

Nov. 14, 1967

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3,352,259

MUNICIPAL INCINERATOR

Filed July 30, 1965

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FIG. 1.

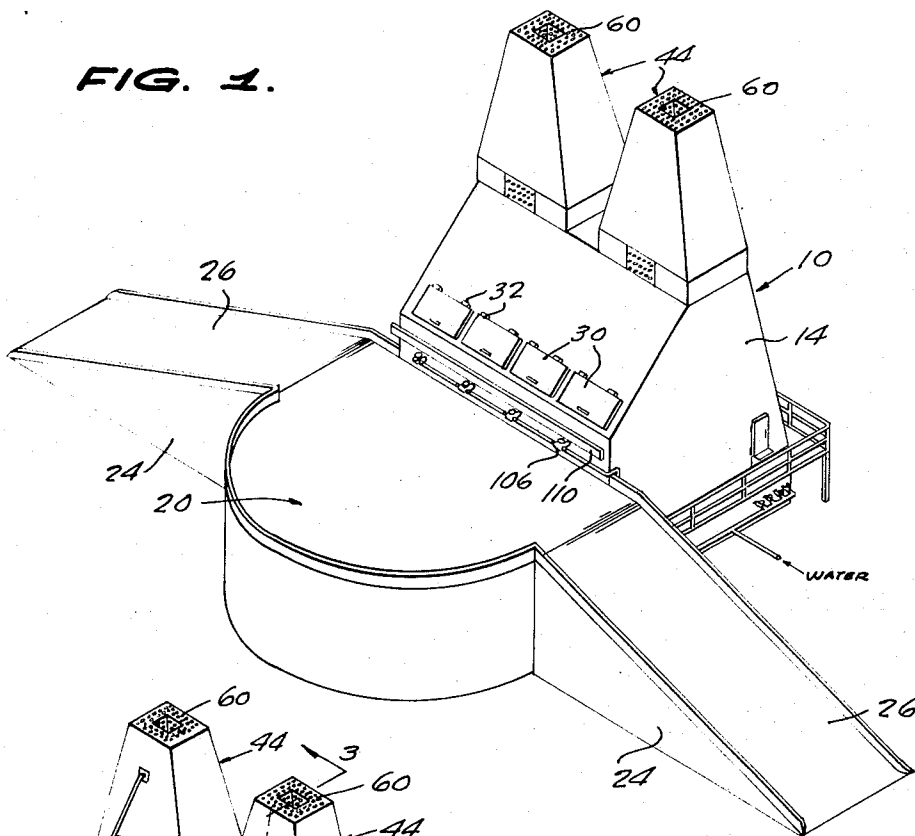
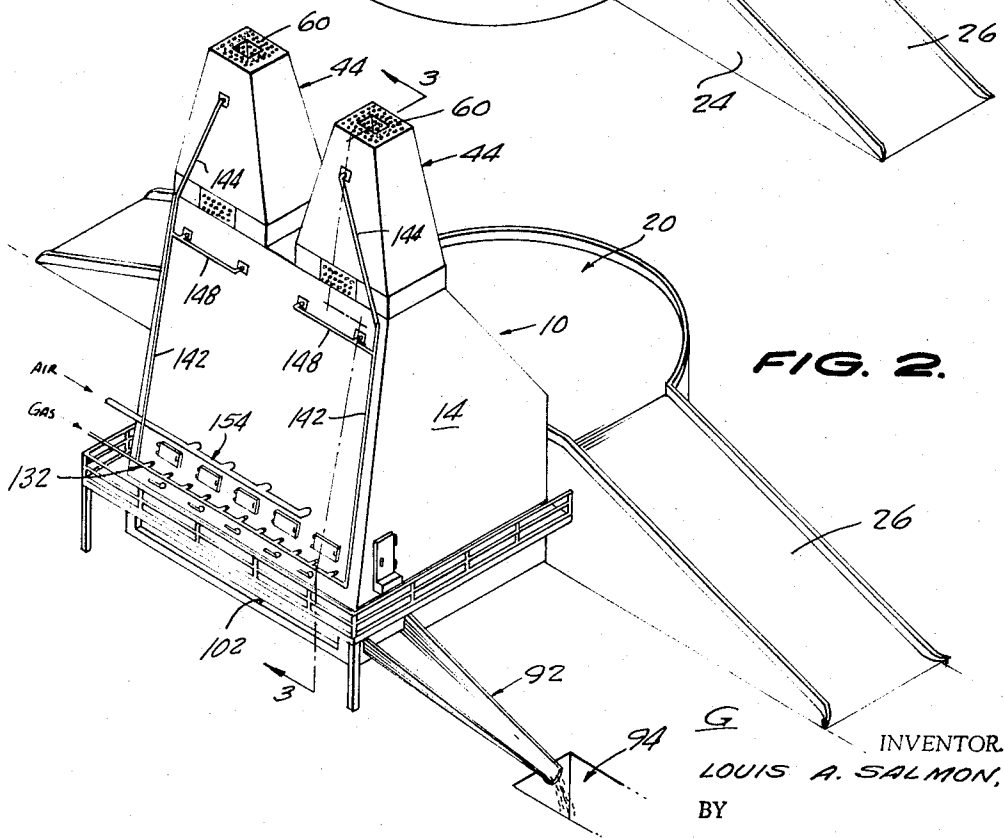


FIG. 2.



