

March 22, 1960

C. C. YOUNG  
INCINERATOR

2,929,342

Filed Aug. 8, 1955

2 Sheets-Sheet 1

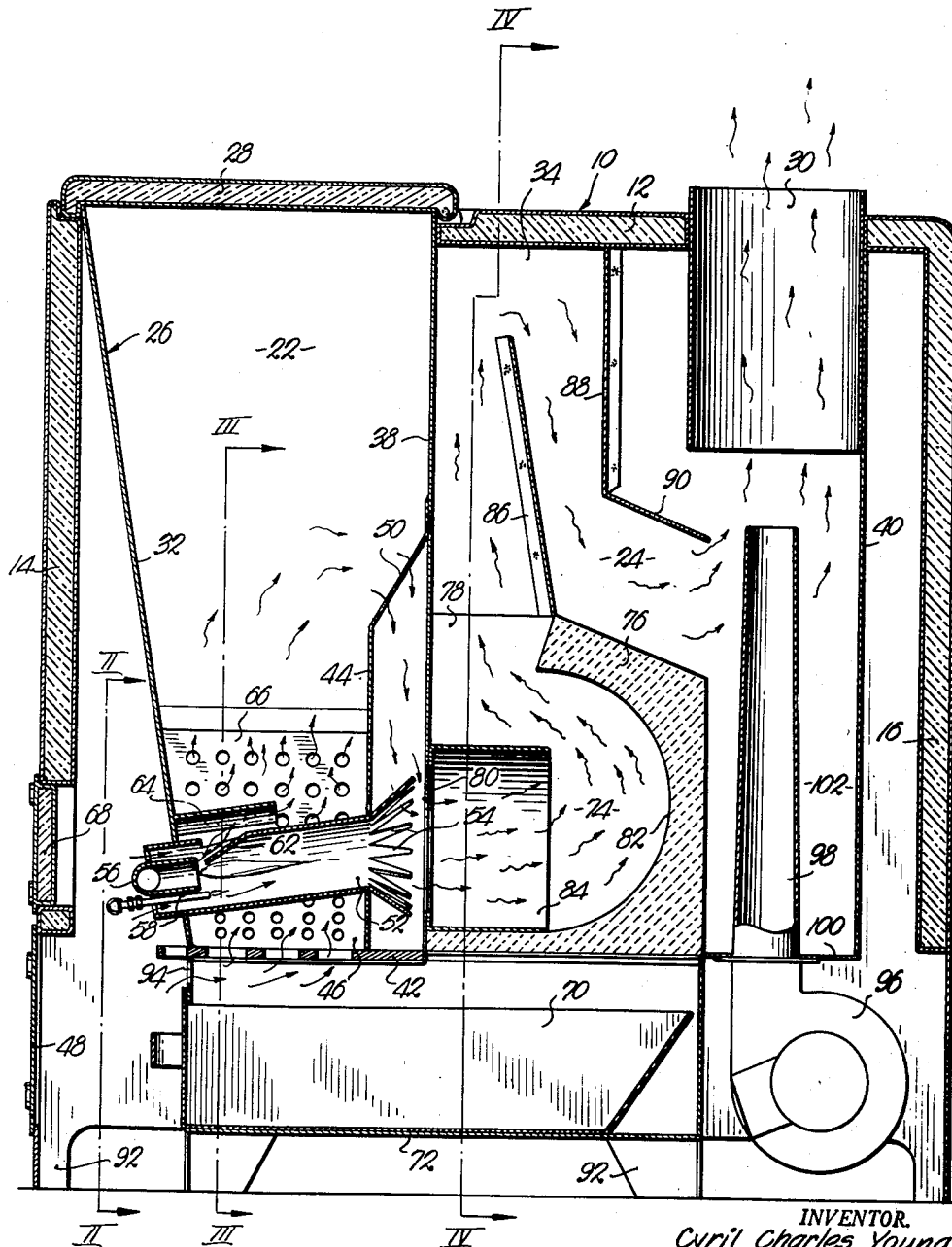


Fig. 1.

