United States Patent

Theoclitus

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[54] **ASH REMOVAL SYSTEM**

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[52] **U.S. Cl.** ..... **110/8 R,** 110/89

[51] **Int. Cl.** **F23g 5/00**

[58] **Field of Search** ..... 110/8 R, 18 R, 89; 126/154

[56] **References Cited**

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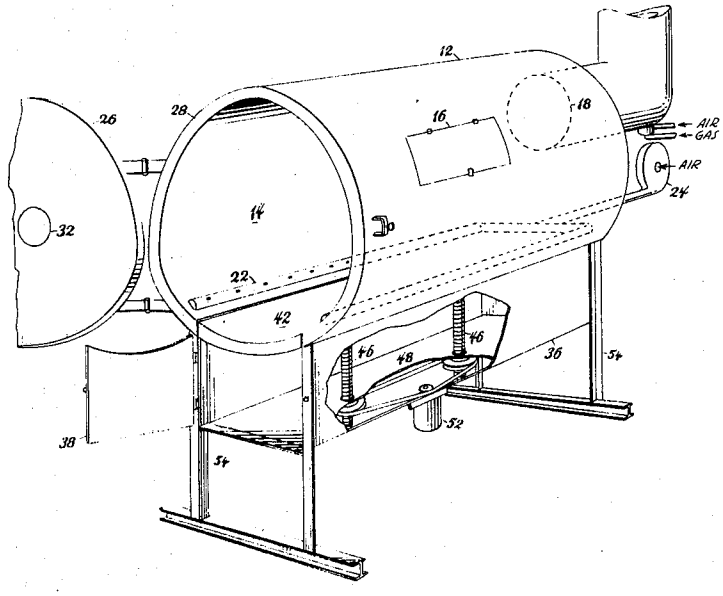
Primary Examiner—Kenneth W. Sprague

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[57] **ABSTRACT**

An incinerator constructed with a floor portion which is separate from the incinerator walls whereby said floor may be lowered or raised independently into a closed casing to compensate for the accumulation ash on said floor to thus provide for a sealed combustion chamber having a constant volume.