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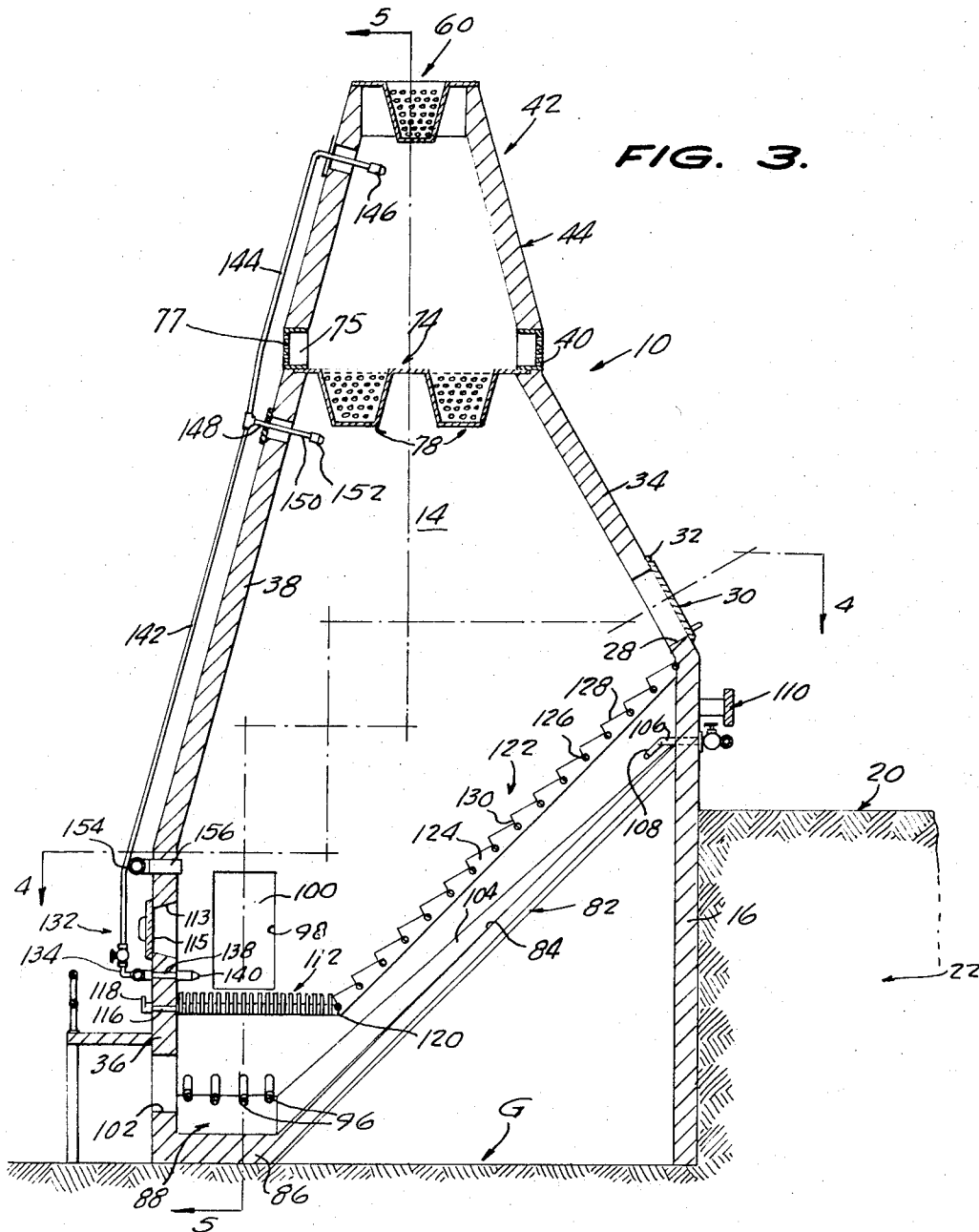
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