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2 Sheets-Sheet 2

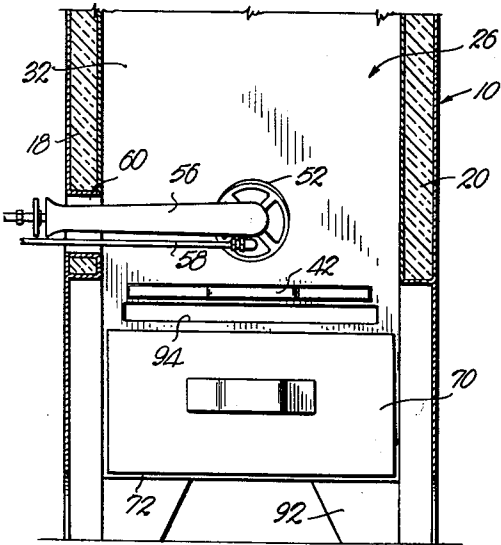


Fig. 2.

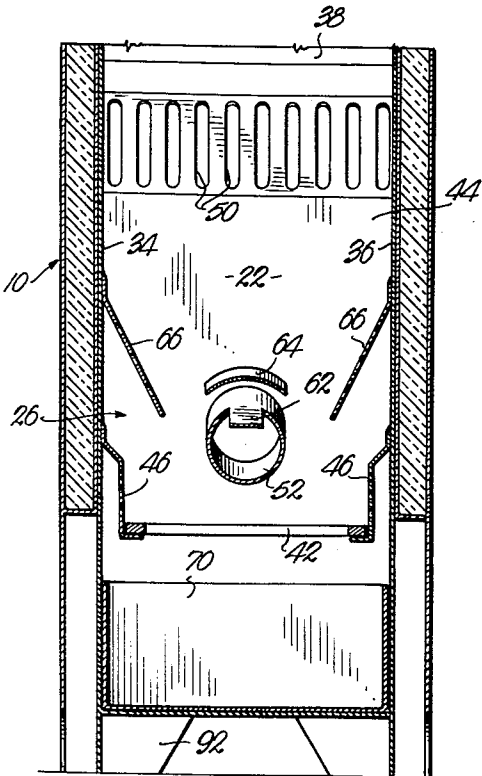


Fig. 3.

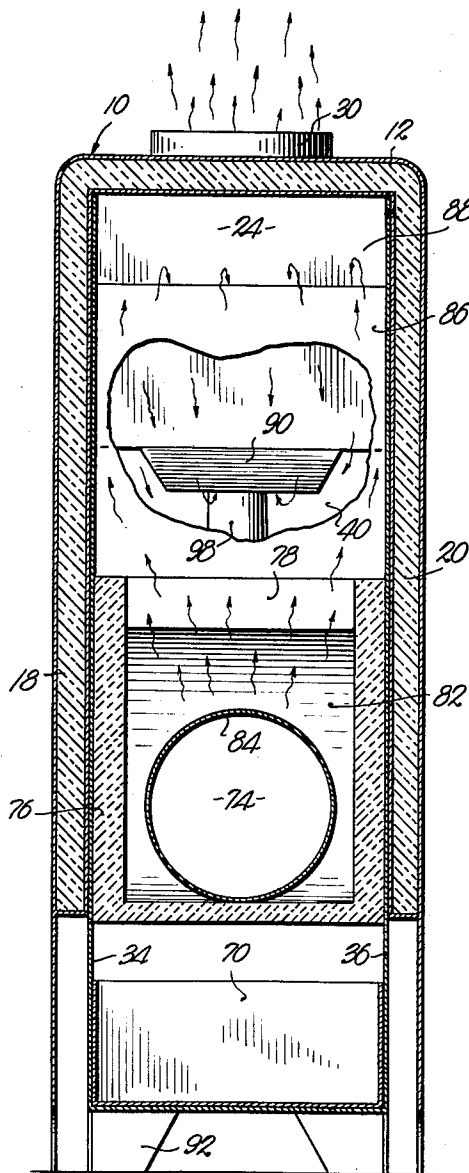


Fig. 4.

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2,929,342

## INCINERATOR

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3 Claims. (Cl. 110—8)

This invention relates to furnaces, ovens and the like for incinerating substances such as refuse, rubbish, garbage and the like, the primary object being to provide an arrangement in an incinerator capable of virtually complete consumption and reduction to ashes of all combustible products, thereby reducing smoke and odor emanating therefrom to a minimum.

