March 20, 1951 J. P. McKINLEY 2,545,625

INCINERATOR

Filed Feb. 25, 1946 2 Sheets-Sheet 1

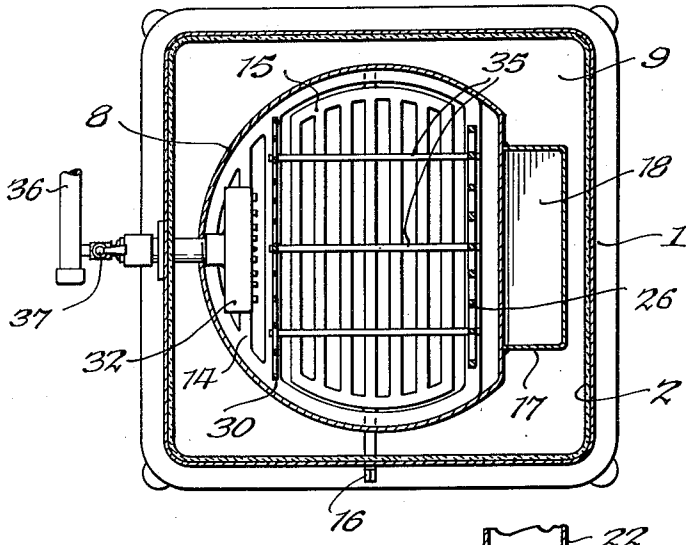


Fig. 2.

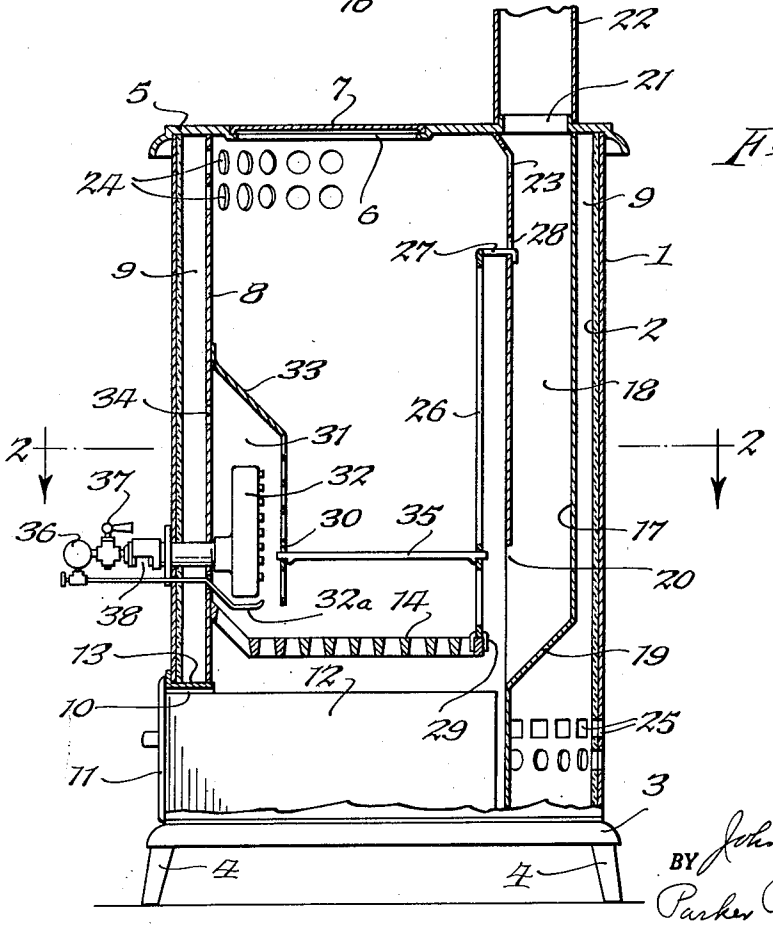


Fig. 1.

