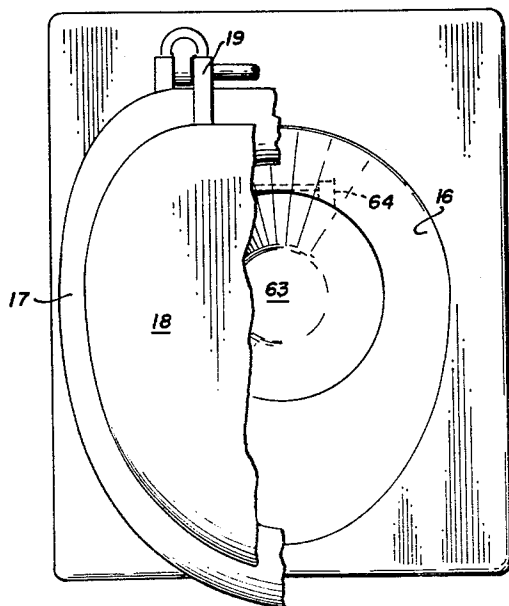


FIG. 6.

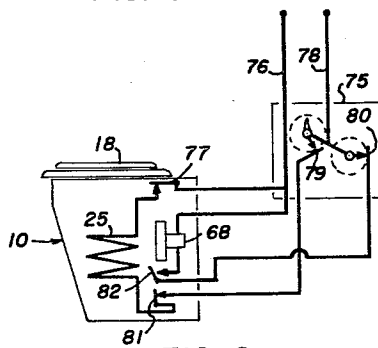


FIG. 9.

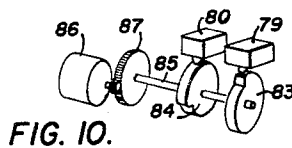


FIG. 10.

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INCINERATOR TOILET

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8 Claims. (Cl. 110—9)

This invention relates to apparatus for the disposal of human body wastes, and more particularly to incinerator type toilets for use where water supplies are limited, for example, on trains, airplanes, buses and campsites.

An object of the invention is to provide a new arrangement and combination of parts in an incinerator toilet for greater efficiency in consuming wastes.

A particular object of the invention is to provide improved efficiency by arranging the heater inside of and adjacent the inner wall of the incinerator chamber for direct radiation of the wastes to be consumed.

Another object, in addition to the foregoing object, is to provide an inwardly projecting flanged reflector around the periphery of incinerator chamber to reflect heat downwardly and thereby reduce heat at the seat which is located above the heater.

Another object is to provide an improved catalyst holding construction for arranging the catalyst around the incinerator whereby the effluent from the incinerator passes over an increased area for promoting maximum odor reduction.

A further object is to provide an improved ash pan and mounting therefor including an effective seal around the upper edge of the pan, together with means accommodating expansion and contraction of the pan due to temperature changes.

These and other objects will become apparent from the following description and the accompanying drawings, wherein:

FIGURE 1 is a broken side elevational and vertical sectional view of an incinerator toilet in accordance with the invention.

FIGURE 2 is a broken sectional view of the lower portion of the apparatus shown in FIGURE 1 and taken approximately along the center thereof.

FIGURE 3 is a broken sectional view similar to FIGURE 2 but taken at a right angle with reference thereto.

FIGURE 4 is a broken plan sectional view taken on line 4—4 of FIGURE 2.

FIGURE 5 is a front elevational view of an incinerator toilet showing a preferred design for the present invention.

FIGURE 6 is a broken top plan view of FIGURE 5.

FIGURE 7 is an elevational view of the blower of the invention and showing the incinerator outlet connected therewith.

FIGURE 8 is a perspective view of the incinerator cover actuating mechanism.

FIGURE 9 is a wiring diagram of an electric circuit for operating the invention, and

FIGURE 10 is a perspective view of the cam-switch arrangement employed in a preferred form of the invention.

In the drawings, the numeral 10 designates a generally rectangular housing having a downwardly and inwardly inclined front wall 11, vertical side walls 12, rear wall 13 and bottom 14. A top 15 fits the upper end of the otherwise open housing, and which top has a depending upper portion 16 of a closet bowl formed therein. Above and around the bowl portion 16 there is a seat 17, together with

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a lid 18, both of which are hinged, at 19, to the rear upper surface of the top 15.

Within the lower portion of the housing 10, and spaced from the walls 11, 12 and 13, there is an incinerator chamber 20 which has a removable ash pan 21 therebeneath. The ash pan 21 is preferably of aluminum, but other metals having high heat conductivity may be used. A metal pan having a conductivity of at least 0.25 calorie/cm.²/cm./sec./° C. is preferred. The side and rear walls 22 and 23 extend to the bottom 14 of the housing 10, and the forward wall 24 extends to the top of the ash pan 21.