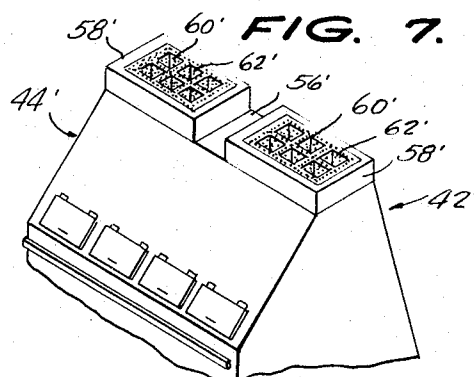
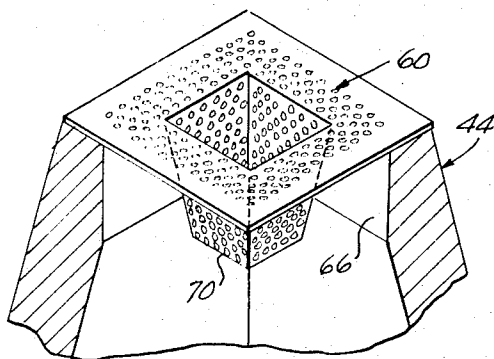
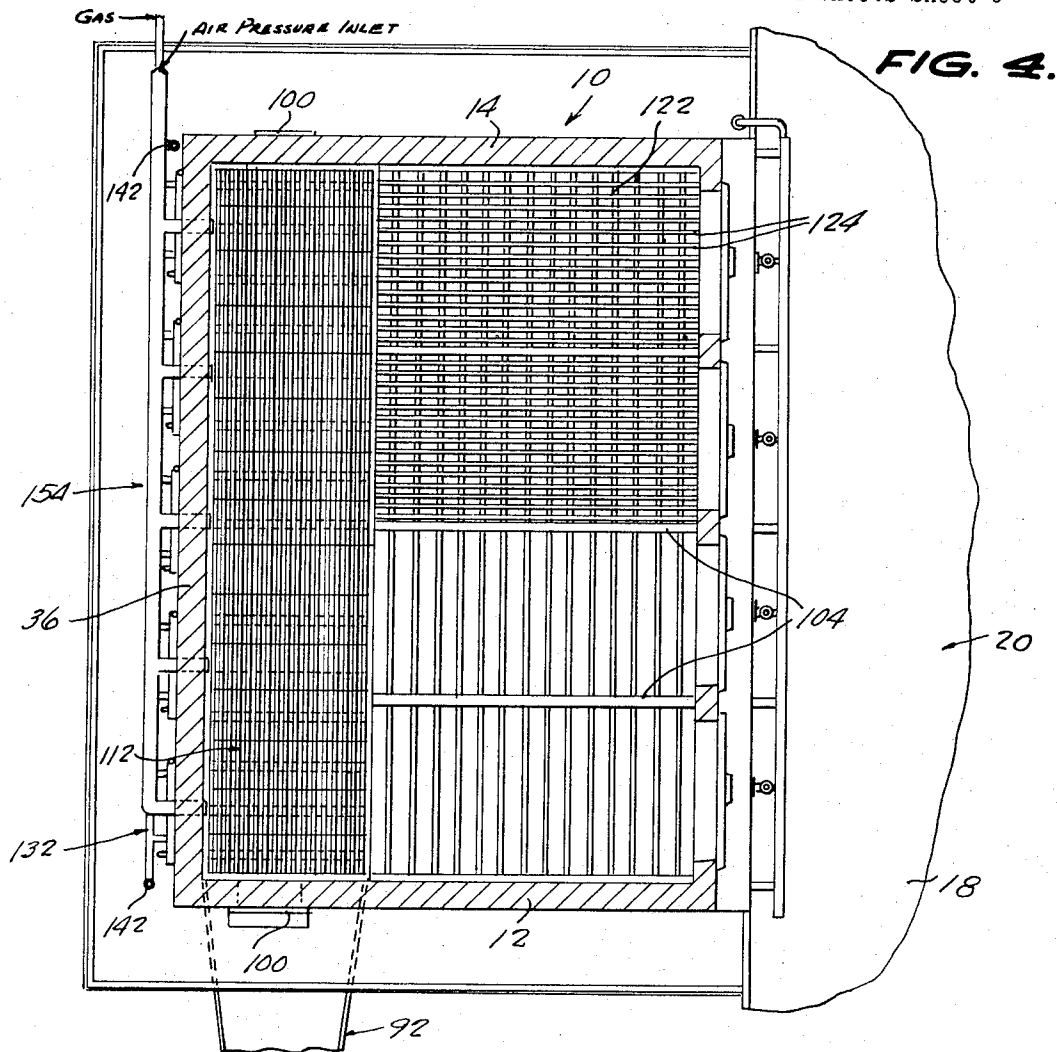