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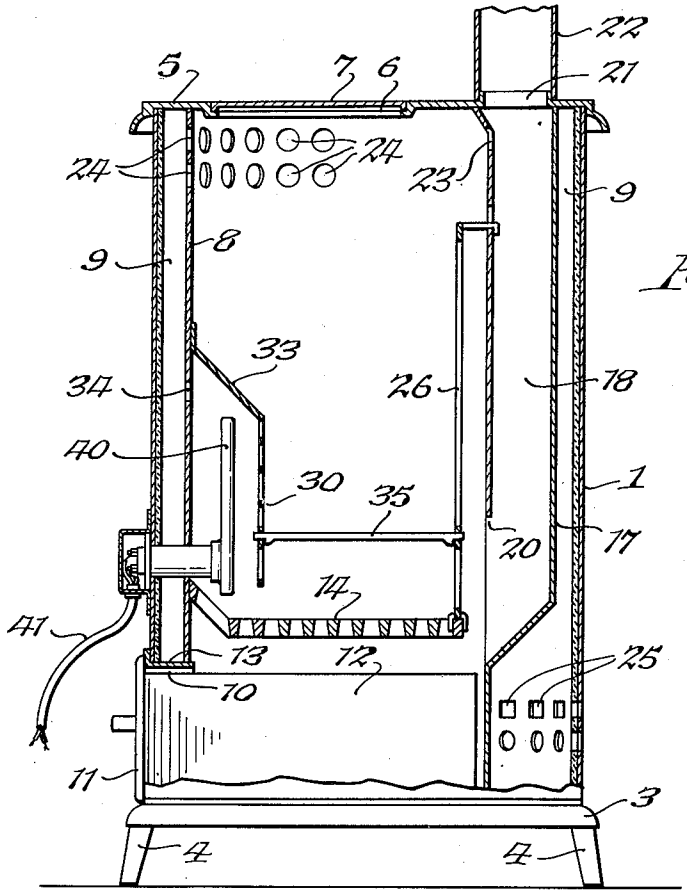


Fig. 3.

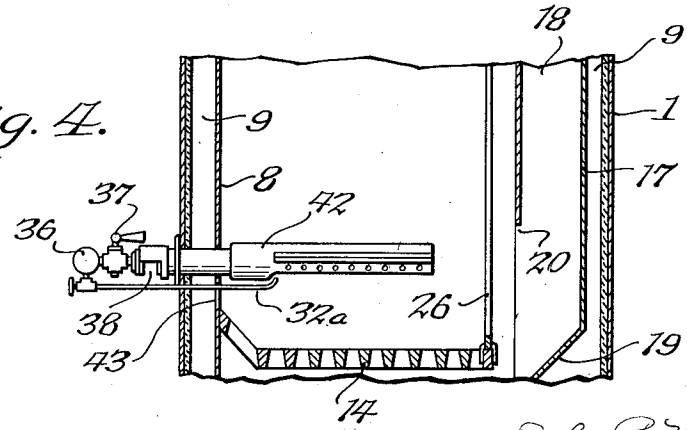


Fig. 4.

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UNITED STATES PATENT OFFICE

2,545,625

INCINERATOR

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Application February 25, 1946, Serial No. 649,942

5 Claims. (Cl. 110—18)

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This invention relates to incinerators of the type adapted for the burning of garbage and other refuse, and is in the nature of an improvement upon prior Patent No. 2,010,460 of August 6, 1935.

An object of the invention is to provide an improved incinerator, with which the combustible part of the refuse may be dehydrated and burned rapidly and without odor in a minimum of time, and with a minimum of supplied heat.

Another object of the invention is to provide an improved incinerator for refuse and garbage, of the down draft type; with which the dehydration of the refuse and garbage may be accomplished rapidly with only the natural draft; with which the dehydration may be accelerated, when desired, through the use of added heat; and with which the danger of odors escaping into the room will be eliminated.

Another object of the invention is to improve the efficiency and operation of incinerators of this type and provide maximum capacity in a minimum of overall space, and which will require a minimum of service and attention.

Various other objects and advantages will be apparent from the following description of several embodiments of the invention, and the novel features will be particularly pointed out hereinafter in connection with the appended claims.

In the accompanying drawings:

Fig. 1 is a side elevation, largely in section, of an incinerator constructed in accordance with this invention.

Fig. 2 is a sectional plan of the same, the section being taken approximately along the line 2—2 of Fig. 1;

Fig. 3 is a sectional elevation similar to Fig. 1, but illustrating the use therewith of an electric heater for accelerating the dehydration of the refuse; and

Fig. 4 is a sectional elevation of a part of the same with a different type of heater employed therewith.

