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Lowe

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[54] **LOW-POLLUTION TRASH INCINERATOR**

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[21] Appl. No.: **348,284**

Related U.S. Application Data

[63] Continuation-in-part of Ser. No. 178,366, Sept. 7, 1971, abandoned.

[52] **U.S. Cl.** ..... **110/8 R,** 110/18 R, 110/49 R, 110/179

[51] **Int. Cl.** **F23g 7/00**

[58] **Field of Search** ..... 110/7 A, 8 R, 18 R, 49 R, 110/173, 179

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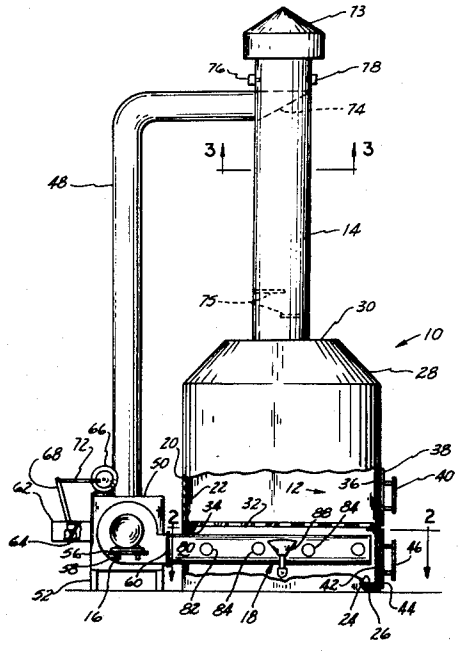
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[57] **ABSTRACT**

A trash incinerator with a combustion chamber connected to a flue and a blower with an inlet connected with the flue and an air inlet. The outlet of the blower is connected to a discharge manifold within the combustion chamber for recirculating a substantial portion of the partially burned combustion products through the chamber to minimize the pollution of the atmosphere resulting from the burning of waste material in the chamber. The outlet of the blower can also be connected to a manifold to provide a stream of air retarding the escape through an opening in the combustion chamber of hot gases produced by material burning in the chamber, thereby protecting a person from the hot gases while charging waste material into the chamber through the opening.