FIG. 6.

FIG. 7.

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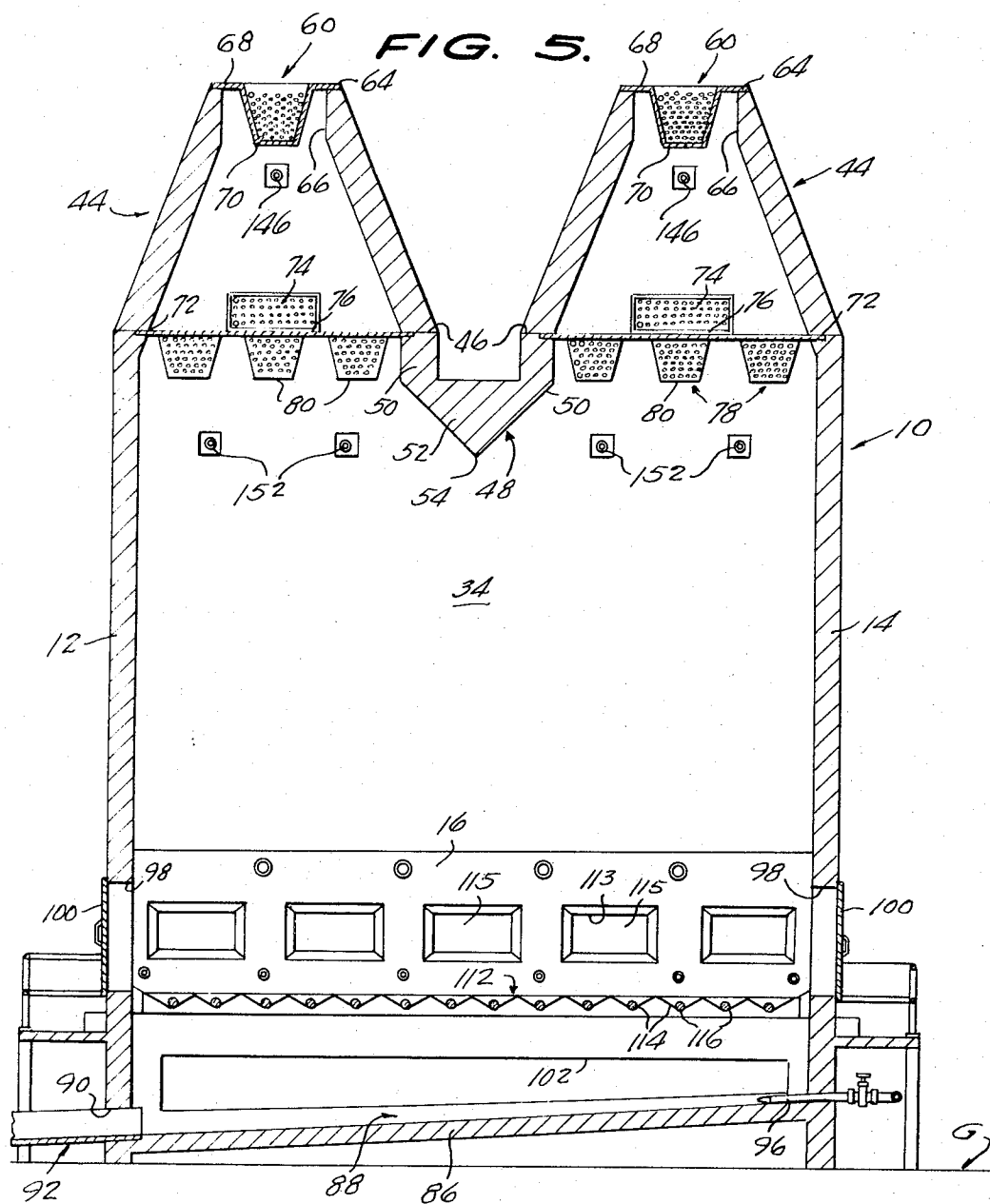
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4 Sheets-Sheet 4



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5 Claims. (Cl. 110—7)

ABSTRACT OF THE DISCLOSURE

A municipal incinerator in which combustible and incombustible waste material is disposed of, by burning the combustible waste material using gas, and mixing the residue ash with the incombustible waste sifted from the whole. The resultant mass is collected and mixed with water, and conveyed as a sludge from the bottom of the incinerator into a pit. Safeguards, such as proper ventilation, spark arresters, and screens are provided, to insure complete combustion of gaseous material used in the burning operation which is expelled into the atmosphere, to preclude a fire hazard from existing, and to prevent solids entrained in the smoke incident to incineration to be expelled from the device.

This invention relates to a municipal incinerator, utilizing gas with adjustable air supply as the incinerating agent, to assure proper combustion.

The primary object of the invention is the provision of a generally superior, more efficient, and more economical device of the kind indicated, wherein the transit of introduced material, to be incinerated, through the device, from a solid or semi-solid initial state, to a discharged final sludge state, is facilitated and can be continuous.