In the embodiment of the invention illustrated in Figs. 1 and 2, the incinerator includes the housing 1 which is preferably rectangular in transverse cross section, and provided on its interior, upright wall with a layer 2 of any suitable heat resisting material, such as asbestos. This housing is supported on a suitable base 3 which provides the bottom for the housing, and this base has feet 4 which support the bottom of the casing above the floor. These feet 4 may, as shown, be individual feet or posts, or they may extend around the major part of the base to conceal the space below the bottom of the housing. The housing is closed at its top by a plate 5 having therein a charging opening 6, which is normally closed by a cover 7 that is hinged or otherwise disposed across the opening 6, so that by lifting the cover 7, one may uncover the aperture or opening 6 to enable refuse and garbage to be deposited in the incinerator.

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Disposed within the housing 1 is a casing or shell 8 which is spaced on its side walls from the housing 1, so as to provide a chamber 9 interposed between the side wall of the housing 1 and the casing 8. This casing 8 is usually made of heavy sheet metal and extends from the top plate 5 downwardly to the base or bottom 3 of the housing. The housing 1 is provided at one side with an opening 10 normally closed by a door or closure 11 and casing 8 is provided with a similar alined opening 8a. These openings 10 and 8a are at the bottom of the housing, and within the housing is disposed an ash pan 12 that fits openings 8a and 10. This pan 12 may be attached to or separate from the door or closure 11, but in this example, it is shown as attached to the closure 11 so as to form therewith a drawer that may be removed in order to empty the ashes from the pan 12. Around the opening 10 is an imperforate plate 13 which extends between the side wall of housing 1 and the casing 8, so that there will be no communication around the opening 10 into the passage 9. Mounted in the casing 8, just above the pan 12, is a grate 14 of any suitable construction, preferably one having a tiltable section 15 and an operating shaft 16 extending to the exterior of the housing, so that unburned parts of the refuse which are too large to pass through the openings in the grate may be dumped into the pan when the section 15 is tilted.

Attached to the rear side wall of the casing 8 is a channel shaped shell 17 which has its open face abutting against the side wall of the casing 8 so as to form therewith a closed flue 18 extending from the top plate or member 5 to the lower part of the housing. The lower end of this flue 18 is closed by an inclined plate 19 leading to the side wall of the casing 8, and the lower edge of this inclined wall 19 is approximately at the level of the grate 14, or only a short distance above or below it. The casing 8 has, in its rear wall, an inlet draft opening 20, the lower edge of which meets the lower end of the inclined plate 19. This opening 20 is upright or approximately vertical and extends from approximately the level of the grate upwardly a substantial distance of

at least four or five inches but preferably less than twelve inches. Thus, this flue passage 18 opens into the casing 8 in the zone immediately above the grate 14. The top member 5 is provided with a flue opening 21 to which is connected a flue pipe 22 on the outside of the housing, and this flue opening 21 is aligned with the flue passage 18. Thus, the pipe 22 forms a continuation of the flue passage 18.

The casing 8 is provided on its rear side, which forms one wall of the flue passage 18, and adjacent the flue opening 21, with limited air vents 23 which are substantial but have a size inadequate to supply the draft of the flue pipe 22. In fact, there are usually two or three of such openings 23, and the total area supplies substantially less than one-half the natural draft of the flue, so that there will always be a substantial draft at the opening 20 into the lower part of the casing 8. The casing 8 is provided with air inlet openings 24 adjacent its upper end, and preferably largely at the front of the housing approximately opposite from the vent openings 23. While one horizontally elongated opening would be the equivalent of these openings 24, it is preferable to use a plurality of apertures arranged in rows which do not extend completely along the sides of the casing 8. These openings 24 allow air to enter the upper end of the casing 8 immediately below the cover 7 from the chamber or space 9 between the housing and the casing.

Air inlet openings 25 are also provided for the space or chamber 9 between the casing and housing at the lower end thereof, and these openings may be in either the bottom or in the rear side wall of the housing 1. Air may enter the space 9 at the lower end thereof, pass upwardly around the casing 8 to the openings 24 where it is preheated, and then enter the refuse chamber in the casing 8 at the upper end and forward part thereof. A small part of the air entering casing 8 will move across the top of the refuse chamber of the casing 8 to reach the limited flue vents 23 and pass out by the chimney flue 22, and the remainder and major part of the ingoing air will pass downwardly in the casing 8 to the flue opening 20, thence by the passage 18 to the chimney flue 22. The portion of the air entering the casing 8 at the upper end thereof, and which moves across and beneath the door opening 6 and the top end of the refuse chamber to the vent 23 will carry with it any odors arising from the refuse or garbage in the casing 8. Also, when the cover 7 is lifted, air may enter through the opening 6 and pass to the vent 23, or downwardly through the casing 8 to the vent opening 20, and thus carry off odors arising from the refuse. This effectively prevents escape of odors into the room while refuse or garbage is being charged into the casing 8 as well as after the cover 7 is closed.