It is the most important object of the present invention to provide a fast-acting incinerator that includes a novel arrangement of structural parts for virtually eliminating any fire hazard by reduction of the stack temperature while at the same time assuring complete burning of all combustible substances. It is a scientifically accepted fact that smoke is always the result of imperfect combustion and, whether visible or not, such gaseous product is made up of incompletely burned volatilized substances. By the same token, odors emanating from the burning materials can be eliminated most effectively by assuring complete combustion.

It is an extremely important object of the instant invention, therefore, to provide an incinerator having, in addition to the main or primary combustion chamber or receptacle for receiving the material to be burned, an after burner or secondary combustion chamber presenting a high temperature section for receiving the unburned products from the primary chamber and consuming the same, to the end that very little smoke and odor pass from the secondary chamber to the outlet flue.

Another important object of the instant invention is to provide an incinerator of the aforementioned character having a unique air circulating system capable of presenting adequate oxygen to support combustion and which atmospheric air is properly heated prior to passage into the high temperature section aforementioned, and ultimately cooled to a substantially lower temperature prior to discharge from the outlet flue.

A still further object of the present invention is to provide an incinerator that includes ignition means in the nature of a fire tube that traverses the material-receiving receptacle whereby to ignite such material by heat conduction through the fire tube.

A still further object of the present invention is to provide an incinerator having the said receptacle traversing fire tube arranged to direct the flame produced therein, not only into the high temperature section of the secondary combustion chamber, but into the material-receiving receptacle itself so as to speed up the initial, as well as the secondary, burning operations.

Another object of this invention is the provision of an incinerator wherein the atmospheric air for supporting combustion is directed into the material being burned through the grate, thence through perforated baffles

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underlying the material so that such air completely permeates the material, and finally, into the secondary chamber for ultimate passage to the flue by way of a downcomer within the receptacle and within which the discharge end of the fire tube terminates in outwardly flared flame controlling fingers.

Other objects include the way in which the incinerator is structurally formed to present a ventilated outer casing; the manner of providing means to collect fly ash; the manner of providing for mechanical inducement of air-flow through the chambers when needed or if desired; and many other advantageous features from the standpoint of convenience of use and maintenance, as well as ease and inexpensive construction, all of which will be made clear or become apparent as the following specification progresses.

In the drawings:

Figure 1 is a substantially central, vertical, cross-sectional view through an incinerator made pursuant to my present invention.

Fig. 2 is a fragmentary, cross-sectional view taken on line II—II of Fig. 1.

Fig. 3 is a fragmentary, cross-sectional view taken on line III—III of Fig. 1; and

Fig. 4 is a cross-sectional view taken on irregular line IV—IV of Fig. 1.

As clearly illustrated in the drawings, the incinerator chosen for illustration of the principles of the present invention, includes an outer casing broadly designated by the numeral 10 that is preferably of double wall construction and insulated substantially throughout as shown presenting a top wall 12, a front wall 14, a rear wall 16, a pair of side walls 18 and 20.

There is presented within the confines of the outer casing 10, a primary combustion chamber 22 and a compartment 24, the former of which is in the nature of an open top and open bottom; material-receiving receptacle 26 normally closed at the top thereof by a door 28 which may be hingedly mounted and which forms a part of the top wall 12. A flue 30 extends through the top wall 12 and communicates with the compartment 24.

Receptacle 26 includes an inclined front wall 32 spanning the distance between the walls 18 and 20 and joined to a pair of side walls 34 and 36 engaging the inner faces of walls 18 and 20 respectively. A vertical partition 38 and a vertical rear wall 40 joining the walls 34 and 36 define the chamber 22 and compartment 24. For ventilating purposes, the walls 32 and 40 are preferably spaced from the walls 14 and 16 respectively.

A foraminous grate 42 at the lowermost end of the receptacle 26, closes the lowermost end of a downcomer 44 within the receptacle 26 and is slidably supported by opposed, perforated brackets 46 secured to the walls 34 and 36 for removal upon opening door 48 in the front wall 14. Downcomer 44 is provided with a plurality of slots 50 as seen in Figs. 1 and 3 of the drawings.