8 Claims, 3 Drawing Figures



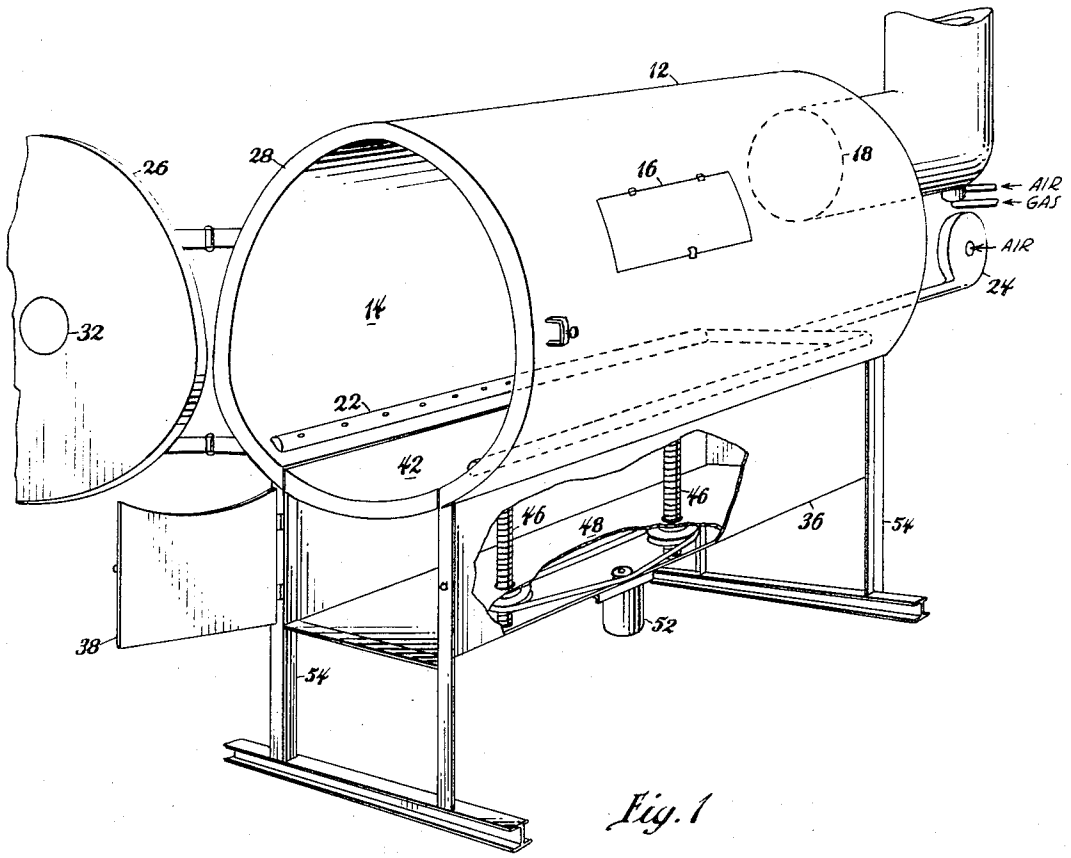


Fig. 1

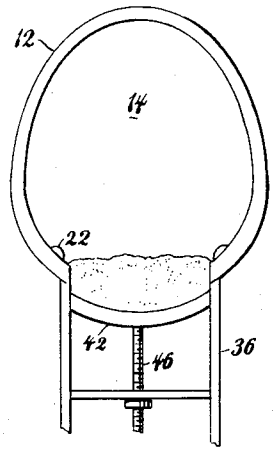


Fig. 2

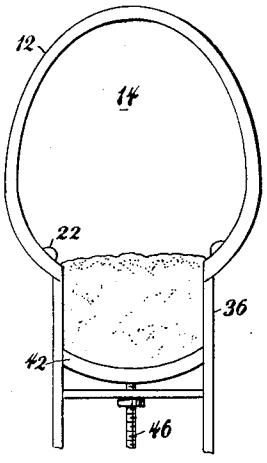


Fig. 3

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ASH REMOVAL SYSTEM

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates to an incinerator having a combustion chamber designed to maintain a constant volume while it is continuously being subjected to an ash build-up from burning wastes which would otherwise progressively reduce the volume of the chamber. By use of the arrangement disclosed herein the volume of the combustion chamber remains substantially constant and the admission of excess air is regulated to closely control the combustion of wastes and preclude the giving-off of smoke, odor and fly ash.

2. Description of Prior Art

Although incineration has long been an accepted method of waste disposal, burning under conditions wherein the volume of the combustion chamber is held constant to control the combustion process was only recently developed along the lines of U.S. Pat. No. 3,568,609, dated Mar. 9, 1971 and issued to Richard F. Stockman. In this device ash resulting from the combustion of waste material was substituted for sand which was placed in the furnace before starting the incinerator process. However, inasmuch as there was a slight, but nearly continual leakage of air into the combustion chamber so that an absolutely sealed combustion chamber was impossible to maintain, combustion conditions were varied. Moreover, the sand itself created problems of handling, corrosion, and erosion that necessitated frequent adjustment or repair.

SUMMARY OF THE INVENTION

This invention provides for an incinerator having a combustion chamber of constant volume that is at all times during use positively sealed from the ambient atmosphere whereby the flow of air for combustion is closely controlled to preclude the supply of excess air. It is therefore the principle objective of this invention to provide a sealed incinerator with a "floating" chamber floor whose position is determined by the amount of ash thereon. Vertical movement of the chamber floor thus compensates for the amount of residual ash being deposited thereon so that the volume of the combustion chamber lying above the ash does not significantly change.

A BRIEF DESCRIPTION OF THE DRAWING

FIG. 1 is an enlarged perspective view of an incinerator having an ash removal arrangement according to this invention, and

FIGS. 2 and 3 are diagrammatic views of the device during its sequence of operation.

In an incinerator, of the "starved-air" type trash or other refuse to be burned, is placed in an incinerator housing **12** that encloses a primary chamber **14**. An opening **16** provides means for supplying refuse into the incinerator chamber, while an exhaust opening **18** is provided to exhaust the gases of combustion therefrom to subject them to one or more additional stages of combustion in accordance with standard apparatus operating according to "starved air" principles.

Air for combustion is supplied through inlet pipes **22** from a manifold connected to any conventional source of supply such as pump **24**.

An access door **26** to the incinerator housing **12** is hinged thereto to permit unencumbered entrance therein for maintenance or repair, and the interior of the housing is covered by a refractory lining **28** that protects it effectively from the high combustion temperatures of the burning refuse.

The access door **26** is provided with a sight hole **32** covered by a pivoted closure to provide an operator with visual access to the interior of the chamber **14** to observe the depth of ash on the chamber floor or other conditions that exist within the incinerator.

Although present incinerator arrangements may provide for a continuous supply of refuse to be loaded into an incinerator, little has been done to provide an arrangement whereby ash resulting from the combustion of said refuse may be removed continuously without opening the combustion chamber to the atmosphere. Moreover, in most cases it is necessary to discontinue all combustion and allow the incinerator to cool before the incinerator is opened. Should the ash removal door be opened more than momentarily during operation of the incinerator, an excess of air will flow into the incinerator to provide for free burning of the refuse therein not in accordance with the normal burning under "starved air" conditions.

In accordance with may invention I provide a rectangular open-ended ash holding chamber **36** extending longitudinally along the bottom of the incinerator **12** and having an ash removal door **38** at one end thereof to permit closure of the chamber **36** except when an excess accumulation of ash in the chamber requires its removal therefrom.