Another object of the invention is the provision of a device of the character indicated above which is devised to discharge into the atmosphere a minimum of noxious products of combustion and sparks, through the incorporation of features such as the use of assistant combustible gases, which assure efficient combustion of material in transit through the device and reduction of the discharge of combustion gases, such as carbon monoxide, incident to incineration, and efficient arrestation of sparks and of solid material entrained in the smoke or other aeriform products of combustion, incident to incineration.

A further object of the invention is the provision, in a device of the character indicated above, of efficient, labor-saving means of introducing incinerable material thereinto, including truck ramps and an unloading platform.

In the drawings:

FIGURE 1 is a front perspective view of a device of the invention;

FIGURE 2 is a rear perspective view of said device;

FIGURE 3 is an enlarged fragmentary vertical transverse section, taken on the line 3—3 of FIGURE 2;

FIGURE 4 is a horizontal section, taken on the line 4—4 of FIGURE 3;

FIGURE 5 is a vertical longitudinal section, taken on the line 5—5 of FIGURE 3;

FIGURE 6 is a further enlarged fragmentary perspective view of a discharge smoke stack of the device; and

FIGURE 7 is a fragmentary perspective view, on a reduced scale, showing a single twin discharge stack, adapted to replace the two stacks of FIGURES 1 to 6.

Referring in detail to the drawings, and first to FIGURES 1 to 6 thereof, the illustrated device comprises a horizontally and vertically elongated housing 10, adapted to rest upon or to be built upon a horizontal ground surface G. The housing 10 can be of masonry construction, or of other suitable construction.

The housing 10 comprises perpendicular left- and right-hand end walls 12 and 14, respectively, between which extend front and rear walls. The front wall comprises a

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perpendicular lower portion 16, which rises above the upper surface 18 of a semicircular horizontal unloading platform 20, which constitutes the top of a built-up earth mound 22. The earth mound 22 is formed with longitudinally outwardly declining portions 24, upon whose tops ramps 26 are laid to enable trucks carrying incinerable material to reach the unloading platform 20, maneuver thereon, and discharge their loads through spaced inlet openings 28 formed in a horizontal row and provided with normally closed doors 30, which are top-hinged as indicated at 32, on the lower wall portions 16.

The inlet openings 28 are formed adjacent to the upper end of the lower portion 16 of the front wall of the housing 10, in an upwardly and rearwardly angled upper portion 34 of the front wall of the housing 10.

The rear wall of the housing 10 comprises a perpendicular lower portion 36, shorter than the lower portion 16 of the front wall, and merges at its upper end into a forwardly and upwardly angled upper portion 38, which reaches to the same level as the upper ends of the side walls 12, 14, and the upper ends of the upper portion of the front wall, so as to define a flat horizontal upper end 40 for the housing 10.

The upper end 40 of the housing 10 is surmounted by and closed by a gaseous discharge smoke stack assembly 42, which comprises a pair of rectangular cross-section, upwardly tapered hollow smoke stacks 44. In the arrangement of FIGURES 1 to 6, the stacks 44 are in longitudinally spaced relationship and rest upon portions of the upper ends of the housing walls, and upon related upper edges 46 of a transverse divider 48, which extends between the upper portions of the front and rear walls of the housing 10.

The front and rear walls of the lower portions of the hollow stacks 44 are provided with air intake or induction openings 75, provided with screens 77. Air is allowed to enter the stacks 44 through said screens 77 and openings 75 to facilitate complete combustion of gaseous material passing upwardly through said stacks.

As shown in FIGURE 5, the divider 48 comprises abbreviated upstanding side walls 50, upon whose upper edges 46, the lower ends of related walls of the stacks 44 rest, and a downwardly directed isosceles triangular body 52 having a lower edge 54 which extends into the housing 10 below the upper end 40 thereof, and is located midway between the end walls of the housing. The divider 48 serves the purpose of directing toward the open lower ends of the stacks 44 smoke and other products of combustion rising within the housing 10, during an incineration operation of the device.

In the alternate arrangement of FIGURE 7, the stack assembly 42' is not separated into spaced stacks, but instead, comprises a single longitudinally elongated stack 44' having a top wall 56', upon which are mounted longitudinally spaced upstanding rectangular collars 58', in which are mounted rectangular perforated smoke dispensers 60'.

In the dual stacks arrangement of FIGURES 1 to 6, the stacks 44 are formed in their flat horizontal upper ends 64 with rectangular parallel sided openings 66, in which rectangular downwardly flaring, perforated smoke dispensers 60, which are parallel spaced from the related walls of the openings 66, and have, on their upper ends, lateral horizontal flanges 68 which rest upon the upper ends 64 of the stacks. The flat bottom walls 70 of the dispensers are perforated.

