United States Patent [19]

Helke

[11] **3,867,729**

[45] **Feb. 25, 1975**

[54] **INCINERATOR**

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[73] Assignee: **La Mere Industries Inc.,** Walworth, Wis.

[22] Filed: **Aug. 17, 1973**

[21] Appl. No.: **389,140**

[52] **U.S. Cl.** **4/131**

[51] **Int. Cl.** **A47k 11/02**

[58] **Field of Search** ..... 4/131, 118, 8; 110/9 E, 110/9 R; 431/79

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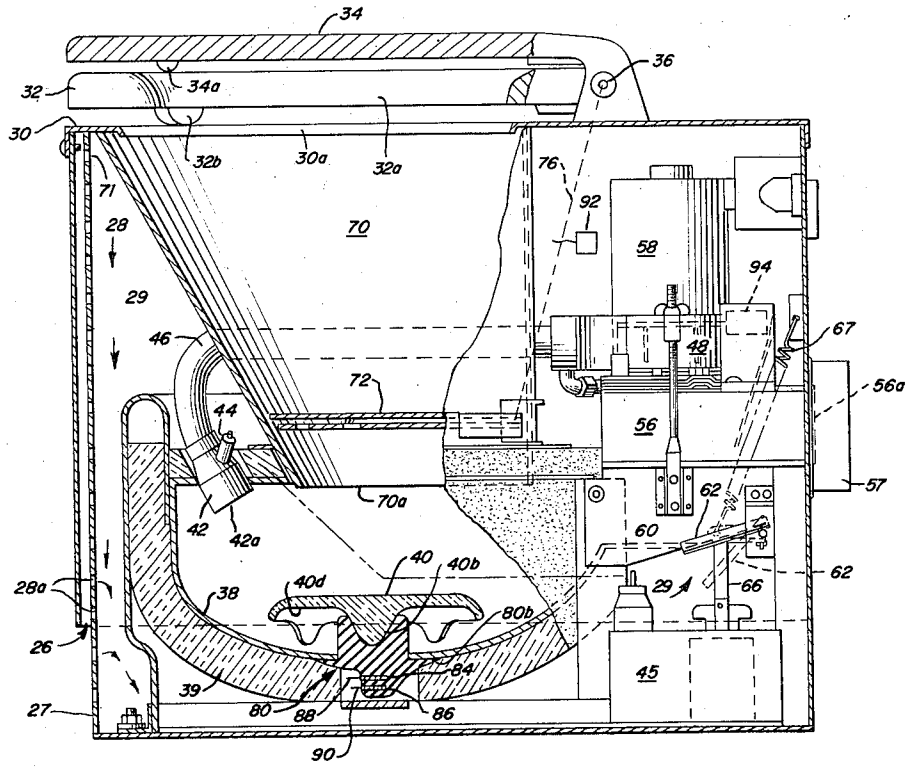
Primary Examiner—Henry K. Artis
Attorney, Agent, or Firm—Coffee & Sweeney

[57] **ABSTRACT**

An incinerating toilet device which burns waste in a combustion chamber after which the combustion chamber is cooled. A control system controls the length of the burning and cooling cycles responsive to the temperature of the combustion chamber and the temperature in the exhaust duct from the combustion chamber. The control senses two combustion chamber temperatures, i.e., a first elevated temperature indicative that waste material has been completely burned and a second more elevated temperature indicative of dangerous conditions in the combustion chamber. Responsive to the first elevated temperature, the control deactivates the combustion chamber burning means and responsive to the second elevated temperature, the control renders the important operative portions of the device, and especially the burning and cooling means, inactivatable until the control is replaced. After deactivation of the burning means responsive to the first elevated temperature, the cooling means cools the combustion chamber to a predetermined significantly lower temperature whereupon the control means deactivates the cooling means.

In the bottom of the combustion chamber, a waste support member is located having a temperature conductive base portion extending to the exterior of the combustion chamber wall where it is provided with receivers for receiving temperature sensitive probes of the control system.

