

[54] **RECIRCULATION OF GASES GENERATED IN ASH PIT**

1,995,893 3/1935 McEver 110/17
2,121,661 6/1938 Hartley et al. 110/12

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[22] Filed: **Mar. 29, 1973**

[21] Appl. No.: **345,935**

[57] **ABSTRACT**

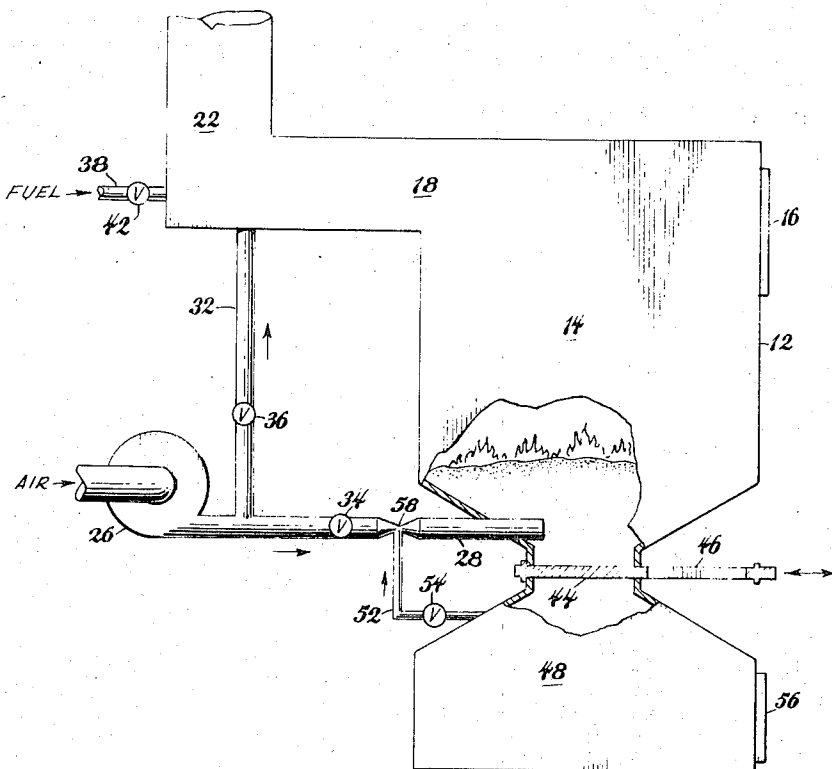
A grateless incinerator with a controlled atmosphere having a pyrolyzation chamber, an afterburner chamber that is downstream therefrom, and an ash discharge chamber subjacent the pyrolyzing chamber. Ash from incinerated refuse in the pyrolyzing chamber may be quickly dumped to the ash discharge chamber and a new charge of refuse placed back in the pyrolyzing chamber. Any smoke, dust or fumes generated by the hot ash in the ash discharge chamber is allowed to vent to an underfire air inlet to the pyrolyzation chamber.

[52] U.S. Cl. 110/8 A, 110/17, 110/49 R
[51] Int. Cl. F23g 5/12
[58] Field of Search..... 110/8 R, 8 A, 8 C, 11, 110/12, 17, 49