Spaced beneath the dispensers 60, and supported upon the upper ends of related walls of the housing 10, and of the divider 48, are lateral horizontal flanges 72 of spark-arrester assemblies 74, the flanges 72 being borne upon by the related lower ends of the stacks 44.

The spark-arrester assemblies 74 comprise plates 76, of which the lateral flanges 72 are a part, which are formed with downwardly extending, rectangular cross section, downwardly tapered, perforated arresters 78, which have flat perforated bottom walls 80. The arresters 78, as shown in FIGURES 3 and 5, are arranged and spaced from each other, and from the adjacent walls of the housing 10, and of the stacks 44, in transversely spaced longitudinal rows.

As shown in FIGURES 3 and 4, an imperforate slide 82, having a relatively smooth upper surface 84, is fixed, at its elevated front end, to the upper part of the perpendicular lower portion 16 of the front wall of the housing 10, on a level below and close to the inlet openings 28, and declines, at a rearward and downward angle approximating 45° to the front edge of a relatively narrow horizontal wall 86, which constitutes the imperforate bottom wall of an ash pit 88 which extends longitudinally between the end walls of the housing 10 substantially at ground level G.

As shown in FIGURE 5, the ash pit bottom wall 86 declines at an acute angle, from the right hand end wall 14 to the left hand end wall 12 of the housing 10, so that sludge, as a product of incineration and the addition of water thereto, is moved rapidly along the bottom wall 86 to and through a discharge opening 90 formed in the lower part of the left hand housing end wall 12, whereat a discharge trough 92 is provided, externally of the housing 10, which empties into a disposal pit 94 provided in the ground G, as shown in FIGURE 2.

Valved water pressure nozzles 96 extend through the right hand housing end wall 12 immediately above the ash pit bottom wall 86, as shown in FIGURES 3 and 5, and serve to mix water with incinerated material and drive this material, as sludge, to the discharge trough 92.

Inspection openings 98, normally closed by removable doors 100, are formed in the upper part of and are spaced along the lower portion 36 of the rear housing wall. An air draft inlet opening 102, extending substantially the length of the lower wall portion 36 immediately above the ash pit bottom wall 86, as indicated in FIGURES 3 and 5, is provided for admitting combustion air to the pit 88 and to the interior of the housing 10.

As shown in FIGURES 3 and 4, transverse separator walls 104 are fixed upon the slide 82 and extend from the upper end to the lower end thereof and increase in height from their upper to their lower ends, the separator walls 104 being equally spaced from each other, longitudinally of the slide, and serving to evenly distribute incoming incinerable material evenly across the slide 82, as this material is deposited on the slide through the inlet openings 28 of the front wall of the housing 10, directly from trucks on the platform 20 and dropped thereon from an avalanche grate.

Valved water pressure pipes 106 traverse the lower portion 16 of the housing front wall immediately above the upper end of the slide 82, and have downwardly angled nozzles 108 closely paralleling the upper surface of the slide, which serves to flush material downwardly along the slide into the ash pit 88. A horizontal longitudinal bumper bar 110 is provided on the front wall of the housing 10, between the pipes 106 and the inlet openings 28, adapted to prevent unloading trucks from damaging contact with the pipes 106 and the front wall of the housing.

Extending between the end walls of the housing 10 is a horizontal grate assembly 112, which is spacedly located between a horizontal row of inspection openings 113 in the lower portion 16 of the rear housing wall and the air inlet opening 102, the openings 113 being closed by doors 115. The grate assembly 112 comprises a plurality of individual, laterally adjacent, transversely extending horizontal grates 114 and preferably has an area of ten square feet or more.

As shown in FIGURE 5, the grates 114 are of upwardly opening V-shaped cross section and are carried by rear-

wardly extending rods 116, which are journaled through the rear housing wall and having rotating handles 118, on their rear ends, by means of which the grates are adapted to be manually rotated from outside of the housing 10, between their normal position, as shown in full lines, to rotated dumping positions, shown in phantom lines.

At their front ends, the grates 114 meet and are pivoted, as indicated at 120, to the lower end of a rearwardly and downwardly angled avalanche grate 122, which extends between the side wall of the housing 10 and downwardly between the upper part of the lower portion 16 of the housing front wall and the horizontal grate assembly 112. As shown in FIGURE 3, the avalanche grate 122 is spaced above the slide 82 and declines at a somewhat sharper angle than the slide 82, and has its upper end located immediately below the inlet openings 28 of the housing front wall. The avalanche grate 122 comprises closely parallel spaced vertical bars 124, which are formed at their upper edges with longitudinal notches 126. The notches 126 define, between them, upper edges 128 disposed at downward and rearward angles, less than the declination of the avalanche grate 122, and relatively short vertical rear edges 130 which are disposed at acute upward and rearward angles relative to the horizontal. The avalanche grate 122 has, as a result, a rearwardly declining stepped upper surface, which causes incinerable material deposited thereon to move downwardly, by gravity, therealong in a series of up and down movements which serve to loosen the material and to cause components thereof, smaller than the spaces between the grate bars 124, to fall onto the slide 82, whereas the larger components are carried down to the grate assembly 112 and are deposited thereon, to be incinerated by a gas burner assembly 132.