A grille 26 is disposed along the rear wall of the casing 8 but on the inside thereof, and is supported at its upper end in any suitable manner from the casing, such as by having arms 27 engaged through slots 28 in the rear wall of the casing 8. This grille extends substantially to the grate 14 and preferably has a forked end 29 which engages over a cross bar of the grate. This serves to space the grille 26 slightly from the rear wall of the casing 8 and thus provide a space along the rear wall of the casing 8 for a substantial distance upwardly from the grate and above the flue opening 20, so that air may pass through the refuse to the flue opening 20 without passing entirely through the full depth of the refuse or garbage. Some of the entering air can also pass along the narrow space between the grille 26 and the rear wall of the casing 8 to reach the flue opening 20, and in doing so will dry the refuse abutting against the grille.

Disposed along the front wall of the casing 8, but on the inside of the casing, is a second grille 30 which is approximately opposite from the grille 26 and extending upwardly from near the grate for a substantial distance. This grille 30 is spaced somewhat from the front wall of the casing 8 so as to provide a compartment 31 in which may be located a suitable source of heat, such as a gas burner 32. The upper edge of the grille 30 is connected to the casing by an inclined, substantially imperforate wall 33, so that refuse or garbage deposited in the casing 8 will be kept away from the burner 32. A limited air inlet opening 34 is provided in the front wall of casing 8 below the inclined wall 33 and substantially above the grate. Preferably opening 34 is provided near the top of the grille 30, so that air may enter this compartment 31 and pass downwardly along the grille 30, some of it passing through grille 30 and thence across the lower end of the refuse chamber in the casing 8 to and through the opposite grille 26 to reach the flue opening 20.

Air entering through this opening 34 is sufficient to provide the secondary air for the operation of the burner 32 and its pilot 32a and, when the burner 32 is not operating, some of this entering air moves directly and horizontally across the lower end of the refuse chamber between the grilles to reach the flue opening 20. This continuous movement of air through the lower end of the refuse chamber provides a steady dehydrating action on the refuse in the refuse chamber, and the dehydration is accelerated when the burner is operating, because in that case the burner not only radiates heat to the refuse abutting against the grille 30, but the hot gases of combustion also pass horizontally through the lower end of the refuse chamber to dry the refuse and garbage supported just above the grate. The burner 32 may be of any suitable type, including the flat type illustrated, which requires a minimum of space in the casing 8.

In order to facilitate the movement of the air and gases across the lower part of the refuse chamber in the casing 8, one or more bars or rods 35 may be disposed between and supported by the grilles 26 and 30, so that some of the refuse and garbage descending in the chamber of the casing 8 will be held up somewhat above the grate, thereby preventing packing of the refuse and garbage upon the grate. This provides passages through the refuse and garbage through which the air and gases may move in the dehydration. Fuel for the burner 32 and the pilot 32a may be supplied through a pipe 36 with a valve 37 controlling the movement of gas to the burner 32. A mixing valve 38 of any suitable type may be associated with the burner.

In the embodiment of the invention illustrated in Fig. 3, the construction is the same as disclosed in Figs. 1 and 2 except that the gas burner 32 is replaced by an electric heater 40 of any suitable type, preferably one resembling a plate with a smooth surface and having therein a resistance heating element. Electric heaters of this type are available in the open market and therefore need not be further described or illustrated. This heater is supplied with operating current through a twin conductor cable 41. Parts in Fig. 3 which

have corresponding parts in Figs. 1 and 2 have similar reference characters.

In Fig. 4 a slight modification of the invention is illustrated in which the grille **30**, the inclined wall **33** and bars **25** are omitted, and the burner **32** is replaced by a burner **42** similar to the gas burner disclosed in said prior Patent No. 2,010,460. The limited opening **34** is replaced by a similar limited opening **43** immediately below the burner but above the grate through which secondary air for the burner may pass into the refuse chamber from the space or chamber **9**. This entering air may thus pass directly across the lower part of the refuse chamber to the grille **26**. The burner **42** will hold up some of the refuse in the chamber, above the grate, which makes the bars **35** unnecessary.