51 Claims, 9 Drawing Figures



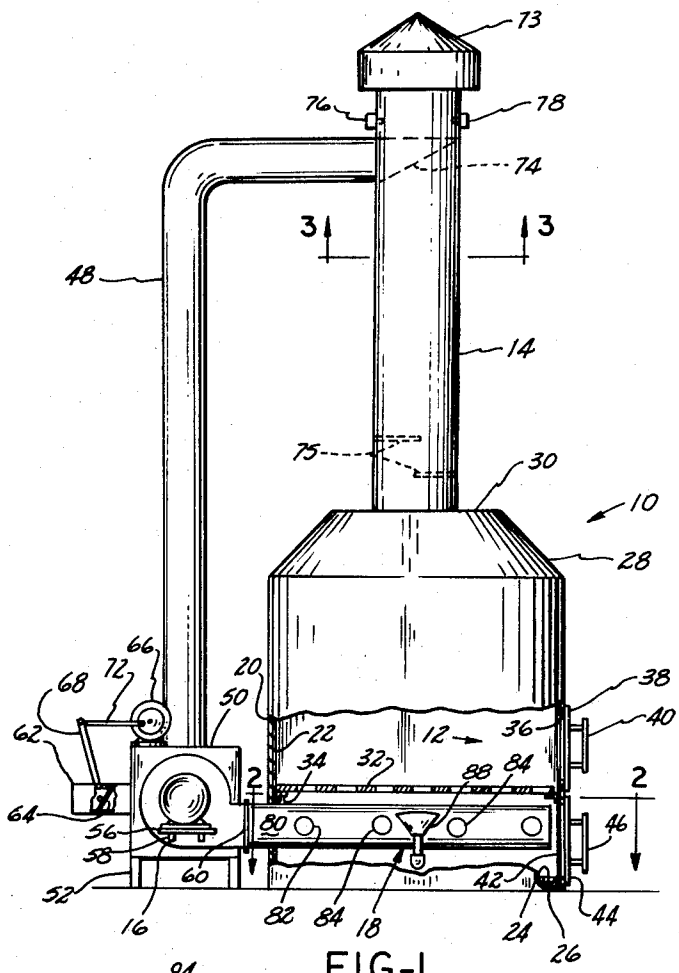


FIG-1

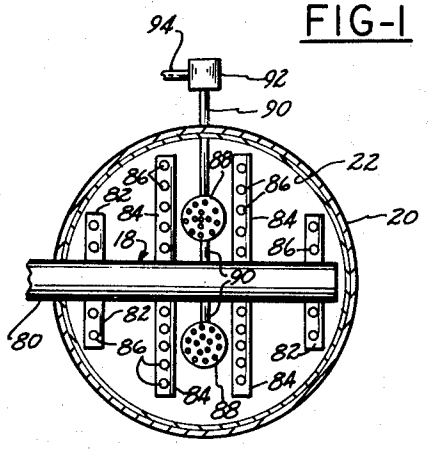


FIG-2

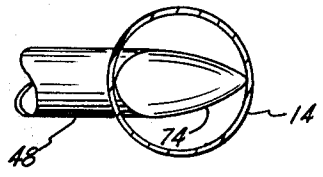


FIG-3

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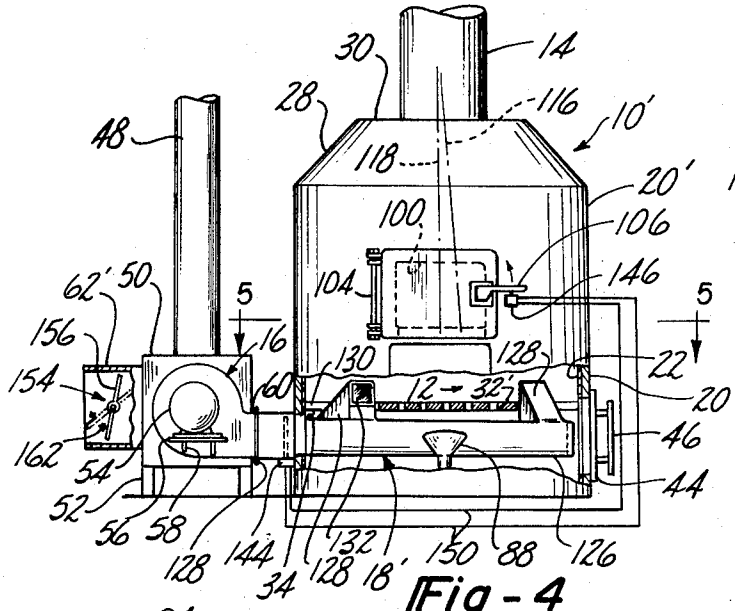


Fig-4

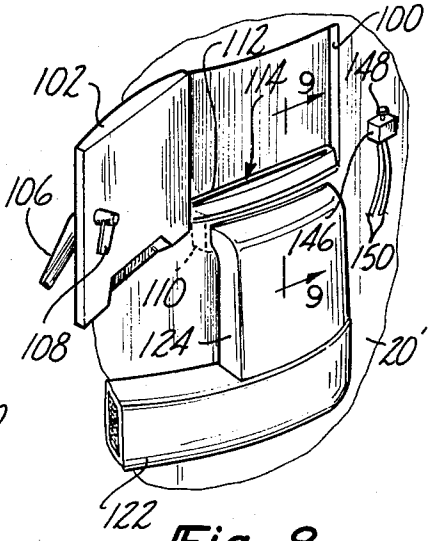


Fig-8

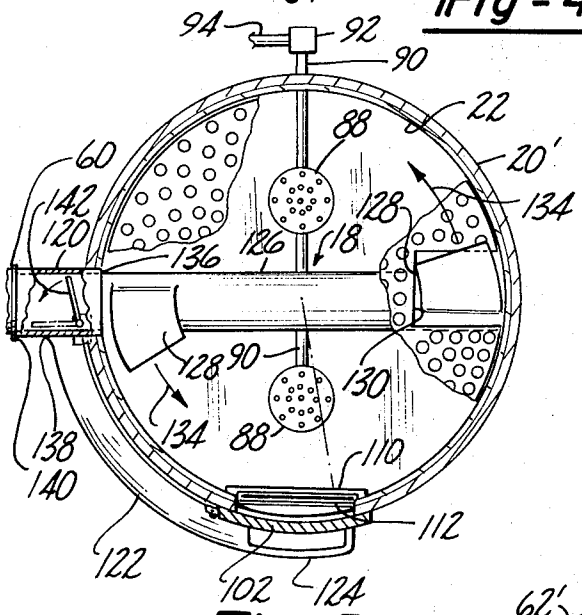


Fig-5

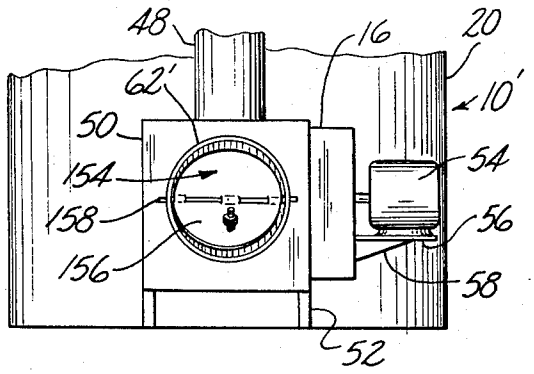


Fig-6

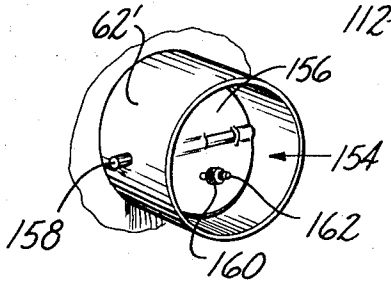


Fig-7

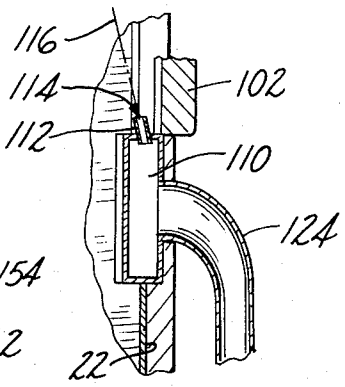


Fig-9

LOW-POLLUTION TRASH INCINERATOR

REFERENCE TO A COPENDING APPLICATION

This is a continuation-in-part of copending U.S. Pat. application Ser. No. 178,366 of Roy E. Lowe, filed Sept. 7, 1971, entitled "Low-Pollution Trash Incinerator," now abandoned.

This invention relates to trash incinerators for burning waste materials such as paper, cardboard, pasteboard, wood, and other combustible trash and refuse.

The combustion process in the usual trash incinerator produces large quantities of combustion products such as partially burned gases, smoke, soot and other particulate contaminants which are discharged into and pollute the atmosphere.

Objects of this invention are to provide a trash incinerator which substantially decreases the pollution of the atmosphere resulting from the burning of waste material, is readily operable by unskilled persons, protects persons charging the incinerator with waste material from the intense heat produced by waste material already being burned therein, is of economical construction and assembly, and is substantially maintenance free.

These and other objects, features and advantages of this invention will be apparent from the following description, appended claims and accompanying drawings in which:

FIG. 1 is a side elevational view of a trash incinerator embodying this invention with portions broken away to illustrate the component parts.