The gas burner assembly 132 comprises an external horizontal manifold 134 extending across the outside of the lower portion 36 of the rear housing wall, on a level spaced between the horizontal grate assembly 112 and the inspection openings 113. From the manifold 134 longitudinally spaced burner pipes 138 extend through the rear housing wall, and terminate in burner nozzles 140. As shown in FIGURE 3, the burner nozzles 140 are spaced closely above the rear part of the horizontal grate assembly 112. The manifold 134 is closed, at one end thereof, and is supplied with gas from the other end thereof.

The gas manifold 134 has, as indicated in FIGURES 2 and 3, branch pipes 142 which extend upwardly along the ends of the housing rear wall, and have inwardly and upwardly angled upper portions 144. The upper portions 144 terminate at their upper ends in forwardly and downwardly angled burner nozzles 146, which extend through the rear walls of the discharge stacks 44 below the upper spark arresters 60, and serve to complete the combustion of products of combustion before discharge of gaseous material upwardly out of the stacks 44 or 44'.

At points spaced below the upper end of the housing 10, the branch gas pipes 142 have horizontal portions 148 which extend inwardly and terminate, at their rear ends, in pipes 150, which extend forwardly through the upper part 38 of the rear housing wall and have burner nozzles 152 on their rear ends which discharge beneath the lower arrester assemblies 74, so that products of combustion, including carbon monoxide, are consumed before they can pass upwardly through the lower arrester assemblies.

Mounted externally on the upper part of the lower rear wall portion 36 of the housing 10 is a horizontal longitudinal air pressure manifold 154, which is closed at one end thereof, and is adapted to be connected at its other end, to a supply of air under pressure. Horizontal, forwardly extending air nozzles 156 on the air manifold 154, extend into the interior of the housing 10 on a level spaced above the horizontal grate assembly inspection openings 113. The air injected by the air nozzles 156 supplements the natural upward air draft within the hous-

ing 10 from the air inlet opening 102, to the ash pit 88 and the grate assembly 112 and produces above the grate assembly 112 and the avalanche grate 122 an upwardly moving body of air with products of combustion entrained therein, which rises to the lower arrester assembly 74 and passes through it to the upper arrester 60 and into the outside air.

In operation, waste material, including combustible material and incombustible material, deposited upon the avalanche grate 122, moves downwardly gravitationally thereon. As the waste material thus moves downwardly, the smaller particles thereof fall through the grate 122, onto the slide 82, down along which they are washed by water from the nozzles 108, into the ash pit 88. At the same time, material retained on the avalanche grate 122 is deposited upon the dumpable horizontal grate assembly 112, where it comes into contact with and is incinerated by the flames issuing from the gas burner nozzles 140, and falls through the grate assembly 112, into the ash pit 88.

The material deposited in the ash pit 88 is forcibly washed, in the form of sludge, along and down the ash pit to the trough 92 by water from the nozzles 96, from which it is deposited into the disposal pit 94.

The valves of the air pressure and gas manifolds are adapted to be regulated to obtain the desired efficiency of combustion of material on the grate assembly 112, and combustion of the products of combustion entrained in gaseous materials rising toward and passing through the spark arresters and smoke dispensers.

It will be understood that, while a single unit has been described and illustrated herein, two or more such units can be constructed, as a single incinerator assembly, according to the amount of refuse to be handled, and operated from a single or more than one ramp.

What is claimed is:

1. A device of the character described, comprising a support, a closed hollow housing mounted on the support, burner means within the lower part of the housing, an ash pit in the housing beneath the burner means, horizontal grate means mounted within the housing and interposed between the ash pit and the burner means, air draft inlet opening means formed in one wall of the housing and opening to the space between the ash pit and said horizontal grate means, outlet stack means on the upper end of the housing, inlet opening means formed through another wall of the housing opposite to said one wall for introducing incinerable material to the horizontal grate means and the ash pit, a stepped avalanche grate declining within the housing from a point beneath said last-named inlet opening means to the adjacent side of said horizontal grate means, an imperforate slide disposed beneath said avalanche grate and extending the length thereof, said slide extending downwardly from said other wall to the adjacent side of the ash pit, said ash pit having a bottom wall which declines from one end of the housing to the other end of the housing, an adjacent end wall of the housing being formed with an opening at the depressed end of the ash pit bottom wall, a disposal trough having an elevated end adapted to receive material from the depressed end of the ash pit bottom wall, and water pressure means comprising nozzles adapted to force water and entrained material downwardly along the ash pit bottom wall from the elevated end of the bottom wall to said trough.