19 Claims, 11 Drawing Figures



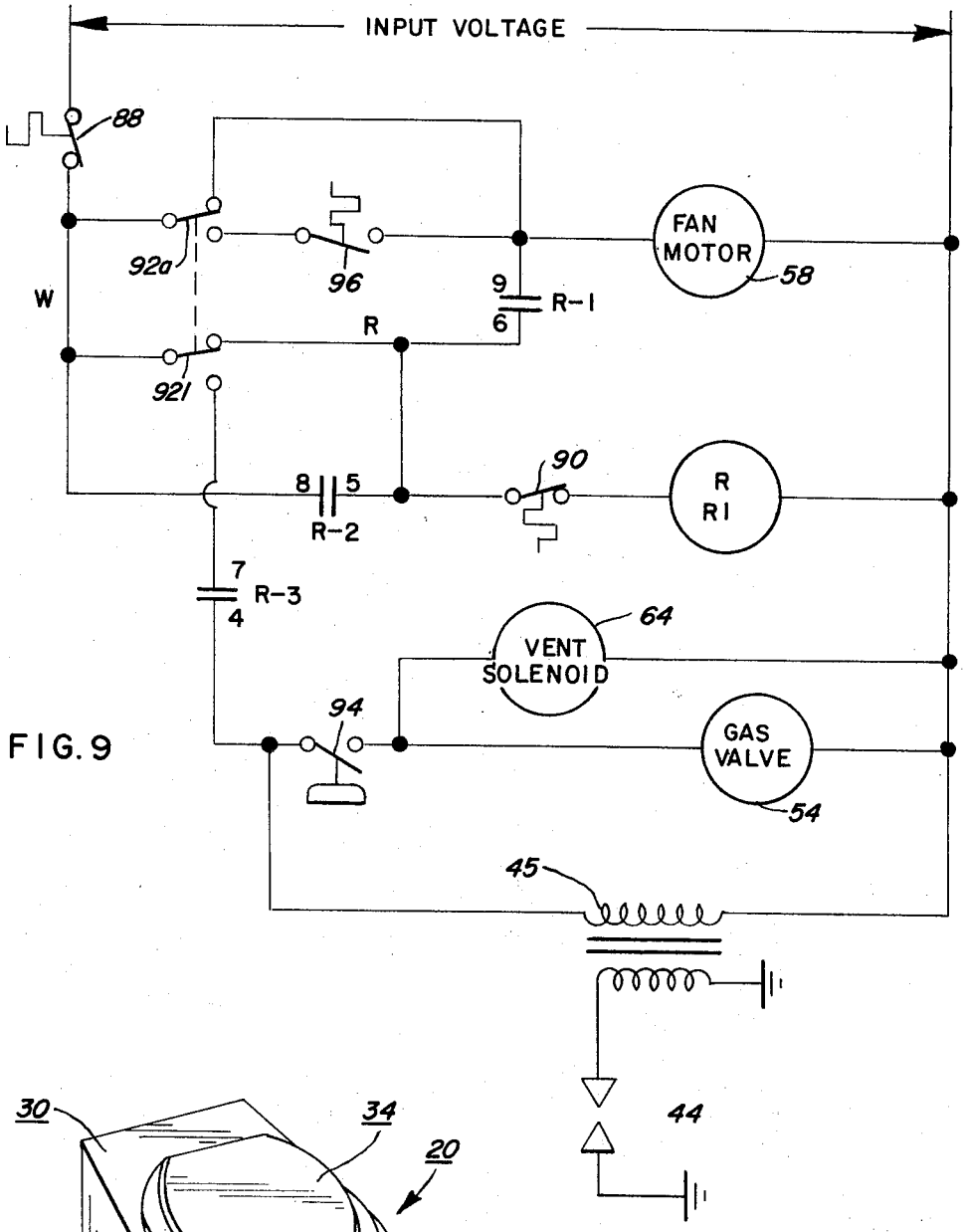

INPUT VOLTAGE
88
92a
96
9
6
R-1
FAN MOTOR
58
W
R
921
8
5
R-2
90
R
RI
7
4
R-3
64
VENT SOLENOID
94
GAS VALVE
54
45
44

FIG. 9

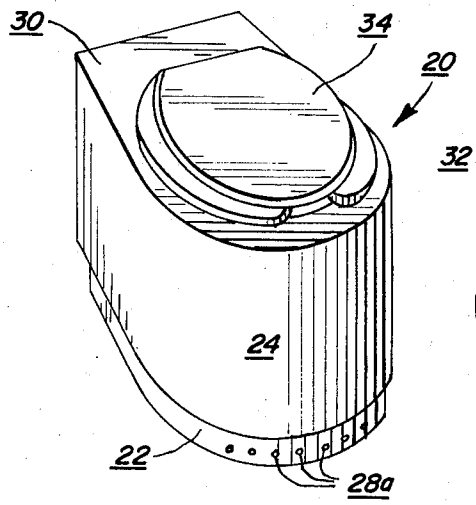
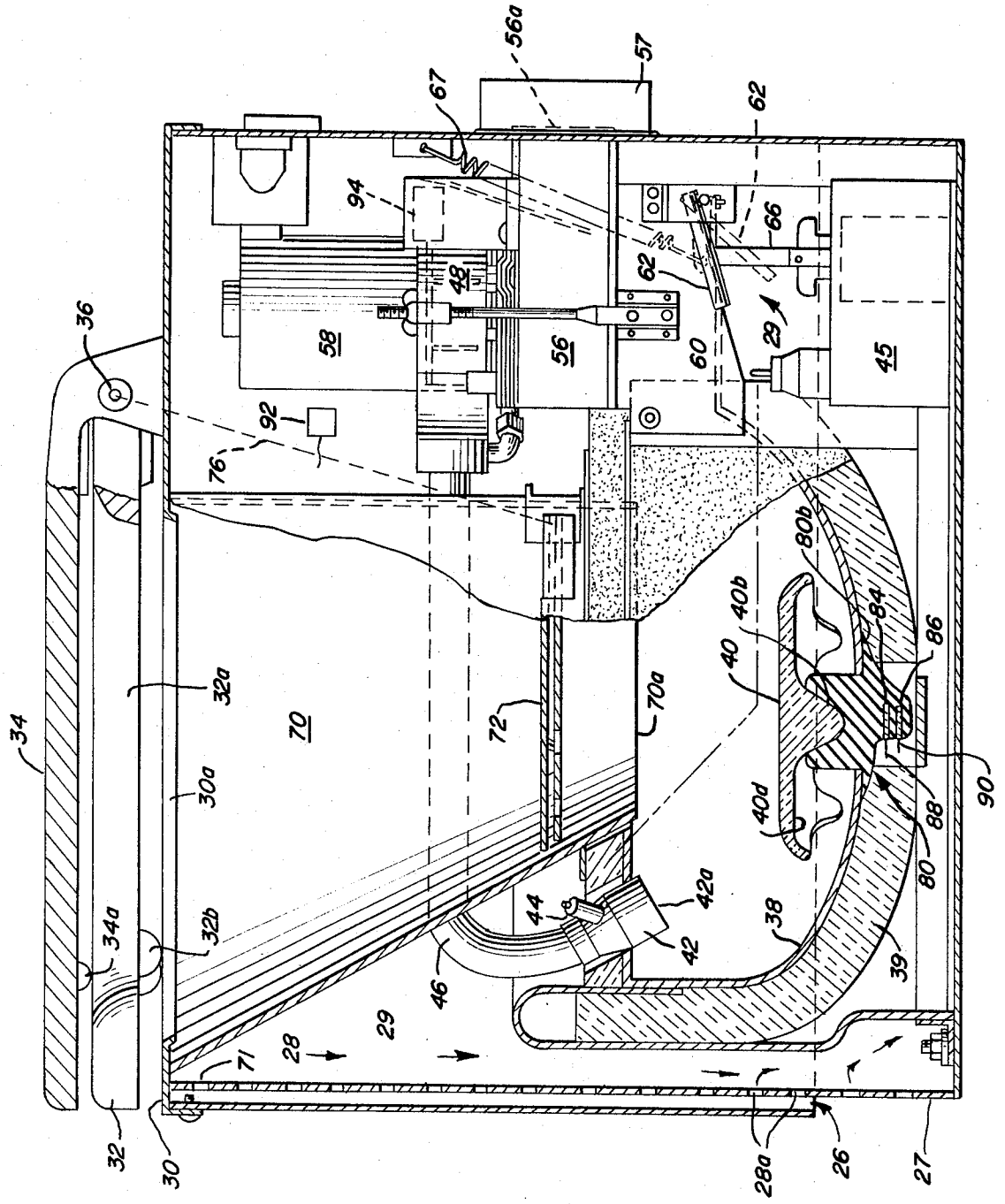

30
34
20
32
24
22
28a

FIG. 1

FIG. 2


56a
57
67
62
94
66
48
58
56
60
29
45
36
92
76
80b
40b
84
86
40
70a
32a
34
70
72
30a
90
40d
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46
29
28
71
32
30
28a
26
27