FIG. 2 is a sectional view on line 2—2 of FIG. 1.

FIG. 3 is an enlarged fragmentary sectional view on line 3—3 of FIG. 1.

FIG. 4 is a fragmentary side view of a modified form of a trash incinerator embodying this invention with portions broken away to illustrate some of the component parts thereof.

FIG. 5 is a sectional view on line 5—5 of FIG. 4.

FIG. 6 is an enlarged fragmentary side view of the trash incinerator of FIG. 4 illustrating an air inlet damper valve assembly thereof.

FIG. 7 is an enlarged isometric view of the air inlet damper valve of FIGS. 4 and 6.

FIG. 8 is an enlarged fragmentary isometric view of the trash incinerator of FIG. 4 illustrating ducts and a discharge manifold for directing a stream of gases across a charging opening to retard the escape of hot gases through the opening to the exterior of the trash incinerator.

FIG. 9 is a fragmentary enlarged sectional view on line 9—9 of FIG. 8.

REFERRING IN MORE DETAIL TO THE DRAWINGS:

FIG. 1 illustrates a trash incinerator 10 embodying this invention with a combustion chamber 12, a cylindrical chimney or flue 14, and a blower 16 connected to a discharge manifold 18. Combustion chamber 12 has a generally cylindrical sidewall 20 with an integrally bonded ceramic lining 22 and a circular bottom wall 24 supported by a channel iron ring 26 fixed to the bottom edge of side wall 20 as by welding. Combustion chamber 12 has a frusto-conical upper portion 28 with a top 30 connected to the lower inlet end of flue 14. Waste material to be burned in chamber 12 is supported therein by a grate 32 mounted in the chamber approximately 1/8 of the way up from bottom wall 24 by a channel iron hoop 34 fixed to sidewall 20. Waste material is inserted into the chamber through an opening 36 in sidewall 20 which is normally closed and sealed by a door 38 with a handle 40. Manifold 18 can be inspected and serviced as well as any ashes removed from bottom 24 through an opening 42 in sidewall 20 which is normally closed and sealed by a hinged access door 44 with a handle 46.

The upper end of flue 14 is coupled adjacent its outlet through a return duct 48 and a mixing chamber 50 supported by legs 52 to the inlet of blower 16. Blower 16 is driven by a variable speed electric motor 54 fastened to a mounting plate 56 fixed by gussets 58 to a sidewall of the housing of the blower 16. The outlet 60 of blower 16 is connected to discharge manifold 18. An atmospheric air inlet duct 62 with a pivotally mounted control valve 64 therein is connected to mixing chamber 50. Valve 64 is opened and closed by an electric control motor 66. Pivotally mounted valve 64 is fixed to a lever arm 68 operably connected to motor 66 by a crank plate 70 fixed to the drive shaft thereof and a link bar 72 pivoted at its opposed ends to lever arm 68 and crank plate 70. To prevent sparks from escaping through and objects from entering flue 14, a bonnet or spark arrester 73 is mounted on the top thereof. The upper end of return duct 48 extends diametrically through flue 14 and is cut away on an oblique angle to provide a generally tear drop shape deflector 74 (FIG. 3) in the flue at the connection with duct 48. Baffles 75 are fixed in flue 14 adjacent its inlet end to reflect heat from chamber 12 and retard surges through flue 14 when blower 16 is started. To control the cycling of trash incinerator 10, a source of light 76 and a photoelectric cell or eye 78 are mounted in generally opposed relation on a diameter of flue 14 above the connection of return duct 48 with the flue.

As shown in FIG. 2, manifold 18 has a main duct 80 closed at one end and a plurality of generally transversely extending branch ducts 82 and 84 each connected to main duct 80 and closed at its free end. Branch ducts 82 and 84 each have a plurality of outlet ports 86 opening generally vertically upwardly below grate 32. To provide a more even distribution of the mass rate of flow of gas through ports 86, the last two ports 86 adjacent the free end of each branch duct 84 are of a larger diameter than the rest of the ports of the branch duct. A combustible gas can be injected into chamber 12 through gas jets 88 underlying grate 32. Gas jets 88 are provided with an automatic pilot and are connected through a conduit 90 to an electrically operated control valve 92 adapted to be connected to a pipe 94 to a source of natural or other combustible gas.

In operating trash incinerator 10, door 38 is opened and the waste material to be burned is loaded into combustion chamber 12 on top of grate 32 through opening 36. The waste material is ignited either manually such as by using a match or automatically by energizing a control means (not shown) to open electrically operated valve 92 which supplies gas to jets 88, and then door 38 is closed. The burning of the waste material produces smoke with hot gasses and other combustion products which are not completely burned. Blower 16 is driven by motor 54 and valve 64 is opened by motor 66 so that as these partially burned combustion prod-

ucts pass up through flue 14, at least a portion thereof are recirculated through return duct 48, mixed with atmospheric air, and discharged through outlet ports 86 of manifold 18 into combustion chamber 12 below grate 32. The recirculation of these combustion products results in a more complete burning of both the combustion products and the waste materials in the combustion chamber which substantially decreases the amount of particulate material, soot, smoke, and other contaminants which are discharged into the atmosphere through the outlet of flue 14. If needed, valve 92 can be opened to supply combustible gas to jets 88 which will provide additional heat resulting in more complete burning of the combustion products and waste materials in combustion chamber 12.