[56] **References Cited**
UNITED STATES PATENTS

2,183,463 12/1939 Moreton 110/12

6 Claims, 2 Drawing Figures



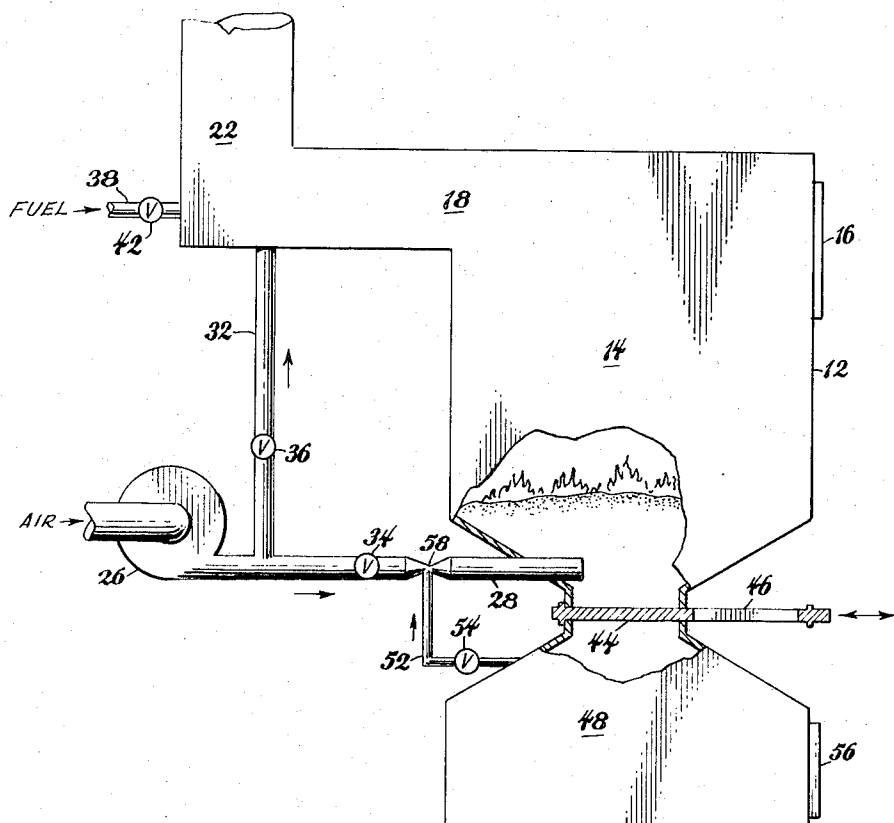


Fig. 1

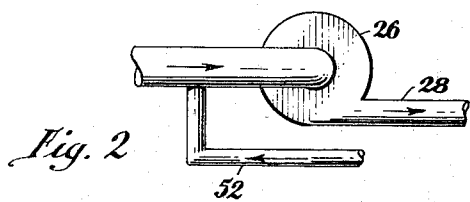


Fig. 2

RECIRCULATION OF GASES GENERATED IN ASH PIT

BACKGROUND OF THE INVENTION

1. Field of the Invention

An incinerator for trash, garbage or other waste that may be fired continuously to provide maximum burning capacity, substantially constant stack temperature, and minimum smoke generation.

2. Description of Prior Art

Multichambered incinerators that have a pyrolyzing chamber in advance of an afterburner are old in the art as shown by U.S. Pat. Nos. 3,591,707 and 3,505,181.

The incinerator devices shown in these patents provide effective incineration of waste, but they must be completely cooled after each "burnout" whereby the ash and other residue resulting from the incineration of each load may be removed therefrom. Thus, the devices of these patents utilize excessive time for a complete burning cycle for each charge. Moreover, harm to the equipment is caused by excessive fluctuation of temperature that results especially in damage to ceramic insulation used in the device. Moreover, continuously varying combustion conditions frequently result in periods of incomplete combustion wherein waste is only partially eliminated and excessive amounts of visible smoke are emitted from the afterburner. Furthermore, the total capacity of a unit is severely restricted because a complete burning cycle includes a long period for "cool-down" and ash removal during which no incineration may be effected.

SUMMARY OF THE INVENTION

This invention therefore relates to an incinerator for trash, garbage and waste of all types that includes an enclosed primary or pyrolyzing chamber, a subjacent ash receiving chamber, and an afterburner that is downstream from the primary combustion chamber.

Duct means connect the ash receiving chamber to a duct supplying underfire air to the pyrolyzing chamber whereby smoke, dust and fumes of all types generated in the ash receiving chamber are directed back into the pyrolyzing chamber under the bed of burning waste to be subjected to continued high temperature and to a filtering action by the fine ash and burning coals. After being subjected to a filter action by the mass of waste in the pyrolyzing chamber, the fumes from the ash receiving chamber continue to be subjected to high incinerating temperatures of the pyrolyzing chamber and the afterburner before being exhausted to the atmosphere.

BRIEF DESCRIPTION OF THE DRAWING

A better understanding of my invention may be had by the reference to the drawing in which:

FIG. 1 shows a sectional elevation of my invention, and

FIG. 2 shows a modification wherein exhaust gas from the ash receiving chamber is exhausted to the inlet of the air supply fan.

DESCRIPTION OF THE PREFERRED EMBODIMENT

In the drawing of the present invention, the reference number 12 defines a housing enclosing a pyrolyzing chamber 14 that includes a loading door 16 for loading

a charge of waste material or trash therein and an outlet opening 18 through which gases generated therein are exhausted.

A duct 20 connected to the outlet opening 18 is sized to include an afterburner 22 that exhausts to the atmosphere through a stack 24.

A source of combustion air comprising a fan 26 exhausts through passageway 28 to the pyrolyzing chamber 14 and through a passageway 32 to the afterburner chamber. Suitable control valves 34 and 36 in their respective flow passageways properly control the flow of air necessary for adequate pyrolyzation in chamber 14 and complete combustion of the gas in chamber 22. A source of fuel is provided to the afterburner 22 through supply line 38 having a suitable control valve 42 therein whereby sufficient fuel is provided to maintain a temperature within the afterburner at all times at what is considered the optimum for combustion of all gases and fumes. The valves 34, 36 and 42 may all be controlled manually or in response to a controller (not shown) set to respond to temperatures within the afterburner in a manner well known and disclosed in U.S. Pat. No. 3,491,707 of Jan. 27, 1970.