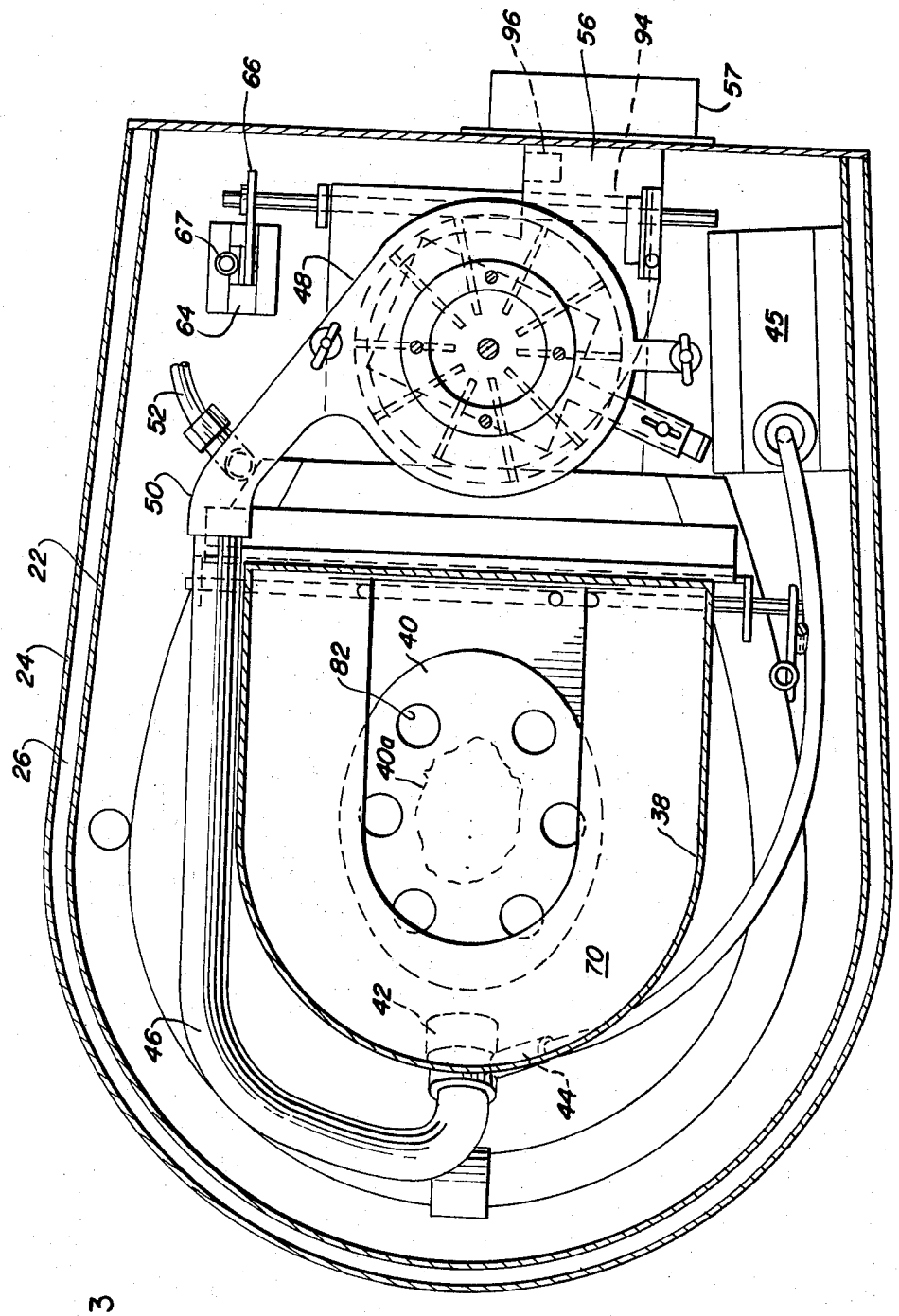


FIG. 3

FIG. 4

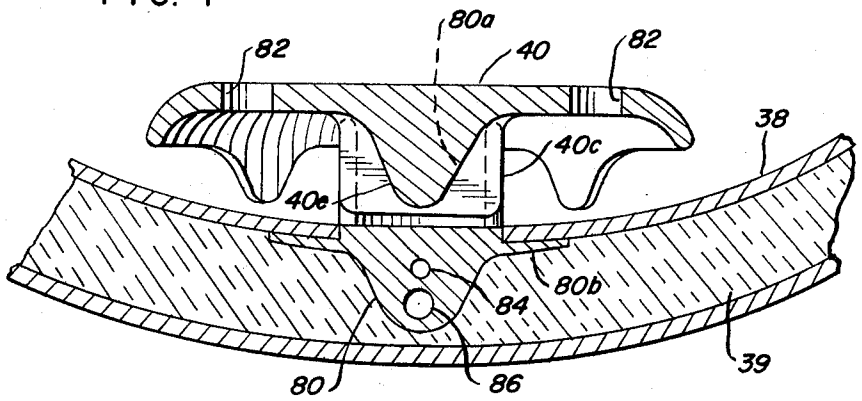


FIG. 5

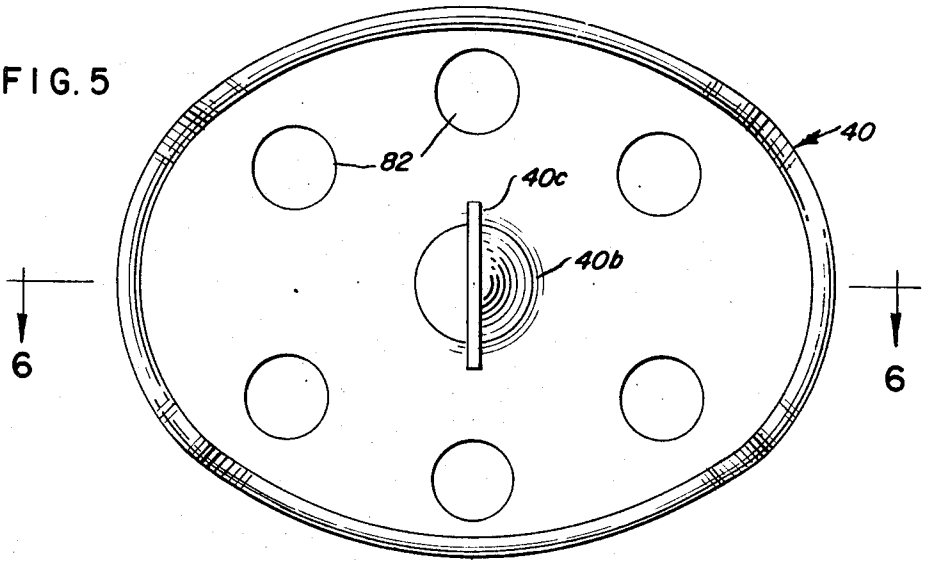


FIG. 6

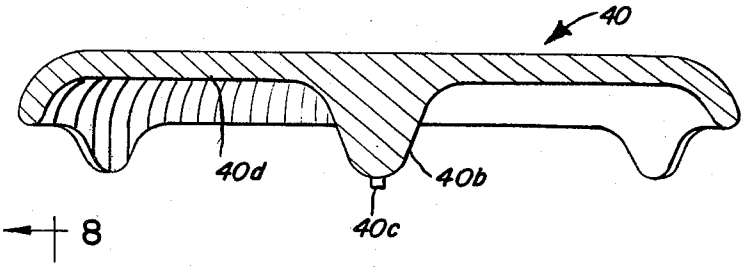


FIG. 7

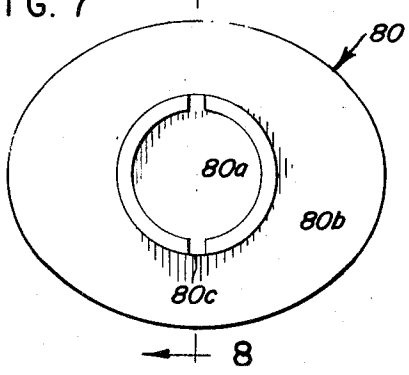
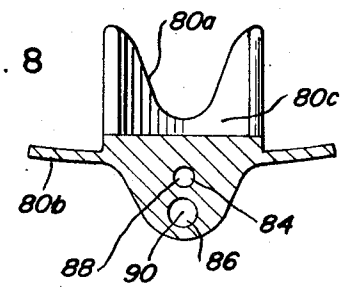


FIG. 8



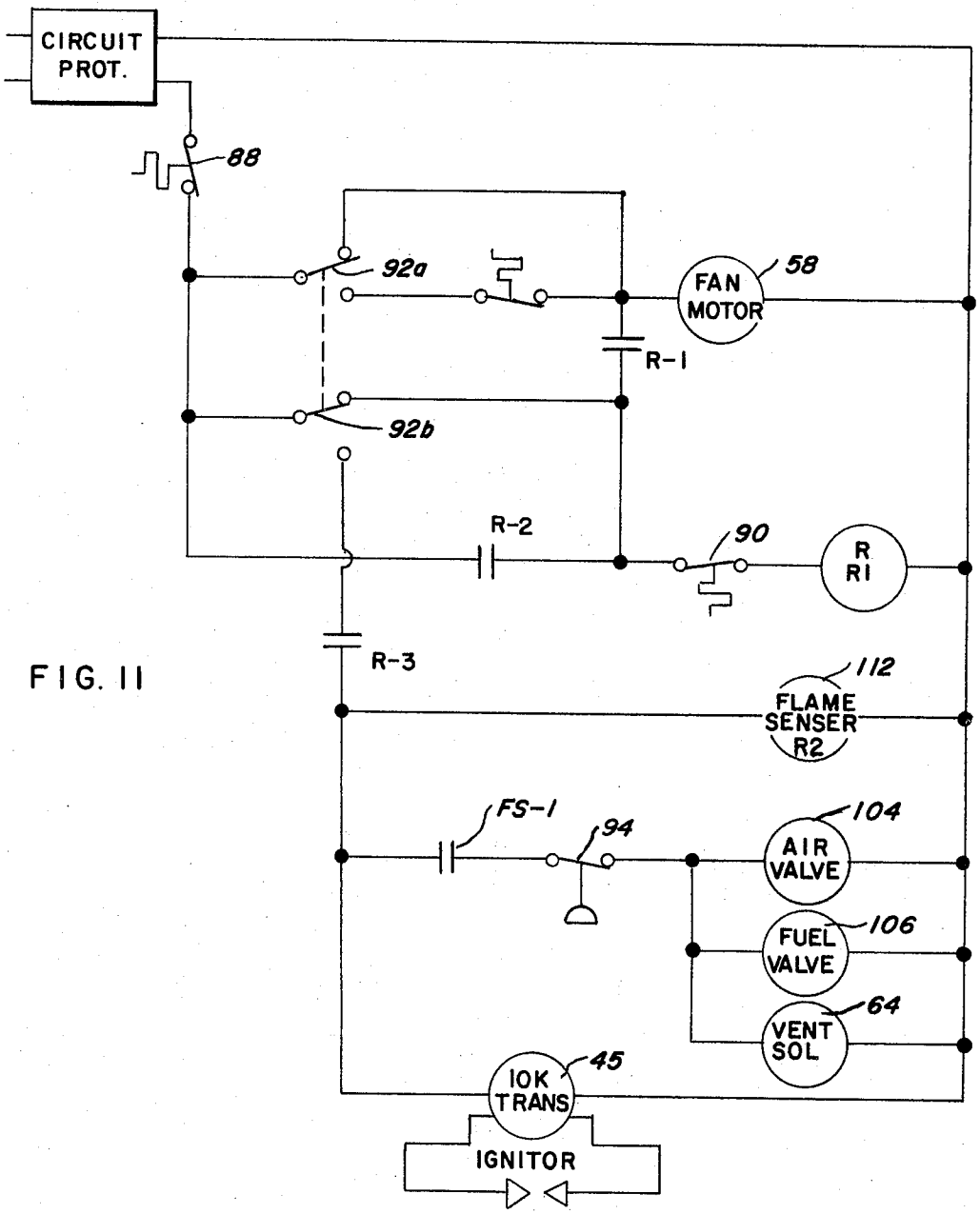

CIRCUIT PROT.
88
92a
92b
FAN MOTOR
58
R-1
R-2
90
R RI
R-3
112
FLAME SENSER R2
FS-1
94
104
AIR VALVE
FUEL VALVE
106
VENT SOL
64
IOK TRANS
45
IGNITOR

FIG. 11