The combustion products are mixed with atmospheric air both in mixing chamber 50 and at the connection of return duct 48 with flue 14. Blower 16 creates a downdraft of atmospheric air through the outlet of flue 14 around deflector 74 and into return duct 48 where the atmospheric air mixes with the combustion products moving upward through flue 14 and into the return duct. This upflow of combustion products and downflow of substantially cooler atmospheric air is believed to produce an air lock which retards the flow of the combustion products and particularly the particulate contaminants through the outlet of flue 14 and facilitates recirculation of the partially burned combustion products. Deflector 74 also tends to retard the flow of the heavier particulate contaminants through the outlet of flue 14 and to channel the gaseous combustion products into return duct 48. The mixing of atmospheric air with the combustion products during recirculation both provides the oxygen needed for further burning of the combustion products and lowers the temperature of the combustion products sufficiently so that a blower made of special high temperature materials and metal alloys is not required.

To optimize the complete burning of the waste material and combustion products, blower 16, atmospheric air inlet valve 64, and gas jets 88 are adjusted automatically by the control means in response to an electric signal produced by photoelectric cell 78. The amount of light received by photoelectric cell 78 from light source 76 is dependent on the extent to which the combustion products discharged to the atmosphere through flue 14 past photoelectric cell 78 are completely burned. Generally, the lesser the extent to which these combustion products are burned, the more translucent or opaque the combustion products will appear which will result in less light being received by photoelectric cell 78. Thus, the electric signal of photoelectric cell 78 will vary with and in proportion to the extent to which the combustion products escaping to the atmosphere through the outlet of flue 14 are completely burned. The control means utilizes the electric signal from photoelectric cell 78 to control motor 66 to open and close valve 64 and to control motor 54 to increase and decrease the speed at which it drives blower 16. In general, the lesser the extent to which the combustion products escaping from the outlet of flue 14 are completely burned, the faster the blower 16 is driven by motor 54 to recirculate a greater portion of the combustion products and the further valve 64 is opened to admit more atmospheric air into mixing chamber 50. Similarly, the control means also opens and closes valve 92 to ignite and shut off gas jets 88 in response to the extent to which combustion products escaping to the atmosphere past photoelectric cell 78 are completely burned. Preferably, the control means always operates blower 16 and keeps atmospheric inlet valve 64 partially open during the entire combustion process to assure that at least a portion of the combustion products are mixed with atmospheric air and recirculated so long as any waste material is being burned in chamber 12. A suitable control means utilizing the signal from photoelectric cell 78 to cycle atmospheric air inlet valve 64, blower 16, and gas jets 88 will be apparent to those skilled in the art and thus will not be described in further detail.

FIGS. 4 through 9 illustrate a modified form of a trash incinerator 10' embodying this invention. The trash incinerator 10' is generally similar to trash incinerator 10 and has a combustion chamber 12, flue 14 and a blower 16. Combustion chamber 12 has a cylindrical side wall 20' with a ceramic lining 22, bottom wall 24, frustoconical upper portion 28 and top 30. Waste material to be burned in trash incinerator 10' is inserted into chamber 12 through a charging opening 100 located in side wall 20' between a grate or hearth 32' and the connection of flue 14 to the chamber. Charging opening 100 is covered by a door 102 mounted by a hinge pin 104 on side wall 20' and having a handle 106 pivotally mounted therein with a latch 108 fixed to the handle for releasably locking the door in its closed position.

To prevent a person charging waste material into trash incinerator 10' from being injured by hot gases, produced by burning waste material in the chamber, escaping through charging opening 100 when door 102 is opened a stream of gases is directed across the opening. As shown in FIGS. 8 and 9, the stream of gases is directed across opening 100 by a manifold 110 with a pair of spaced apart lips 112 forming a mouth or outlet 114 extending across the bottom of opening 100. Preferably, outlet 114 directs a stream of escaping gases across the entire width of opening 100 adjacent the bottom thereof in a path inclined inwardly toward the point at which the center of the inlet of flue 14 is connected with the top 30 of chamber 12 as indicated in FIG. 4 by broken line 116 representing the path of the stream of gases intersecting center line 118 of flue 14. A flow of gases from the outlet of blower 16 is directed to manifold 110 and, thence, outlet 114 through a valve housing 120, a duct 122 extending generally circumferentially around a portion of the exterior of combustion chamber 12 and a duct 124 extending generally vertically between duct 122 and manifold 110.

As shown in FIGS. 4 and 5, a discharge manifold 18' has a main duct 126 with two discharge outlet hoods 128 connected thereto and extending at least partially through openings 130 in grate or hearth 32'. Each outlet hood 128 has a generally rectangular mouth 132 and extends generally arcuately within the chamber to impart a generally counterclockwise (as viewed in FIG. 5) swirling motion to the gases discharged therefrom as indicated by arrows 134 which is believed to improve the combustion or burning of waste materials received on grate 32'.

Valve housing 120, which is generally rectilinear in cross section, has two outlets 136 and 138 connected to main duct 126 of manifold 18' and duct 122 of manifold 110 and an outlet 140 connected to outlet 60 of blower 16. A valve plate 142 is mounted in housing 120

for pivotal movement to pass gases through either outlet **136** or **138** of the housing as shown in FIG. **5** in phantom and solid line positions respectively. Valve **142** is pivotally moved to block either outlet **136** or **138** in response to the latching and unlatching of door **100** by a solenoid **144** mechanically connected to valve **142.** Solenoid **144** pivotally moves valve **142** in response to changes of state of the contacts of a microswitch **146** electrically connected with solenoid **144** by a pair of lead lines **150.** Switch **146** is mounted on side wall **20'** of the trash incinerator with its actuator stem **148** underlying handle **106** of door **102** such that movement of handle **106** to lock and release the door moves actuator **148** to change the state of the contacts of the switch.