Within the incinerator chamber 20 there is a vertically disposed coiled heating element 25, hereinafter referred to as the heater, and around which there is a perforated wall 26, hereinafter referred to as the wall reflector. An inwardly and downwardly directed reflector 27 is integral with the upper periphery of the wall reflector 26 and is positioned above the heater 25. The wall reflector 26 and heater 25 are substantially square when viewed from above, as shown in FIGURE 4. Spaced from both the incinerator chamber wall and the reflector wall there is a vertical perforated retaining wall 28 which is outwardly flanged at its upper end to engage the incinerator chamber wall 24 below the top of the latter. This arrangement provides a receptacle for an odor reducing catalyst 29 and a catalyst hopper 30 thereabove.

Mounted on springs 31 on the hopper bottom 14 there are parallel, forwardly and rearwardly directed slides 32 which bear against the bottom of the ash pan 21. Around the upper outer surface of the vertical wall 34 there is a seal 35 of soft insulating material, such as asbestos batting. The top of the seal 35 makes sliding contact with the bottom 36 of the incinerator chamber 20. The seal is supported on an outwardly directed flange 37 on the outer surface of the vertical walls 34 of the ash pan 21. The sides of the ash pan 21 extend outwardly through an opening 38 in the forward housing wall 11 where they are provided with a cover plate 39 which is larger than said opening and which plate is provided with a handle 40 on its outer surface. Within the ash pan 21 and mounted on vertical supports 41 there are closely spaced horizontal rods 42 for supporting solid waste deposited thereon.

On top of the incinerator chamber 20 there is a sliding cover 43 comprised of fore and aft rectangular members 44 and 45 connected with each other by a hinge 46. Both members 44 and 45 have laterally projecting studs 47 and 48 on opposite sides thereof. The rear studs 48 engage channel tracks 49 secured in opposing parallel relation on opposite side walls 12 of the hopper 10. As particularly shown in FIGURE 1, the tracks 49 are vertical at the rear of the hopper 10 and extend downwardly and curve forwardly to a location where they parallel the sides of the rear cover 45 when the latter is in closed position.

The cover 43 is slidably moved forwardly and rearwardly by an actuating mechanism 50, best illustrated in FIGURES 1 and 8, and which mechanism is comprised of vertically extending arms 51 having longitudinal slots 52 in the upper ends thereof for engaging the studs 47 on the forward cover member 44, a transverse shaft 53 which is journaled at its end in bearings 54 on the hopper bottom 14. The arms 51 are rigid with the shaft 53 whereby said arms will operate in unison. Forwardly of one arm 51 there is a depending bell crank 55 pivotally mounted on the adjacent housing wall 12 by means of a stub shaft 56. An integral lever 57 extends forwardly through

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an opening 58 in the forward housing wall 11 where the lever is provided with a pedal 59. The depending end of the cell crank 55 is pivotally connected with the adjacent arm 51 above the shaft 53 by means of a link 60. A hole 61 is provided in the depending portion of the bell crank 55 for receiving the end of a coiled tension spring 62, the remaining end of which is connected with the forward housing wall 11.

Beneath the upper bowl portion 16 there is a bowl 63 pivotally connected to the rear thereof by means of a hinge 64, and mounted on the upper surface of the forward cover member 44, there is an upstanding rearwardly directed leaf spring 65 which makes contact with the bottom of the bowl when the cover 43 is in its closed or partially closed position. In front of the forward cover member 44, and stationarily secured to the incinerator chamber 20, there is a baffle or splash guard 66 which extends upwardly above the lower edge of the upper bowl portion 16.

Secured to the back wall 23 of the incinerator chamber 20 there is a centrifugal blower 67, driven by an electric motor 68, the discharge duct 69 of which blower extends horizontally and adjacent the channel 70 formed by the spaced relation of the perforated catalyst retaining wall 28 and the incinerator chamber walls 22, 23 and 24. The extending end of the blower duct 69 is closed, as at 71, and perpendicular to the duct adjacent the closed end there is a vent pipe 72 which extends through the rear housing wall 13. An opening 73 in the rear chamber wall 23 has a baffle 74 thereover directing the discharge from the channel 70 to the vent pipe 72. The opening 73 and baffle 74 are located in the blower duct 69 to cause a venturi effect therein and draw effluent outwardly from the chamber 20 and over the catalyst 29, the latter being in the form of metallic oxide pellets.