At the bottom of the incinerator chamber **14** and intermediate the air supply pipes **22** is a "floating" or vertically movable chamber floor **42** which is somewhat smaller than the horizontal dimensions of the ash holding chamber **36** so that it fits within and may be freely raised or lowered into said chamber. By thus raising or lowering the floor **42** in accordance with the amount of ash thereon, the top of the ash layer on the bottom of the incinerator chamber **14** may be maintained at a constant level so the volume of the chamber **14** lying above the top of the ash deposits will remain virtually unchanged during a prolonged period of waste incineration.

In a conventional incineration of the "starved air" type, combustion of refuse in the chamber **14** progressively builds up a layer of ash on the bottom of said chamber so the volume of the chamber will decrease accordingly. Air for combustion being supplied by pipes **22** will also channel through the ash to provide a selective burning of the refuse. In this invention, however, a build-up of ash within the chamber **14** calls for a lowering of the chamber floor **42** so the point of combustion is adjacent the air supply pipes and the volume of the incinerator chamber **14** remains virtually constant.

The chamber floor **42** is moved vertically by any suitable means such as shown by a pair of jack screws **46** threaded through the floor **48** of the ash holding chamber and rotated by a motor and V-belt arrangement **52** as actuated by an operator viewing conditions within the incinerator through "sight hole" **32**. Although the mechanical jack screws **46** are the only embodiment illustrated in the drawing, any equivalent

manually operated or automatic elevator which is responsive to the weight or depth of ash on the floor **42** is intended to lie within the purview of the present invention. After the chamber floor **42** has been lowered to an extreme position for the collection of ash may be removed through the removal door **38** and the floor **42** accordingly raised back to its original position.

Legs or mounting means **54** support the incinerator at an elevated position above ground level whereby the jack screws **46** may be rotated within floor **48** to lower the floor **42** to the bottom of enclosing chamber **36** as the ash deposits continue to accumulate. An alternate arrangement would recess the entire incinerator into a partially buried position with suitable pits for the recessed jack screws **46**. Thus, as ash is deposited on the chamber floor, the floor may be lowered as required to maintain a constant level at the point of combustion.

Since other equivalent means for lowering the floor **42** may be used instead of the mechanical method shown, it will be understood that this disclosure is illustrative only of a preferred means embodying the invention and the invention is to be determined only by the scope of the appended claims.

I claim:

1. In an incinerator for the disposal of waste material by oxidation a closed casing defining a substantially airtight combustion chamber, means for feeding waste into said combustion chamber, means for subjecting said waste to a process of combustion, a holding means for residue from the combustion of said waste comprising an ash holding chamber at the bottom of the combustion chamber lying contiguous therewith, and a floor for said holding chamber vertically movable to permit lowering thereof as ash build-up on said floor develops whereby the floor may be lowered an amount commensurate with the ash deposits thereon to provide the combustion chamber with a constant volume.

2. An incinerator for the disposal of waste by combustion having a closed casing defining a substantially airtight combustion chamber, means for feeding waste material into said combustion chamber, an exhaust port for the exhaust of the products of combustion therefrom, a holding means for residue from the combustion of said waster comprising an ash holding chamber at the bottom of the combustion chamber lying contiguous therewith, a floor for said ash holding chamber vertically movable with respect to the incinerator casing adapted to simultaneously comprise a floor for the incinerator chamber and the ash holding chamber, and means for lowering said floor into the ash holding chamber whereby the surface thereof may be maintained constant to provide the combustion chamber with a constant volume.

3. An incinerator for the disposal of waste by combustion as defined in claim **2** including means for the supply of oxygen to the combustion chamber independent from the movable floor for the ash holding chamber to permit lowering said floor with respect to the oxygen supply means for the combustion chamber.

4. An incinerator for the disposal of waste by combustion as defined in claim **3** wherein the means for the supply of oxygen to the combustion chamber comprises an apertured tube extending longitudinally along the edge of the movable floor.

5. An incinerator for the disposal of waste by combustion as defined in claim **4** wherein the means for the supply of oxygen to the combustion chamber comprises an apertured tube lying on each side of the incinerator chamber.

6. An incinerator for the disposal of waste by combustion as defined in claim **5** wherein oxygen supply tubes on opposite sides of the incinerator chamber are laterally adjacent and independent from the movable floor for the ash holding chamber.

7. An incinerator for the disposal of waste by combustion as defined in claim **6** wherein the ash holding chamber subjacent the combustion chamber has vertical walls that provide for constant clearance around the movable floor as said floor is lowered into the ash holding chamber.

8. An incinerator for the disposal of waste matter by combustion as defined in claim **2** wherein the means for lowering the floor into the ash holding chamber lies intermediate oxygen supply pipes at opposite sides of the incinerator casing.

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