A substantially horizontal fire tube 52 traversing the receptacle 26 at the lowermost end of the latter above the grate 42, passes through wall 32 and downcomer 44, terminating within the latter in a plurality of outwardly flared fingers 54.

A primary burner 56 and a pilot burner 58 within the fire tube 52 at the opposite end thereof, extends through an opening 60 in the wall 18 as seen in Fig. 2. A downturned flap 62 struck from the tube 52 presents an opening for passage of a portion of the flame produced in the

tube 52 into the receptacle 26, such opening being protected by overlying shield 64 secured to the wall 32.

The material to be burned in the receptacle 26 is directed to the fire tube 52 for ignition thereby (it being understood that tube 52 is made from heat conducting material) by opposed, downwardly and inwardly inclined perforated baffles 66 secured to the walls 34 and 36 above the brackets 46. Burners 56 and 58 are rendered accessible by the provision of a door 68 in the wall 14 above door 48. An open top ash receiver 70 resting on a bottom wall 72 beneath the grate 42, may be removed by opening the door 48.

The compartment 24 is provided with a secondary combustion chamber 74 by virtue of flame baffle 76 made from heat resisting materials such as firebrick, concrete or other ceramic substances, and which spans the distance between the walls 34 and 36 as seen in Fig. 4. Flame baffle 76 has an outlet 78 at the top thereof next adjacent the partition 38 and communicates with an opening 80 formed in the partition 38 at the bottom thereof in alignment with the discharge end of the fire tube 52, it being seen therefore, that the secondary combustion chamber 74 and the downcomer 44 are thereby placed into communication. Flame baffle 76 has a semi-circular wall 82 facing the partition 38 and a flame control tube 84 within the flame baffle 76 secured to the partition 38 and communicating directly with the opening 80.

Air emanating from the outlet 78 of the flame baffle 76 is channelled to the flue 30 through a circuitous path and therefore, cooled prior to discharge from the incinerator through the provision of a pair of baffles 86 and 88 spanning the distance between the walls 34 and 36 and secured thereto. Baffle 86 inclines upwardly and inwardly toward the partition 38 from the outlet opening 78 of flame baffle 76. The lowermost end of the vertical baffle 88 terminates in a narrower tongue 90 that is inclined downwardly and outwardly toward the vertical wall 40.

Atmospheric air may enter along the walls 32 and 40 by virtue of the fact that the outer casing 10 is provided with a plurality of supporting feet 92 and such air may enter the receptacle 26 through an air inlet slot 94 in the wall 32 between grate 42 and the ash receiver 70.

In the event it becomes necessary or desirable to augment the flow of air through the chamber 22 and compartment 24, there may be provided a blower 96 that receives atmospheric air from between the legs 92 and discharges the same upwardly through a pipe 98 aligned with the flue 30. The air discharge pipe 98 extends through a bottom wall 100 joining wall 40 and extending to the flame baffle 76, presenting a fly ash receptacle 102 which may be cleaned in any suitable manner such as by provision of an access door within one of the walls 18 or 20 (not shown).

In operation, the refuse to be burned such as all kinds of rubbish including paper, as well as garbage and other waste material, may be dumped into the receptacle 26 by opening door 28. It falls immediately upon the fire tube 52 but the latter is protected against such material falling thereinto by the shield 64. Furthermore, the material is held away from the opening 80 by the downcomer 44.

The constantly burning pilot burner 58 is utilized to ignite the gas or other fuel emanating from the burner 56 when the control valve (not shown) is opened. The flame produced thereby within the fire tube 52 is not only directed into the secondary combustion chamber 74 of compartment 24, but a portion of such flame passes upwardly through the opening provided by flap 62 and into the refuse thereabove. Thus, the material in receptacle 26 is ignited not only by heat conduction through the tube 52, but by direct flame. Air enters the receptacle 26 by way of the air inlet slot 94 and the grate 42. Such air is pre-heated as it passes upwardly

along the outer surfaces of the tube 52 and readily passes through the material being burned by virtue of the perforations in brackets 46 and baffles 66. The hot air thereupon enters the downcomer 44 through the slots 50 and passes into the secondary combustion chamber 74 via opening 80.