The bottom of the chamber 14 is provided with a laterally movable plate 44 that includes an aperture 46 therein. Lateral movement of said apertured plate permits alignment of chamber 14 and aperture 46 whereby the chamber 14 may quickly drop its contents to a subjacent ash receiving chamber 48 having a conventional ash clean-out door 52 whereby an accumulation of ashes or residue may be removed for ultimate disposal.

As ash and other residual matter is dropped through opening 46 from pyrolyzation chamber 14 to ash receiving chamber 48, such agitation will produce a cloud of particulate matter and smoke including fumes and fine particles of airborne ash. This smoke and ash will rise and subsequently be exhausted from chamber 48 through passageway 52 back to duct 28 that supplies the underfire air to the pyrolyzing chamber 14. The passageway 52 is provided with a suitable valving means 54 that may be closed completely to provide for the isolation of chamber 48 from chamber 14. Although closure of ash clean-out door 56 will substantially preclude entry of combustion air, sufficient natural leakage around door 56 will allow entry of limited ambient air sufficient to permit the exhaust of smoke and fumes via duct 52.

To enhance the exhaust of airborne ash and fumes from chamber 48 through passageway 52, the air supply passageway 28 is preferably provided with a venturi or other form of restriction 58 that, when air from fan 26 is forced therethrough, will have a suction effect upon chamber 48 and thus serve as a smoke ejector therefor.

A similar effect may be produced by extending duct 52 to the inlet of fan 26 in the manner shown by FIG. 2 of the drawing whereby the airborne particulate matter and the fumes from chamber 48 are directed to the suction inlet and thence through the fan 26 to chamber 14 as underfire air.

As the airborne ash and fumes from chamber 48 are directed into chamber 14 they are filtered upward through the bed of burning coals and packed waste to strip the particulate matter from the gas. Moreover, the velocity of airflow through chamber 14 is maintained below 9 - 10 ft./sec. whereby there is little entrainment

of particulate matter therein and only substantially dustfree air is exhausted to the afterburner.

While several specific arrangements of our devices have been defined herein, it will be understood that the concepts described may be applicable to other shapes and arrangements of apparatus employed for the stated purpose. It is thus to be understood that various chambers may be made in the details of construction without departing from the spirit of the invention.

We claim:

1. An incinerator for burning combustible waste material that comprises a pyrolyzing chamber having a loading opening for the admission of waste material and an outlet opening for the exhaust of gases generated therein, an outlet duct including an afterburner chamber therein connected to said outlet opening, a source of air for the pyrolyzing chamber, a passageway supplying air from said source and exhausting into the lower portion of the pyrolyzing chamber to provide a source of combustion air beneath the charge of waste material therein, an ash receiving chamber isolated from the pyrolyzing chamber, means moving the ash from the pyrolyzing chamber to the ash receiving chamber, and duct means connecting the ash receiving chamber to the pyrolyzing chamber to permit fumes generated in the ash receiving chamber to circulate back to the pyrolyzing chamber and filter through the waste material therein before being exhausted to the afterburner.

2. An incinerator as defined in claim 1 wherein the duct means conducting fumes from the ash receiving chamber is connected to the passageway that supplies air to the pyrolyzing chamber whereby the fumes from the ash receiving chamber are conducted into the pyrolyzing chamber along with the combustion air.

3. An incinerator as defined in claim 2 including a restriction in the passageway supplying air from said source to the pyrolyzing chamber to produce an area

of low pressure, and means connecting the ash receiving chamber to the pyrolyzing chamber at said area of low pressure to thus produce a continuous aspiration effect upon the fumes of said ash receiving chamber when air is flowing through said duct.

4. An incinerator for burning combustible waste that comprises a pyrolyzing chamber having a loading opening for the admission of a charge of waste material and an outlet opening for the exhaust of gases generated therein, an outlet duct including an afterburner chamber therein connected to said outlet opening, a source of combustion air for the pyrolyzing chamber, an air supply passageway supplying air from said source to the lower portion of said pyrolyzing chamber, an ash receiving chamber subjacent the pyrolyzing chamber, closure means movable between open and closed positions separating the pyrolyzing chamber from the ash receiving chamber, means actuating the movable closure means to interconnect the pyrolyzing chamber with the ash receiving chamber, and duct means connecting the ash receiving chamber with the passageway supplying air to the pyrolyzing chamber whereby smoke exhausting from the ash receiving chamber is introduced into the lower portion of the pyrolyzing chamber and filtered through the charge of waste therein before being exhausted to the afterburner.

5. An incinerator as defined in claim 4 including a venturi-like restriction in the air supply passageway, and means linking said venturi-like restriction to the duct from the ash receiving chamber to subject the fumes therein to suction produced by the flow of combustion air through the venturi.

6. An incinerator as defined in claim 4 wherein the duct from the ash receiving chamber is connected to the source of air for the pyrolyzing chamber whereby fumes from the ash receiving chamber mixed with combustion air.

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