Aluminum oxide pellets surround the chamber in the manner described in the foregoing and are activated by the heater 25. A characteristic of aluminum oxide, Al_2O_3 , as an odor reducing catalyst in accordance with the invention is the pellets tend to flake over a period of time and reduce in size. The supply of pellets in the catalyst hopper 30 automatically replenish the pellets between the perforated reflector 26 and perforated retaining wall 28 by gravity. Other suitable metallic oxides may be employed, for example, magnesium oxide.

Referring now to FIGURES 9 and 10, the heater 25 is supplied from a power source through a timer 75 of conventional construction. One lead 76 is connected with the heater 25 after passing through a normally closed thermoswitch 77, which operates on temperature rise. The thermoswitch 77 is located in the upper portion of the housing 10 and protects against overheating in the event of blower failure. The same lead 76, without passing through the thermoswitch 77 is connected with a terminal, not shown, of the blower motor 68. The remaining lead 78 is divided within the timer 75 where it is connected with two normally open switches connected with the heater and blower, respectively. Between the timer switch 78 and the heater 25, and located within and near the bottom of the housing 10 there is a normally closed thermoswitch 81 which opens on temperature rise. Similarly, between the timer switch 80 and the blower motor 68 and located within the housing 10, there is a normally open thermoswitch 82 which maintains the blower motor in operation after the last referred to normally closed switch 81 opens. After a pre-selected time, the timer switches 79 and 80 de-energize the heater 25 and the blower motor 68. Schematically shown in FIGURE 10 there are two cams 83 and 84 on a single shaft 85, which cams operate timer switches 79 and 80. The motor 86 and gear train 87 comprise a part of the conventional timing mechanism 75. The arrangement of cams 83 and 84 cause the blower motor 68 to operate after the heater 25 is de-energized.

The upper bowl portion 16 and the bowl 63 may be

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lined with paper prior to each use of the apparatus, or the same may be coated with Teflon or similar resin having a slick surface and capable of withstanding considerable heat. Small amounts of water may be used for flushing the bowl prior to emptying it.

The heater 25 is activated by means of the timer 75 either prior to, or subsequent to, emptying the bowl 63. The emptying operation is carried out by stepping on the pedal 59, which moves the parallel arms 51 rearwardly. The rear cover member 45 tilts upwardly between the tracks 49 and the forward cover member 44 moves back far enough to allow the bowl to drop its contents into the incinerator 20. The spring 62 returns the cover 43 to its closed position, and during the closing operation the leaf spring 65 on the forward cover member 44 makes contact with the bowl 63, returning the same to its closed position. The heating and blower cycles have been described in the foregoing, but it is pointed out that the heating of the catalyst and the drawing of the effluent therethrough by the blower is an operation which extends entirely around the incinerator chamber. It is also pointed out that the heater is inside of the wall reflector 26 whereby the waste to be consumed is subjected to direct radiation as well as reflected radiation.

The invention is not limited to the exemplary construction herein shown and described, but may be made in various ways within the scope of the appended claims.

What is claimed is:

1. In a waterless toilet, a housing, a vertically disposed incinerator chamber within said housing and spaced from the walls thereof, said chamber being open at its upper and lower ends, an ash pan within said housing beneath said incinerator chamber, a cover mounted on top of said incinerator chamber, means for moving said cover, a reflector wall within said incinerator chamber and positioned around the inner area thereof, a heater within said reflector wall and adjacent thereto, said reflector wall being perforated, a perforated channel around said perforated reflector wall, a blower, means communicating said blower with said channel, said blower being mounted in a position to draw air from said channel, and means discharging effluent from said blower.
2. In a waterless toilet as defined in claim 1, the construction including an odor reducing catalyst between said perforated reflector wall and said perforated channel.
3. In a waterless toilet as defined in claim 2, the construction wherein said odor reducing catalyst is in the form of aluminum oxide pellets of a size large enough to be retained between said perforated reflector wall and said perforated channel.
4. In a waterless closet as defined in claim 2, the construction wherein the odor reducing catalyst between said perforated reflector wall and said perforated channel is in the form of metallic oxide pellets, and a reservoir above and communicating with the space between said wall and said channel for containing additional said pellets.
5. In a waterless toilet as defined in claim 1, the construction including opposing upwardly curved tracks on opposite sides of said housing, and laterally projecting studs on opposite sides of said cover slidably engaging said tracks.
6. In a waterless toilet as defined in claim 1, the construction including an inwardly and downwardly directed reflector around the upper periphery of said reflector wall and over said heater.
7. In a waterless toilet as defined in claim 1, the construction including,

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a seal around the upper periphery of said ash pan making sliding contact with the side walls of said incinerator chamber.

8. In a waterless toilet as defined in claim 1, the construction including,

leads connecting a power source with said heater and said blower,

a timer connected with at least one of said leads, said timer including cam operated switches connected with said heater and said blower.

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