In trash incinerator **10'**, the amount of air passing through air inlet duct **62'** into mixing chamber **50** is controlled by an automatic damper valve **154.** Damper valve **154** has a valve plate **156** pivotally mounted by a shaft **158** in cylindrical inlet duct **62'** with a counterweight **160** which urges valve plate **156** toward its closed position as shown in FIG. **7.** Counterweight **160** is adjustably received on a threaded stud **162** fixed to and projecting from the lower portion of valve plate **156.**

Trash incinerator **10'** operates in generally the same manner as trash incinerator **10** in burning waste products with a substantial decrease in pollution of the atmosphere and, thus, a detailed description of this operation will not be repeated. In trash incinerator **10'**, damper valve **154** automatically varies the amount of air flowing through passageway **62** into mixing chamber **50** in response to the speed at which blower **16** is driven by motor **54.** The speed of motor **54** and, hence, blower **16** can be controlled either manually by appropriate switches or automatically by photoelectric cell **78.** If the speed of motor **54** is controlled by photoelectric cell **78** to optimize the complete burning of waste material and the products of combustion damper valve **154** when properly adjusted automatically varies the amount of air flowing into mixing chamber **50** in accordance with the speed of blower **16** controlled by photoelectric cell **78** without the need for a valve control motor **66** controlled by the signal produced by photoelectric cell **78** as used in trash incinerator **10.** The extent to which damper valve **154** opens at any selected speed of blower **16** can be varied and adjusted by changing the position of counterweight **160** on threaded stud **162.**

In trash incinerator **10'**, pivotal movement of handle **106** to the unlatched position trips actuator **148** of microswitch **146** to change the state of the contacts thereof and thereby actuate solenoid **144** to pivotally move valve plate **142** to the position shown in solid line in FIG. **5.** In this solid line position, valve plate **142** blocks the flow of gases from outlet **60** of blower **16** into discharge manifold **18'** and directs the flow of such gases through outlet **114** of manifold **112.** This provides a stream of gases which retards the escape of hot gases and particulate contaminants within chamber **12** to the exterior thereof through charging opening **100** to provide what might be termed a heat shield protecting a person charging waste material into the combustion chamber through charging opening **100** when waste material is already being burned in the chamber. With valve **142** in this solid line position, blower **16** also continues to recirculate gases through return duct **48** which prevents particulate contaminants such as fly ash from escaping to the atmosphere through the upper end of flue **14.** When door **102** is closed and handle **106** pivoted to the latched position, the state of the contacts of micro-switch **146** is again changed to actuate solenoid **144** to pivotally move valve **142** counterclockwise in the direction of arrow **164** to the position shown in phantom line in FIG. **5.** When valve **142** is in this phantom line position, trash incinerator **10'** operates in the same manner as incinerator **10.**

An example of a trash incinerator **10** embodying this invention, which is provided by way of illustration and not of limitation, has a chamber sidewall 6 feet in diameter and 6 ⅔ feet high with a truncated cone portion 2 ½ feet high and a grate or hearth 2 feet above the bottom. This incinerator has a flue 19 inches in diameter and 19 feet long and a return duct 9 inches in diameter. The main duct of the manifold is 7 inches in diameter and the branch ducts are 3 inches in diameter. The small ports in the branch ducts are 3/8 inch in diameter and the large ports 1/2 inch in diameter. The atmospheric air inlet duct to the mixing chamber has a rectangular cross section 3 by 9 inches and the blower has a capacity of approximately 500 cubic feet per minute at a head pressure of 1 inch of water when driven at 1,750 R.P.M. and provides a discharge pressure in the neighborhood of 1 to 2 pounds per square inch gauge at the ports of the manifold.

The trash incinerator of this invention recirculates at least a portion of the partially burned combustion products to substantially decrease the pollution of the atmosphere by the burning of waste materials. The control of the blower, gas jets and atmospheric air inlet either directly by valve **64** and control motor **66** in incinerator **10** or indirectly by damper valve **154** in incinerator **10'** in response to the electrical signal of the photoelectric cell provides an incinerator which automatically optimizes its operation to provide the maximum decrease in the pollution of the atmosphere under varying operating conditions with different waste materials, and hence, this trash incinerator is readily operable by unskilled persons. The discharge of a stream of gases across the charging opening when it communicates with the atmosphere provides a heat shield which prevents a person charging a trash incinerator in which waste material is already being burned from being injured by hot gases and heat escaping through the charging opening when it is open. This trash incinerator has comparatively few component parts, most of which can be either fabricated from standard materials or purchased as standard components and hence, is of economical construction and assembly and relatively maintenance free.

I claim:

1. A trash incinerator comprising a combustion chamber, support means within said chamber to receive combustionable waste material thereon, a flue having an inlet connected to said chamber above said support means and an outlet opening to the atmosphere above said chamber, a blower having an inlet connected with said flue above said inlet thereof and below said outlet thereof, discharge means within said chamber for discharging gases into the lower portion of said chamber adjacent combustionable material received on said support means, said blower also having an outlet connected to said discharge means such that at least a portion of the combustion products produced by the

burning of waste material in said chamber which pass into said flue are recirculated by said blower and discharged through said discharge means into said chamber to more completely burn the combustion products and waste material whereby pollution of the atmosphere by burning the waste material is decreased, and a light source and a photoelectric cell mounted on said flue above said connection of said blower inlet with said flue and in generally opposed relation to each other so as to produce an electric signal responsive to and variable with the extent to which the combustion products escaping to the atmosphere through said flue past said photoelectric cell are completely burned.

2. The trash incinerator of claim **1** which also comprises an atmospheric air inlet passageway connected with said inlet of said blower and a valve means adapted to control and vary the amount of atmospheric air flowing through said atmospheric air inlet passageway and into said blower.

3. The trash incinerator of claim **2** which also comprises an electric control motor operably connected with said valve means to open and close said valve means.

4. The trash incinerator of claim **1** which also comprises a variable speed electric motor operably connected to said blower, and control means using the electric signal from said photoelectric cell to control and vary the speed at which said electric motor drives said blower whereby the speed of said motor within predetermined limits is increased as the extent to which the escaping combustion products are completely burned decreases.