In all of the embodiments of the invention the arrangement of the apertures **24** largely at a distance from the limited vent openings **23** is a material help in removing all danger that odors may escape into the room through the charging door or cover **7**, and there will, at all times, be a down draft through the refuse chamber and also an additional cross draft through the lower zone of the refuse chamber above the grate which provides a continuous dehydrating action on the refuse. The dehydration is accelerated by the operation of the gas burner or electric heater. The arrangement is compact and provides maximum capacity for the refuse with a minimum of overall space.

It will be understood that various changes in the details, materials and arrangements of parts which have been herein described and illustrated in order to explain the nature of the invention, may be made by those skilled in the art within the principle and scope of the invention, as expressed in the appended claims.

I claim as my invention:

1. An incinerator comprising a casing having a refuse holding chamber with a grate at its lower end, a charging opening adjacent its top, and a major air inlet also adjacent its top, an exhaust flue terminating within said casing, substantially closed at its lower end and having above its lower end an upright major inlet opening, the lower edge of which is approximately at the level of the grate, and a grille along the wall of said chamber in front of said inlet opening to pass air from the lower part of said chamber in an approximately horizontal direction into said flue inlet opening, said casing having a limited air passage opening into the lower part of said chamber above said grate and opposite said exhaust flue upright opening.

2. An incinerator comprising a casing having a refuse holding chamber with a grate at its lower end, a charging opening adjacent its top, and a major air inlet also adjacent its top, an exhaust flue terminating within said casing, substantially closed at its lower end and having above its lower end an upright major inlet opening, the lower edge of which is approximately at the level of the grate, and a grille along the wall of said chamber in front of said inlet opening to pass air from the lower part of said chamber in an approximately horizontal direction into said flue inlet opening, said casing having a limited air inlet in its side wall, insufficient in size to supply the draft of said flue, opening into said chamber substantially above the grate and spaced well from said grille in a direction peripherally of said chamber, said casing also having therein a source of heat above said grate and spaced well from the grille in front of said flue inlet opening.

3. An incinerator comprising a casing having a refuse holding chamber with a grate at its lower end, a charging opening adjacent its top, and a major air inlet also adjacent its top, an exhaust flue terminating within said casing, substantially closed at its lower end and having above its lower end an upright major inlet opening, the lower edge of which is approximately at the level of the grate, a grille along the wall of said chamber in front of said inlet opening to pass air from the lower part of said chamber in an approximately horizontal direction into said flue inlet opening, said casing having a limited air inlet in its side wall, insufficient in size to supply the draft of said flue, opening into said chamber substantially above the grate and spaced well from said grille in a direction peripherally of said chamber, and a gas burner in said casing well above said grate and extending in a direction towards said grille from the opposite side of the casing to spread the descending refuse in said chamber and heat it, whereby air may pass from said limited air inlet to said major flue inlet horizontally through the refuse in the lower end of said chamber to dehydrate the refuse to a combustible condition and supply secondary air to said burner.

4. An incinerator comprising a housing, a casing within said housing and having its side walls spaced from the housing side walls and extending to and abutting the upper end of said housing, with the top of the housing also forming the top of the casing, the top of said housing having a charging opening leading to the interior of said casing, a door closing said opening, a grate within and extending in a direction crosswise of, said casing at a level above the lower end of said housing, a grille within said casing and disposed along and spaced from the side wall of said casing, a source of heat disposed within said casing and spaced from and just above the level of said grate, for heating refuse in the interior of said casing above said grate, an exhaust flue extending into said housing and having an inlet opening which is mainly vertical, with its lower edge approximately at the level of the grate, and along and spaced somewhat from said grille, said casing having a main air inlet adjacent its top and a limited air inlet adjacent said source of heat at the side of the casing about opposite from said flue inlet, whereby some air may pass across said casing chamber above said grate to said exhaust flue inlet to dehydrate the refuse in the lower part of said casing and just above said grate, and a major part of the inlet air may pass downwardly through said casing chamber to reach said exhaust flue inlet opening.

5. An incinerator comprising a refuse receiving casing having a chamber with a grate at its lower end and a grille-like side wall for a substantial distance upwardly from the grate, an exhaust flue having an inlet opening adjacent and facing said grille-like side wall, said inlet opening being substantially above said grate, said casing having a main air inlet near its upper end and a limited air inlet just above said grate and about opposite said flue inlet opening, whereby movement of air and gases horizontally through the portion of the refuse immediately above the grate from the limited air inlet to the main flue inlet will dehydrate it preparatory to burning.

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