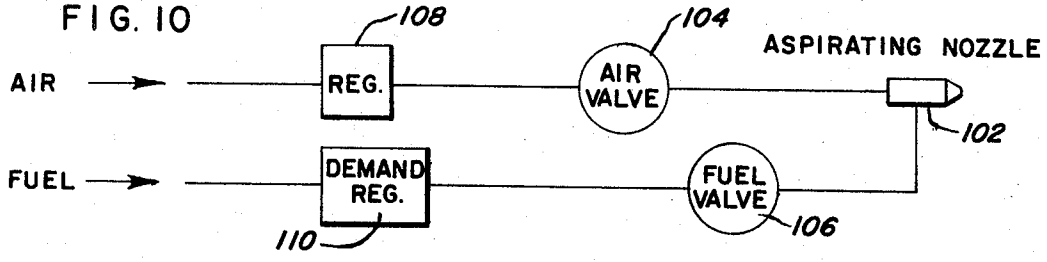

AIR
FUEL
REG.
108
DEMAND REG.
110
AIR VALVE
104
FUEL VALVE
106
ASPIRATING NOZZLE
102

FIG. 10

INCINERATOR

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates to incinerators which operate by burning waste during a burning cycle, followed by a combustion chamber cooling cycle, and especially relates to control of the of the cycles. More particularly, the invention relates to control of the burning and cooling cycles in incinerating toilets which are useful for disposing of human wastes.