All unburned particles, i.e., smoke emanating from the receptacle 26, passes immediately to the fingers of flame emanating from the tube 52 within the downcomer 44 and is channelled into secondary combustion chamber 74 by the tube 84. Such smoke is virtually consumed in its entirety within the secondary combustion chamber 74 and the air emanating therefrom through the outlet 78, cools as it flows past baffles 86 and 88 and the tongue 90 to the flue 30. Thus, the stack temperature is appreciably reduced and fly ash is collected within the receptacle 102. Manifestly, if the blower 96 is utilized, the flow of air from the slot 94 to the flue 30, is increased.

It is appreciated further, as above indicated, that by virtue of such construction, very little smoke passes from the flue 30 and odors are reduced to a minimum since substantially all of the odor producing products are completely consumed prior to discharge from the outlet 78. Having thus described the invention what is claimed as new and desired to be secured by Letters Patent is:

1. An incinerator comprising structure having a primary combustion chamber having an air inlet and adapted to receive material to be burned, and a compartment having a flue; a secondary combustion chamber in the compartment having an outlet communicating with the flue and an inlet; a downcomer duct in the primary chamber having an upper inlet communicating with said chamber and a lower outlet communicating with said inlet of the secondary chamber for passage of unburned products from the primary chamber to the secondary chamber; a fire tube traversing the primary chamber; means for producing a flame in the tube, said tube being disposed to direct the flame into the secondary chamber through said inlet of the latter; and means in the primary chamber for funneling said material into surrounding contacting relation to said tube.

2. An incinerator comprising structure having a primary combustion chamber having an air inlet and adapted to receive material to be burned, and a compartment having a flue; a secondary combustion chamber in the compartment having an outlet communicating with the flue and an inlet; a downcomer duct in the primary chamber having an upper inlet communicating with said chamber and a lower outlet communicating with said inlet of the secondary chamber for passage of unburned products from the primary chamber to the secondary chamber; a fire tube traversing the primary chamber; means for producing a flame in the tube, said tube being disposed to direct the flame into the secondary chamber through said inlet of the latter; and means including a plurality of baffles in the primary chamber for funneling said material into surrounding contacting relation to said tube, said baffles being perforated for passage of air from said first recited air inlet to the material.

3. An incinerator comprising a receptacle adapted to receive material to be burned; a formaminous grate at the lowermost end of the receptacle and open to the atmosphere for passage of air into the receptacle; a fire tube of heat-conductible substance traversing the receptacle at said end thereof above the grate for igniting said material; a combustion chamber having an inlet and an outlet; a downcomer duct communicating at its lower end with said chamber and at its upper end with said receptacle for passage of said air and unburned products from the receptacle to the chamber; and means for producing a flame in said tube and directing the same into the chamber from one end of the tube through said inlet, said tube terminating at said one end thereof in a

plurality of outwardly flared fingers within the down  
comer duct.

# References Cited in the file of this patent

## UNITED STATES PATENTS

|           |         |                |    |
|-----------|---------|----------------|----|
| 449,486   | Lord    | Mar. 31, 1891  | 5  |
| 914,923   | Cahoone | Mar. 9, 1909   |    |
| 1,155,492 | Krenz   | Oct. 5, 1915   |    |
| 1,275,651 | Borge   | Aug. 13, 1918  |    |
| 1,643,206 | Epstein | Sept. 20, 1927 | 10 |

1,755,027  
1,995,893  
2,010,460  
2,355,466  
2,545,625  
2,646,758  
2,711,139

366,531  
524,336

|          |               |
|----------|---------------|
| Saha     | Apr. 15, 1930 |
| McEver   | Mar. 26, 1935 |
| McKinley | Aug. 6, 1935  |
| Perry    | Aug. 8, 1944  |
| McKinley | Mar. 20, 1951 |
| Greemen  | July 28, 1953 |
| Martin   | June 21, 1955 |

## FOREIGN PATENTS

|               |              |
|---------------|--------------|
| Germany       | Jan. 6, 1923 |
| Great Britain | Aug. 5, 1940 |