5. The trash incinerator of claim **2** which also comprises an electric control motor operably connected to said valve means, and control means using the electric signal from said photoelectric cell to operate said valve control motor whereby said valve means is opened to increase within predetermined limits the flow of air from the atmosphere through said air inlet passageway and into said blower in response to the extent to which the escaping combustion products are completely burned decreases.

6. The trash incinerator of claim **2** which also comprises a variable speed electric motor operably connected to said blower, and control means using the electric signal from said photoelectric cell to control and vary the speed at which said electric motor drives said blower whereby the speed of said motor within predetermined limits is increased as the extent to which the escaping combustion products are completely burned decreases.

7. The trash incinerator of claim **6** which also comprises an electric control motor operably connected to said valve means and said control means uses said variable electric signal from said photoelectric cell to operate said valve control motor whereby said valve means is opened to increase within predetermined limits the flow of air from the atmosphere through said air inlet passageway and into said blower in response to the extent to which the escaping combustion products are completely burned decreases.

8. The trash incinerator of claim **1** which also comprises at least one gas jet within said combustion chamber and an electrically operated gas control valve connected to said jet and adapted to be connected to a supply of combustible gas for controlling the flow of the combustionable gas into said chamber through said jet, and a control means using said electric signal from said photoelectric cell to operate said gas control valve whereby said gas control valve is opened to supply a combustible gas to said chamber through said jet in response to a predetermined extent to which the escaping combustion products are only partially burned.

9. The trash incinerator of claim **4** which also comprises at least one gas jet within said combustion chamber and an electrically operated gas control valve connected to said jet and adapted to be connected to a supply of combustible gas for controlling the flow of gas into said combustion chamber through said jet, and in which said control means also uses said electric signal from said photoelectric cell to operate said gas control valve whereby said gas control valve is opened to supply a combustible gas to said chamber through said jet in response to a predetermined extent to which the escaping combustion products are only partially burned.

10. The trash incinerator of claim **7** which also comprises at least one gas jet within said combustion chamber and an electrically operated gas control valve connected to said jet and adapted to be connected to a supply of combustible gas for controlling the flow of the combustionable gas into said combustion chamber through said jet, and in which said control means also uses said electric signal from said photoelectric cell to control said gas control valve whereby said gas control valve is opened to supply a combustible gas to said chamber through said jet in response to a predetermined extent to which the escaping combustion products are only partially burned.

11. The trash incinerator of claim **1** in which said support means comprises a grate and said discharge means comprises a manifold underlying said grate with a main passageway and a plurality of branch passageways extending generally transversely to said main passageway with each of said branch passageways having at least one metering port therein opening generally upwardly.

12. The trash incinerator of claim **11** in which at least one of said branch passageways has a plurality of generally axially spaced ports with at least one of the ports adjacent the end of said one branch passageway distal from said main passageway having a larger diameter than the ports of said one branch passageway adjacent said main passageway.

13. The trash incinerator of claim **4** in which said blower inlet is connected with said flue such that when said blower is operated a downdraft of atmospheric air through the outlet of said flue and into said blower inlet is created, whereby the flow of particulate contaminants of the combustion products through the outlet of said flue is retarded.

14. The trash incinerator of claim **7** in which said blower inlet is connected with said flue such that when said blower is operated a downdraft of atmospheric air through the outlet of said flue and into said blower inlet is created, whereby the flow of particulate contaminants of the combustion products through the outlet of said flue is retarded.

15. The trash incinerator of claim **14** which also comprises a deflector mounted in said flue below said outlet thereof and at or above said connection of said blower inlet with said flue, whereby at least a portion of the particulate contaminants of the combustion products

are deflected from passing through said outlet of said flue.

16. A trash incinerator comprising a combustion chamber, support means within said chamber to receive combustionable waste material thereon, a flue having an inlet connected to said chamber above said support means and an outlet opening to the atmosphere above said chamber, a blower having an inlet connected with said flue above said inlet thereof and below said outlet thereof, discharge means within said chamber for discharging gases into the lower portion of said chamber adjacent combustionable waste material received on said support means, said blower also having an outlet connected to said discharge means such that at least a portion of the combustion products produced by the burning of waste material in said chamber which pass into said flue are recirculated by said blower and discharged through said discharge means into said chamber to more completely burn the combustion products and waste material to decrease pollution of the atmosphere by burning the waste material, and said blower inlet being connected with said flue such that when said blower is operated a downdraft of atmospheric air through the outlet of said flue and into said blower inlet is created, whereby the flow of particulate contaminants of the combustion products through the outlet of said flue is retarded.

17. The trash incinerator of claim 16 which also comprises a deflector mounted in said flue below said outlet thereof and at or above said connection of said blower inlet with said flue, whereby at least a portion of the particulate contaminants of the combustion products are deflected from passing through said outlet of said flue.

18. The trash incinerator of claim 16 which also comprises a return duct connecting said blower inlet with said flue, said return duct having a portion thereof extending generally horizontally across said flue to deflect at least a portion of the combustion products passing into said flue into said return duct for recirculaton to said chamber.

19. The trash incinerator of claim 4 wherein said valve means comprises a damper valve means which is normally closed when said blower is not operating and responsive to the operating speed of said blower to increasingly permit within predetermined limits more air to flow from the atmosphere into said blower as the operating speed of said blower increases.

20. The trash incinerator of claim 16 which also comprises an atmospheric air inlet passageway connected with said inlet of said blower, whereby when said blower is operating air can flow through said inlet passageway and be discharged through said discharge means into said chamber.

21. The trash incinerator of claim 17 which also comprises an atmospheric air inlet passageway connected with said inlet of said blower, whereby when said blower is operating air can flow through said inlet passageway and be discharged through said discharge means into said chamber.