2. Brief Description of the Prior Art

Incinerating toilets and other small household incinerating devices are coming more and more into use as pollution problems grow. For example, such incinerating devices have found use in residences, camping areas, cottages and boathouses, and on vehicles such as house trailers, houseboats and trains, and many other areas. Such devices usually operate on a timed burning cycle followed by a timed cooling cycle. The length of the cycle is often built into the device and it is often unnecessary to complete the full timed burning cycle for incinerating the deposited waste. This, of course, wastes fuel. Moreover, should the timer develop a malfunction or jam during the burning cycle the cycle could continue without terminating and develop extremely high and dangerous temperatures within the combustion chamber. The possibility of extreme temperature conditions necessitates the use of more expensive materials for fabricating the combustion chamber.

SUMMARY OF THE INVENTION

The present invention provides an incinerator of the type operating on an untimed burning period or cycle followed by an untimed cooling period or cycle. The burning cycle is terminated responsive to a first elevated temperature in the combustion chamber indicative of completion of burning. The cooling cycle commences and is terminated by reduction of temperature to a lower level so that the device can be comfortably reused. Additionally, a second very highly elevated combustion chamber temperature condition indicative of malfunction is detected for completely and permanently deactivating the important components of the incinerator by opening a control switch which cannot be reclosed. This requires the presence of a repairman to replace the switch, at which time he can examine the device and correct the malfunction. The fail-safe provide by the second high temperature shut-off advantageously permits the use of less expensive materials in fabricating the combustion chamber walls, e.g., sheet metal in lieu of the customary cast steel.

An imporved combustion chamber waste support system is also provided in the form of a foraminous platform having a heat conductive support leg impaling the combustion chamber bottom wall and fitted with temperature probes exteriorly of the chamber for sensing temperatures indicative of combustion chamber temperatures.

While this invention is susceptible of embodiment in many different forms, there is shown in the drawings and will herein be described in detail an embodiment and modification thereof, with the understanding that the present disclosure is to be considered as an exemplification of the principles of the invention and is not intended to limit the invention to the embodiment or modification illustrated.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a perspective view of a form of incinerator of the present invention;

FIG. **2** is an enlarged vertical section along the line 2—2 in FIG. **1**;

FIG. **3** is a section along line 3—3 of FIG. **2** with a trapdoor member removed to expose parts located therebelow;

FIG. **4** is a section through the combustion pot of the device along line 4—4 of FIG. **3**;

FIG. **5** is a bottom plan view of the waste support member shown in the device in FIGS. **2–4**;

FIG. **6** is a section along line **6—6** of FIG. **5**;

FIG. **7** is a top plan view of a base member upon which the waste support member of FIGS. **2–6** rests;

FIG. **8** is a section along line **8—8** of FIG. **7**;

FIG. **9** is a wiring diagram of a control circuit useful in the device of FIGS. **1** through **8**;

FIG. **10** is a flow scheme for use in modifying the device of FIGS. **1–8** for burning oil in lieu of gas; and

FIG. **11** is a wiring diagram of a control system useful in the modified device.

DESCRIPTION OF THE PREFERRED EMBODIMENT

To a large extent the present invention provides improvements and modifications in an incinerating toilet such as that shown in Frankel et al. U.S. Pat. No. 3,338,191 and Frankel et al. U.S. Application Ser. No. 108,040, filed Jan. 20, 1971. As background material and so far as description of the structure and operation of an incinerating toilet is concerned, U.S. Pat. No. 3,338,191 and U.S. Application Ser. No. 108,050 are hereby incorporated herein by reference.

Referring first to FIGS. **1–3**, the incinerating toilet includes a tear drop shaped cabinet **20** with a housing **22** and an outer sidewall skirt **24** secured by suitable spacer members to the housing **22** to define an air space **26** between housing **22** and skirt **24.** Air can enter air space **26** (FIG. **2**) at the bottom of skirt **24** and ports **28** are provided around the upper portion and the lower front portion of housing **22** for entry of air from space **26** into another air space **29** within housing **22.** Ports **28***a* (FIGS. **1** and **2**) are also provided for more direct entry of air into the lower portion of space **29.** Skirt **24,** being shorter than housing **22,** also provides a foot well at the front and sides of the device. The double wall structure of housing **22** and skirt **24** adds strength to the unit.

Housing **22** also includes a top deck **30** having a central waste receiving opening **30***a* with a seat such as split seat **32,** with seat opening **32***a* generally registering with the opening **30***a*. A lid or cover **34** for opening **32***a* is secured to a hinge rod **36** (FIGS. **2** and **4**) for pivotal movement with rod **36** between open and closed positions. Spacers **34***a* are provided on the bottom surface of cover **34** for spacing cover **34** from seat **32** when cover **34** is in its closed position. Seat **32** is pivotally mounted on hinge rod **36** for movement between raised and lowered positions. Seat **32** also has spacers **32***b* for spacing it from top wall **30** when in lowered position.

mounted in the bottom of cabinet **20** is a large and deep combustion pot (FIGS. **2** and **3**) defining a combustion chamber **38** containing a waste support member **40.** The combustion chamber wall can be formed

of sheet metal and has an outer layer of high temperature insulation **39.** A gas burner **42** (FIG. 2) is mounted at an elevated position at about the lip of the combustion chamber **38** and trained downward at an angle to the sidewall of the combustion chamber to impinge a flame on the upper surface of member **40** generally in the flame foot print area **40***a* indicated in FIG. **3.** An upstream igniter is provided for burner **42** in the form of spark plug **44** which is mounted in a position spaced upstream from the flame supporting outlet or holding port **42***a* of burner **42** so that the igniter **44** is removed from and protected from contamination with urine salts, splash, slosh, etc. from the raw and burning wastes. An ignition coil **45** services spark plug **44.**

A mixture of air and fuel, in this case gas, is supplied by a supply conduit or tube **46** to burner **42** from pressurizer **48** (FIGS. 2 and 3) mounted in the rear of the cabinet **20.** Pressurizer **48** has an outlet mixing chamber **50** (FIG. 3) into which a gas line **52** introduces fuel. A gas line solenoid valve **54** (FIG. 2), of the "on-off" type, is provided for controlling flow of gas through line **52** and into chamber **50,** thereby controlling flow of gas to the burner outlet **42***a* for supporting a flame. Valve **54** is opened during the burning cycle and closed during the cooling cycle although pressurizer **48** functions during both cycles so that combustion air is supplied during the burning cycle and cooling air is supplied to the combustion chamber from nozzle **42** during the cooling cycle.