22. The trash incinerator of claim 18 which also comprises an atmospheric air inlet passageway connected with said inlet of said blower, whereby when said blower is operating air can flow through said inlet passageway and be discharged through said discharge means into said chamber.

23. The trash incinerator of claim 20 which also comprises a damper valve means adapted to control and vary the amount of air flowing through said atmospheric air inlet passageway and into said blower, said damper valve means being normally closed when said blower is not operating and responsive to the operating speed of said blower to increasingly permit within predetermined limits more air to flow from the atmosphere into said blower as the operating speed of said blower increases.

24. The trash incinerator of claim 23 wherein said damper valve means comprises at least one valve plate mounted in said atmospheric air inlet passageway for movement to closed and open positions, said valve plate being counterweighted to move toward said closed position when said blower is not operating.

25. The trash incinerator of claim 24 which also comprises an adjustable counterweight carried by said valve plate to urge said valve plate toward said closed position.

26. The trash incinerator of claim 21 which also comprises a damper valve means adapted to control and vary the amount of air flowing through said atmospheric air inlet passageway and into said blower, said damper valve means being normally closed when said blower is not operating and responsive to the operating speed of said blower to increasingly permit within predetermined limits more air to flow from the atmosphere into said blower as the operating speed of said blower increases.

27. The trash incinerator of claim 22 which also comprises a variable speed electric motor operably connected to said blower, whereby the speed at which said blower is driven by said electric motor can within predetermined limits be increased as the extent to which combustion products escaping from said outlet of said flue are completely burned decreases

28. The trash incinerator of claim 23 which also comprises a variable speed electric motor operably connected to said blower, whereby the speed at which said blower is driven by said electric motor can within predetermined limits be increased as the extent to which combustion products escaping from said outlet of said flue are completely burned decreases.

29. A trash incinerator comprising a combustion chamber, support means within said chamber to receive combustionable waste material thereon, a flue having an inlet connected to said chamber above said support means and an outlet opening to the atmosphere above said chamber, a blower having an inlet connected with said flue above said inlet thereof and below said outlet thereof, discharge means within said chamber for discharging gases into said chamber adjacent combustionable material received on said support means, an atmospheric air inlet passageway connected with said inlet of said blower such that when said blower is operating air can pass through said inlet passageway and into said blower, damper valve means adapted to control and vary the amount of air flowing from the atmosphere through said atmospheric air inlet passageway and into said blower, said blower having an outlet connected to said discharge means such that at least a portion of the combustion products produced by the burning of waste material in said chamber which pass into said flue are recirculated by said blower and discharged from said discharge means into said chamber to more completely burn the combustion products

and waste material to decrease pollution of the atmosphere by burning the waste material, a variable speed electric motor operably connected to said blower such that the speed at which said blower is driven by said electric motor can within predetermined limits be increased as the extent to which combustion products escaping from said outlet of said flue are completely burned decreases with said damper valve means being normally closed when said blower is not operating and responsive to the operating speed of said blower to increasingly permit within predetermined limits more air to flow from the atmosphere into said blower as the operating speed of said blower increases.

30. The trash incinerator of claim **29** wherein said blower inlet is connected with said flue such that when said blower is operating a downdraft of atmospheric air through the outlet of said flue and into said blower inlet is created, whereby the flow of particulate contaminants of the combustion products through the outlet of said flue is retarded.

31. The trash incinerator of claim **4** wherein said chamber has a charging opening therein through which waste material can be placed in said chamber on said support means, and also comprises a cover adapted to open and close said charging opening to the exterior of said chamber, and outlet means adjacent said charging opening adapted to discharge a stream of gases across said charging opening toward the interior of said chamber, said outlet means being connected with said outlet of said blower at least when said cover is open for the flow of gases from the outlet of said blower through said outlet means, whereby shielding of the exterior of said chamber from hot gases produced by waste material being burned within said chamber is provided by the stream of gases discharged from said outlet means when said cover is open.

32. The trash incinerator of claim **6** wherein said chamber has a charging opening therein through which waste material can be placed in said chamber on said support means, and also comprises a cover adapted to open and close said charging opening to the exterior of said chamber, and outlet means adjacent said charging opening adapted to discharge a stream of gases across said charging opening toward the interior of said chamber, said outlet means being connected with said outlet of said blower at least when said cover is open for the flow of gases from the outlet of said blower through said outlet means, whereby shielding of the exterior of said chamber from hot gases produced by waste material being burned within said chamber is provided by the stream of gases discharged from said outlet means when said cover is open.

33. The trash incinerator of claim **16** wherein said chamber has a charging opening therein through which waste material can be placed in said chamber on said support means, and also comprises a cover adapted to open and close said charging opening to the exterior of said chamber, and outlet means adjacent said charging opening adapted to discharge a stream of gases across said charging opening toward the interior of said chamber, said outlet means being connected with said outlet of said blower at least when said cover is open for the flow of gases from the outlet of said blower through said outlet means, whereby shielding of the exterior of said chamber from gases produced by waste material being burned within said chamber is provided by the stream of gases discharged from said outlet means when said cover is open.

34. The trash incinerator of claim **33** wherein said charging opening is in a side wall of said chamber and interposed between said support means and said inlet of said flue connected to said chamber, and said outlet means discharges the stream of gases adjacent the bottom of said opening so that the stream of gases flows upwardly across said opening and generally toward said inlet of said flue connected to said chamber.

35. The trash incinerator of claim **34** wherein said outlet means directs the stream of gases generally toward the center of the connection of said inlet of said flue with said chamber.

36. The trash incinerator of claim **33** which also comprises a valve which in the first position directs the gases from the outlet of said blower through said discharge means into said chamber and in a second position directs the gases from the outlet of said blower through said outlet means and across said opening.