In the exhaust system for exhausting air and combustion gases from the combustion chamber **38** of the device, there is provided a blower **56** having an outlet at **56***a* attached to and in communication with siutable vent duct work at **57.** A motor **58** is provided for driving both pressurizer **48** and blower **56.** A housing defining blower inlet chamber **60** is mounted at the combustion chamber exhaust outlet below blower **56** at the blower intake and the housing is equipped with a hinged variable vent valve **62** for regulating the flow of air into the inlet chamber **60** from air space **29** which surrounds the combustion chamber **38** and the sides of the hopper. The variable vent valve **62** is moved to open position (shown in phantom in FIG. 2) by a solenoid **64** through suitable linkage **66** and is returned to a closed position (shown in full lines in FIG. 2) by return spring **67** when solenoid **64** is de-energized.

During the cooling cycle, the plate or hinged vent valve **62** remains in closed position under tension of spring **67.** Exhaust blower **56** draws cooling air supplied by pressurizer **48** through conduit **46** and from burner outlet **42***a*, and air from various leaks in the device, i.e., as permitted by the trapdoor (described below) in the hopper, from around the burner mounting and around vent valve **62,** into chamber **60** for exhausting at exhaust outlet **56***a*. During the burning cycle the vent valve **62** is moved to open position so that much more air is drawn from space **26** (FIG. 2) through ports **28,** thence through space **29** and into inlet chamber **60** for exhausting, at the same time decreasing the flow of air through the combustion chamber which results in a higher combustion chamber burning temperature. Ports **28***a* permit greater air flow through the portion of space **29** immediately surrounding the combustion chamber **38** for producing a cooling effect on the exterior of the insulated combustion chamber and hopper during the burning cycle. Open vent valve **62** also results in reduction of air flow through the combustion chamber by decreasing the draft on the combustion chamber by blower **56** and the reduced air flow through combustion chamber **38.**

Inside cabinet **20** and above the combustion chamber **38,** a receptacle or hopper **70** (FIG. 2) extends from top wall **30** to a lower hopper lip **70***a* at a hopper bottom outlet which opens into combustion chamber **38** for directing waste into the combustion chamber. A trapdoor **72** is secured by a suitable hinge **74** at the rear wall of hopper **70** for pivotal movement between positions opening and closing the hopper bottom outlet. Suitable linkages indicated by the dotted lines **76** are provided between the trapdoor **72** and lid **34** for opening trapdoor **72** each time lid **34** is opened and closing trapdoor **72** each time lid **34** is closed.

The wast support member **40** forms a part of a waste support and combustion chamber temperature sensing system (FIGS. **2–6**). In the form shown, the member **40** (FIGS. **2–6**) is a four-legged, mushroom-shaped trivet of ceramic, cast steel or other heat resistant material having a waste supporting upper surface and a central bottom convex projection **40***b* (FIGS. 2 and **4–6**) supported in a concave receiver **80***a* of a cast iron base member **80** (FIGS. **2, 4, 7** and **8**). The base member **80** is of highly heat conductive material and functions as a heat sink.

Base member **80** has a peripheral flange portion **80***b* which is secured to the bottom surface of the sheet metal combustion chamber wall **38** by copper brazing or the like so that the receiver **80***a* projects upwardly within the combustion chamber and receives surface **40***b* to support the trivet within the combustion chamber. Where the combustion chamber **38** is cast in lieu of being formed of sheet metal, the base **80** can be cast as an integral portion of the combustion chamber walls.

The four legs of the trivet retain the upper platform surface of the trivet fairly level within the combustion chamber. Ports or bores **82** are provided through the platform portion of trivet **40** for drainage of liquid therebelow. Thus, when the flame engages and heats the trivet it burns solid waste material on the trivet surface and vaporizes liquid from beneath the trivet. The bottom surface **40***d* of trivet **40** is curved adjacent its outer edge for focusing radiating heat on the combustion chamber bottom wall for faster vaporization and combustion of any liquid or other waste material beneath the trivet.

An upwardly projecting slot **80***c* (FIGS. **7** and **8**) is provided in the top portion of base **80** for receiving a locating fin **40***c* (FIGS. **4–6**) extending laterally from the convex projection **40***b* for properly radially locating the trivet **40** relative to the base member **80.** Outside of the combustion chamber, base **80** includes a pair of probe receiving cavities or bores **84** and **86** in which temperature sensitive probes **88** and **90** (FIG. 2) are contained. Probe **88** is a non-resettable high temperature responsive switch which permanently breaks an electrical circuit when it reaches a temperature of about 750°F. Probe **90** is a temperature responsive electrical switch which breaks contact at about 450°F. and resets or closes when cooled down.

The 450°F. temperature at probe **90** indicates that the temperature in the combustion chamber has reached about 1,500 °F. for at least one-half second for the purpose of destroying all odors in the combustion chamber. The 750°F. temperature at probe **88** indicates that the combustion cycle is proceeding out of

control, possibly due to a failure in probe **90**, and may soon reach a dangerous temperature.

A number of electrical components are provided in cabinet **20** for controlling the burning and cooling cycle. For example a DPDT lid switch **92** (FIG. **2**) is mounted for actuation by movement of the lid to turn on the blower motor **58** each time lid **34** is opened. Switch **92** is shown in FIG. **2** associated with linkage **76** by which switch **92** is actuated. When the lid **34** is closed, switch **92** initiates the burning cycle. A sail switch **94** (FIGS. **2** and **3**) is mounted in the exhaust portion of blower **56** and closes responsive to detection of air flow from blower **56** and reopens when air flow ceases. A temperature responsive blower cooling switch **96** (FIG. **3**) is also mounted in the blower exhaust and opens when the temperature in the blower exhaust is below about 120°F.

Turning now to FIG. **9**, suitable circuitry is provided for controlling operation of the incinerating toilet on temperature responsive cycles. The circuitry is shown with the lid **34** in raised position with DPDT seat switch contact **92***b* supplying power through closed control switch **90** to TPDT relay R which closes relay contacts R–**1**, R–**2** and R–**3**. Blower motor **58** is energized through relay contact R–**1** so that air is circulated through combustion pot **38** during use of the device to carry away odors. The movement of air by blower **56** through exhaust outlet **56***a* closes sail switch **94**.

After use, the lid **34** is closed, reversing the poles of the seat switch **92**. Relay R holds through closed contact R–**2** and closed cycle control switch **90**. The blower motor **58** is now energized through closed contacts R–**1** and R–**2** and the igniter **44** is energized through contact R–**3**, and switch **92** and the vent solenoid and gas valve solenoid are energized through said switch **94**. Fuel and air are supplied to the burner **42** and the burner is ignited. At a temperature of about 120°F. the blower cool-down switch **96** closes to directly energize the blower motor **58** through contact **92***a*. When the temperature of the combustion chamber reaches 400° to 450°F. as detected by temperature sensitive cycle control switch **90**, switch **90** opens, de-energizing relay R so that contacts R–**1** through R–**3** open. This de-energizes the vent solenoid **64**, the gas valve solenoid **54** and the igniter **44** and initiates a cool cycle. Blower motor **58** continues to be energized until the temperature in exhaust outlet **56***a* falls to about 120°F. whereupon the temperature sensitive blower cool-down switch **96** opens to de-energize blower motor **58** and terminate the cooling cycle. Cycle control switch **90** recloses at about 100°F. The device is then ready for reuse.

As safety features, it will be noted that the gas valve **54** will not open unless sail switch **94** detects flow of air through outlet **56***a* so that raw gas will not collect in the combustion chamber **38** should there be a failure in ignition. Further, the combustion chamber overheat switch **88** is provided, which opens at about 750°F. responsive to a rise in the combustion chamber temperature to an extremely high temperature indicating a malfunction in the system. Switch **88** is not resettable once open so that the user will be required to call a repairman to replace switch **88** and make other necessary repairs prior to further use of the device.

If it is desired to use an oil burner rather than a gas burner in the device, certain modification will be made. For example, referring to FIG. **10**, an aspirating oil burner **102** replaces the gas burner **42** and is supplied with air through air valve **104** and fuel oil through fuel valve **106**. Both the air and fuel lines are equipt with pressure regualtors **108** and **110** respectively.

As shown in FIG. **11** certain other modifications were made in the device using the oil burner. For example, sail switch **94** controls both the fuel valve and air valve. Additionally, a flame sensor **112** is provided for detecting a flame at burner **102** or at a pilot for burner **102**. if no flame is detected within a short interval after the burning cycle commences, flame sensor **112** opens contact FS–**1** to close air valve **104** and fuel valve **106**. This prevents puddling of fuel oil in the combustion chamber in the event there is no ignition.

I claim:

1. An incinerator comprising a casing, wall means defining a combustion chamber in said casing having an outlet exhaust duct extending to the exterior of said casing, inlet means in said casing for delivering waste material to be burned to said combustion chamber, a fuel burner for burning the waste material during a burning cycle in said combustion chamber, means for cooling the combustion chamber during a cooling cycle, and control means for activating both said burner and said cooling means and for deactivating said burner means including a temperature sensor for sensing a predetermined elevated temperature of said combustion chamber and fuel valve means for deactivating said burning means responsive to said elevated temperature without deactivating said cooling means at said temperature.

2. The incinerator of claim **1** including a second temperature sensor in said outlet exhaust duct for de-energizing said blower responsive to a decrease in temperatures from said elevated temperature to a reasonably comfortable temperature substantially lower than said elevated temperature.

3. The incinerator of claim **1** wherein said cooling means comprises draft means for drawing gases from said combustion chamber into said exhaust duct, and including a source of air adjacent said duct, an air valve which is open during the burning cycle for admitting air from the source into the duct, and means for closing said valve responsive to said elevated temperature.

4. An incinerating device comprising a casing, a combustion chamber in said casing, inlet means in said casing for delivering waste material to be burned to said combustion chamber, means for burning the waste material in said combustion chamber, means for cooling the combustion chamber, and control means for activating and deactivating said burning means and said cooling means including temperature sensing means for sensing a predetermined elevated temperature of said combustion chamber indicative of completion of burning and a predetermined decreased temperature substantially lower than said elevated temperature, and indicative of completion of cooling, means for deactivating the burning means responsive to the elevated temperature and means for deactivating the cooling means responsive to said decreased temperature.

5. The device of claim **4** including replaceably mounted sensing and non-resettable breaking means for sensing a predetermined maximum temperature limit for use of the device significantly greater than said elevated temperature and for breaking to deactivate both the burning and heating means responsive to said temperature limit.

6. An incinerating device comprising a casing, a combustion chamber in said casing, inlet means in said casing for delivering waste material to be burned to said combustion chamber, fuel burner means for burning the waste material in said combustion chamber and having a fuel supply conduit with an on-off valve for controlling fuel flow to the burner, means for activating said burner means including means for opening the fuel control valve, a first temperature sensing means for sensing a predetermined first elevated temperature of said combustion chamber, means for resettably deactivating said burner including means for closing said valve responsive to said first elevated temperature, and a second temperature sensing means for sensing a second elevated temperature of said combustion chamber significantly higher than said first elevated temperature and for deactivating said burner including closing said valve responsive to said second elevated temperature.

7. An incinerating device comprising a casing, a combustion chamber in said casing, inlet means in said casing for delivering waste material to be burned to said combustion chamber, fuel burner means for burning the waste material during a burning cycle in said combustion chamber and having a fuel supply conduit and fuel supply control valve means, control means for activating and deactivating said burner means including means for opening said valve while activating the burner, means for sensing a predetermined first elevated temperature of said combustion chamber, means responsive to said sensing means for closing said valve, means for sensing a second elevated temperature of said combustion chamber significantly higher than said first elevated temperature for overriding said activating means and rendering said burner inactivatable with said valve closed.

8. The device of claim 7 wherein said cooling means comprises a blower for drawing air through and around the combustion chamber.

9. The device of claim 8 including a sail switch for blocking opening of the fuel valve in the absence of a draft of air by said blower.

10. The device of claim 7 wherein said cooling means comprises draft means for drawing gases from said combustion chamber into said exhaust duct, and including a source of air adjacent said duct, an air valve which is open during the burning cycle for admitting air from the source into the duct, and means for closing said valve responsive to said elevated temperature, and wherein said overriding means renders said draft means and air valve inactivatable.

11. The device of claim 7 including a seat member having a central opening in registry with said inlet means, and a hinged lid for covering and uncovering said opening, said control means including means responsive to raising said lid to uncovering position for activating said cooling means and means responsive to closing said lid for activating said burner means.

12. The device of claim 11 wherein said overriding means is non-resettable and is replaceably mounted in heat receiving proximity to the combustion chamber.

13. An incinerating device comprising a casing, wall means defining a combustion chamber in said casing having an outlet exhaust duct extending to the exterior of said casing, inlet means in said casing for delivering waste material to be burned in said combustion chamber, means for burning the waste material during a burning cycle in said combustion chamber, means for cooling the combustion chamber during a cooling cycle, a support member for receiving waste to be burned above the combustion chamber bottom wall and having a heat conductive base extending through the bottom wall, and temperature sensor means mounted in said base for sensing a predetermined elevated temperature indicating completion of burning in said combustion chamber for de-energizing said burning means.

14. The device of claim 13 including a second temperature sensor mounted in said base for sensing a second predetermined elevated temperature indicating hazardous thermal conditions in said combustion chamber significantly higher than said first elevated temperature for de-energizing said burning and cooling means.