37. The trash incinerator of claim **36** which also comprises electric control means associated with said cover and said valve to move said valve to said first position when said cover is closed and to said second position when said cover is open.

38. The trash incinerator of claim **37** wherein said cover comprises a door having a latch releasably retaining said door in the closed position and said control means comprises an electric solenoid operably connected with said valve and a switch with contacts changing states in response to movement of said latch to latching and releasing positions, said solenoid responding to changes of state of said switch to move said valve to said second position when said latch is moved to said released position and to said first position when said latch is moved to said latching position.

39. The trash incinerator of claim **20** wherein said chamber has a charging opening therein through which waste material can be placed in said chamber on said support means, and also comprises a cover adapted to open and close said charging opening to the exterior of said chamber, and outlet means adjacent said charging opening adapted to discharge a stream of gases across said charging opening toward the interior of said chamber, said outlet means being connected with said outlet of said blower at least when said cover is open for the flow of gases from the outlet of said blower through said outlet means, whereby shielding of the exterior of said chamber from hot gases produced by waste material being burned within said chamber is provided by the stream of gases discharged from said outlet means when said cover is open.

40. The trash incinerator of claim **39** which also comprises a valve which in a first position directs gases from the outlet of said blower through said discharge means into said chamber and in a second position directs gases from the outlet of said blower through said outlet means and across said opening.

41. The trash incinerator of claim **39** wherein said charging opening is in a side wall of said chamber and interposed between said support means and said inlet of said flue connected to said chamber, and said outlet means discharges the stream of gases adjacent the bottom of said opening so that the stream of gases flow generally upwardly across said opening and generally toward said inlet of said flue connected to said chamber.

42. The trash incinerator of claim 29 wherein said chamber has a charging opening therein through which waste material can be placed in said chamber on said support means, and also comprises a cover adapted to open and close said charging opening to the exterior of said chamber, and outlet means adjacent said charging opening adapted to discharge a stream of gases across said charging opening toward the interior of said chamber, said outlet means being connected with said outlet of said blower at least when said cover is open for the flow of gases from the outlet of said blower through said outlet means, whereby shielding of the exterior of said chamber from hot gases produced by waste material being burned within said chamber is provided by the stream of gases discharged from said outlet means when said cover is open.

43. A trash incinerator comprising a combustion chamber having at least one generally vertically extending side wall, support means within said chamber to receive combustionable waste material thereon, a flue having an inlet connected to said chamber above said support means and an outlet opening to the atmosphere above said chamber, a charging opening in said side wall of said chamber through which waste material can be placed in said chamber on said support means, said charging opening being positioned between said support means and said inlet of said flue connected to said chamber, a door adapted to open and close said charging opening to communication with the exterior of said combustion chamber, a first discharge means adjacent said charging opening adapted to discharge a stream of gases generally across said opening and into said chamber, a blower having an outlet connected to said first discharge means and adapted to provide a flow of gases through said first discharge means at least when said door is open, whereby the stream of gases provides a shield retarding the escape of hot gases produced by waste material burning in said chamber to the exterior of the chamber through said charging opening when said door is open.

44. The trash incinerator of claim 43 wherein said blower has an inlet connected with said flue above said inlet thereof and below said outlet thereof, and also comprises a second discharge means within said chamber for discharging gases into said chamber adjacent combustion material received on said support means, said blower outlet also being connected to said discharge means such that at least a portion of the combustion products produced by the burning of waste material in said chamber which pass into said flue can be recirculated by said blower an at least when said door is closed discharged through said second discharge means into said chamber to more completely burn the combustion products and waste material to decrease pollution of the atmosphere by burning the waste material.

45. The trash incinerator of claim 44 which also comprises an atmospheric air inlet passageway connected with said inlet of said blower and adapted to supply air from the exterior of said combustion chamber to said blower.

46. The trash incinerator of claim 44 which also comprises a valve means movable to a first position to direct gases from said outlet of said blower into said first discharge means and to a second position to direct gases from the outlet of said blower to said second discharge means.

47. The trash incinerator of claim 46 which also comprises a valve means movable to a first position to direct gases from said outlet of said blower into said first discharge means and to a second position to direct gases from the outlet of said blower to said second discharge means.

48. The trash incinerator of claim 46 which also comprises electro-mechanical control means adapted to move said valve means to said first position when said door is open and to said second position when said door is closed.

49. The trash incinerator of claim 47 which also comprises electro-mechanical control means adapted to move said valve to said first position when said door is open and to said second position when said door is closed.

50. The trash incinerator of claim 4 which also comprises a latch movable to a locked position to retain said door in said closed position and to a released position to release said door so that it can be opened and wherein said electro-mechanical control means comprises an electric switch adapted to change states when said latch is moved to and from said locked and released positions thereof and a solenoid operably connected with said valve means and responsive to changes of state of said switch to move said valve means to said first position thereof when said latch is in said released position and to said second position thereof when said latch is in said locked position.

51. The trash incinerator of claim 49 which also comprises a latch movable to a locked position to retain said door in said closed position and to a released position to release said door so that it can be opened, and wherein said electro-mechanical control means comprises an electric switch adapted to change states when said latch is moved to and from said locked and released positions thereof and a solenoid operably connected with said valve means and responsive to changes of state of said switch to move said valve means to said first position thereof when said latch is in said released position and to said second position thereof when said latch is in said locked position.

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UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,799,077 Dated March 26, 1974

Inventor(s) Roy Eltone Lowe

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

Column 4, line 66, cancel "outlet 140" and insert--inlet 140--

Column 14, line 29, cancel "claim 4" and insert--claim 48--

Signed and sealed this 13th day of August 1974.

(SEAL)
Attest:

McCOY M. GIBSON, JR.
Attesting Officer

C. MARSHALL DANN
Commissioner of Patents