15. The device of claim 14 wherein said first predetermined elevated temperature is in the range of 400° to 500°F. and said second predetermined elevated temperature is above 750°F., a third temperature sensor mounted in said outlet exhaust duct for de-energizing said cooling means responsive to a decrease in temperature from said first elevated temperature to a predetermined temperature substantially lower than said first elevated temperature and in the range of about 100° to 150°F.

16. The device of claim 13 wherein said support member comprises a foraminous trivet having a central bottom convex surface and the base is an upstanding leg with concave top for releasably receiving the convex surface of the trivet for supporting the trivet.

17. The device of claim 13 wherein said support member is foraminous and said burning means is a fuel burner mounted to impinge a flame directly on and under said support member.

18. The device of claim 13 wherein said support member has a bottom surface portion for radiating heat against the combustion chamber bottom wall.

19. The device of claim 18 wherein said supporot member is ceramic and mushroom shaped.

* * * * *

UNITED STATES PATENT OFFICE

CERTIFICATE OF CORRECTION

Patent No. 3,867,729 Dated February 25, 1975

Inventor(s) Robert C. Helke

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

IN THE CLAIMS:

Claims 1, 4, 6, 7, 12, 13 and 14 should be deleted and the following claims substituted therefor:

1. An incinerator comprising a casing, wall means defining a combustion chamber in said casing having a waste receiving wall and an outlet exhaust duct extending to the exterior of said casing, inlet means in said casing for delivering waste material to be burned to said combustion chamber, a fuel burner for burning the waste material during a burning cycle in said combustion chamber, means for cooling the combustion chamber during a cooling cycle, and control means for activating both said burner and said cooling means and for deactivating said burner means including a temperature sensor directly contacting said waste receiving wall for sensing a predetermined elevated temperature of said combustion chamber and fuel valve means for deactivating said burning means responsive to said elevated temperature without deactivating said cooling means at said temperature.

Signed and Sealed this

ninth Day of *September 1975*

[SEAL]

Attest:

RUTH C. MASON
Attesting Officer

C. MARSHALL DANN
Commissioner of Patents and Trademarks

FORM PO-1050 (10-69)

USCOMM-DC 60376-P69
U.S. GOVERNMENT PRINTING OFFICE: 869-930

UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,867,729 Dated February 25, 1975

Inventor(s) Robert C. Helke

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

4. An incinerating device comprising a casing, a combustion chamber in said casing having a waste receiving bottom wall, inlet means in said casing for delivering waste material to be burned to said combustion chamber, means for burning the waste material in said combustion chamber, means for cooling the combustion chamber, and control means for activating and deactivating said burning means and said cooling means including a first temperature sensor in direct contact with the waste receiving wall for sensing a predetermined elevated temperature of said combustion chamber indicative of completion of burning and a second temperature sensor for sensing a predetermined decreased temperature substantially lower than said elevated temperature, and indicative of completion of cooling, means for deactivating the burning means responsive to the elevated temperature and means for deactivating the cooling means responsive to said decreased temperature.

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UNITED STATES PATENT OFFICE

CERTIFICATE OF CORRECTION

Patent No. 3,867,729 Dated February 25, 1975

Inventor(s) Robert C. Helke

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

6. An incinerating device comprising a casing, a combustion chamber having a waste receiving bottom wall in said casing, inlet means in said casing for delivering waste material to be burned to said combustion chamber, fuel burner means for burning the waste material in said combustion chamber and having a fuel supply conduit with an on-off valve for controlling fuel flow to the burner, means for activating said burner means including means for opening the fuel control valve, a first temperature sensing means contacting said bottom wall for sensing a predetermined first elevated temperature of said combustion chamber, means for resettably deactivating said burner including means for closing said valve responsive to said first elevated temperature, and a second temperature sensing means contacting said bottom wall for sensing a second elevated temperature of said combustion chamber significantly higher than said first elevated temperature and for deactivating said burner including closing said valve responsive to said second elevated temperature.

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UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,867,729 Dated February 25, 1975

Inventor(s) Robert C. Helke

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

7. An incinerating device comprising a casing, a combustion chamber with a bottom waste receiving wall in said casing, inlet means in said casing for delivering waste material to be burned to said combustion chamber, fuel burner means for burning the waste material during a burning cycle in said combustion chamber and having a fuel supply conduit and fuel supply control valve means, control means for activating and deactivating said burner means including means for opening said valve while activating the burner, means in contact with said wall for sensing a predetermined first elevated temperature of said combustion chamber, means responsive to said sensing means for closing said valve, means in contact with said wall for sensing a second elevated temperature of said combustion chamber significantly higher than said first elevated temperature for overriding said activating means and rendering said burner inactivatable with

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CERTIFICATE OF CORRECTION

Patent No. 3,867,729 Dated February 25, 1975

Inventor(s) Robert C. Helke

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

said valve closed.

12. The device of claim 11 wherein said overriding means is non-resettable.

13. An incinerating device comprising a casing, wall means defining a combustion chamber in said casing having an outlet exhaust duct extending to the exterior of said casing, inlet means in said casing for delivering waste material to be burned in said combustion chamber, means for burning the waste material during a burning cycle in said combustion chamber, means for cooling the combustion chamber during a cooling cycle, a support member for receiving solid waste to be burned above the combustion chamber bottom wall releasing liquid waste to the bottom wall and having a heat conductive base extending through and forming a part of the bottom wall, and temperature sensor

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UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,867,729 Dated February 25, 1975

Inventor(s) Robert C. Helke

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

means mounted in contact with the bottom wall for sensing a predetermined elevated temperature indicating completion of burning in said combustion chamber for de-energizing said burning means.

14. The device of claim 13 wherein said sensor means is mounted in said base and including a second temperature sensor mounted in said base for sensing a second predetermined elevated temperature indicating hazardous thermal conditions in said combustion chamber significantly higher than said first elevated temperature for de-energizing said burning and cooling means.

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UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,867,729 Dated February 25, 1975

Inventor(s) Robert C. Helke

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

20. The device of claim 13 wherein said support member is movably mounted.

Column 8, line 49, "under" should read -- through --.

Column 8, line 53, "ceramic and" should be deleted.

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UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3867729 Dated 2/25/75

Inventor(s) Robert C. Helke

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Column 1, Line 50 delete "vide" and
insert --vided---.

Column 1, Line 54, delete "imporved" and
insert --improved--.

Column 2, Line 31, delete "108,040" and
insert --108,050--.

Column 6, Line 3, delete "equipt" and
insert --equipped--.

Signed and sealed this 27th day of May 1975.

(SEAL)
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RUTH C. MASON
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* U.S. GOVERNMENT PRINTING OFFICE : 1969 O—366-334.