2. A device of the character described, comprising a support, a closed hollow housing mounted on the support, burner means within the lower part of the housing, an ash pit in the housing beneath the burner means, horizontal grate means mounted within the housing and interposed between the ash pit and the burner means, air draft inlet opening means formed in one wall of the housing and opening to the space between the ash pit and said horizontal grate means, outlet stack means on the upper end of the housing, inlet opening means formed through another wall of the housing opposite to said one wall for

introducing incinerable material to the horizontal grate means and the ash pit, a stepped avalanche grate declining within the housing from a point beneath said last-named inlet opening means to the adjacent side of said horizontal grate means, an imperforate slide disposed beneath said avalanche grate and extending the length thereof, said slide extending downwardly from said other wall to the adjacent side of the ash pit, said ash pit having a bottom wall which declines from one end of the housing to the other end of the housing, an adjacent end wall of the housing being formed with an opening at the depressed end of the ash pit bottom wall, a disposal trough having an elevated end adapted to receive material from the depressed end of the ash pit bottom wall, and water pressure means comprising nozzles adapted to force water and entrained material downwardly along the ash pit bottom wall from the elevated end of the bottom wall to said trough, and air pressure nozzle means opening into the housing above and along said horizontal grate means.

3. A device of the character described, comprising a support, a closed hollow housing mounted on the support, burner means within the lower part of the housing, an ash pit in the housing beneath the burner means, horizontal grate means mounted within the housing and interposed between the ash pit and the burner means, air draft inlet opening means formed in one wall of the housing and opening to the space between the ash pit and said horizontal grate means, outlet stack means on the upper end of the housing, inlet opening means formed through another wall of the housing opposite to said one wall for introducing incinerable material to the horizontal grate means and the ash pit, a stepped avalanche grate declining within the housing from a point beneath said last-named inlet opening means to the adjacent side of said horizontal grate means, an imperforate slide disposed beneath said avalanche grate and extending the length thereof, said slide extending downwardly from said other wall to the adjacent side of the ash pit, said ash pit having a bottom wall which declines from one end of the housing to the other end of the housing, an adjacent end wall of the housing being formed with an opening at the depressed end of the ash pit bottom wall, a disposal trough having an elevated end adapted to receive material from the depressed end of the ash pit bottom wall, and water pressure means comprising nozzles adapted to force water and entrained material downwardly along the ash pit bottom wall from the elevated end of the bottom wall to said trough, air pressure nozzle means opening into the housing above and along said horizontal grate means, and an external gas manifold on the housing having pipes spaced therealong and extending into the housing and feeding said burner means.

4. A device of the character described, comprising a support, a closed hollow housing mounted on the support, burner means within the lower part of the housing, an ash pit in the housing beneath the burner means, horizontal grate means mounted within the housing and interposed between the ash pit and the burner means, air draft inlet opening means formed in one wall of the housing and opening to the space between the ash pit and said horizontal grate means, outlet stack means on the upper end of the housing, inlet opening means formed through another wall of the housing opposite to said one wall for introducing incinerable material to the horizontal grate means and the ash pit, a stepped avalanche grate declining within the housing from a point beneath said last-named inlet opening means to the adjacent side of said horizontal grate means, an imperforate slide disposed beneath said avalanche grate and extending the length thereof, said slide extending downwardly from said other wall to the adjacent side of the ash pit, said ash pit having a bottom wall which declines from one end of the housing to the other end of the housing, an adjacent end wall of the housing being formed with an opening at the

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depressed end of the ash pit bottom wall, a disposal trough having an elevated end adapted to receive material from the depressed end of the ash pit bottom wall, and water pressure means comprising nozzles adapted to force water and entrained material downwardly along the ash pit bottom wall from the elevated end of the bottom wall to said trough, air pressure nozzle means opening into the housing above and along said horizontal grate means, an external gas manifold on the housing having pipes spaced therealong and extending into the housing and feeding said burner means, said housing having an open upper end, said discharge stack means comprising at least one hollow stack imposed upon said upper end of the housing, a lower perforated spark arrester and smoke disposer assembly interposed between the stack means and the upper end of and extending transversely across the housing, and an upper spark arrester and smoke dispenser disposer assembly in the upper end of the stack means and extending thereacross.

5. A device of the character described, comprising a support, a closed hollow housing mounted on the support, burner means within the lower part of the housing, an ash pit in the housing beneath the burner means, horizontal grate means mounted within the housing and interposed between the ash pit and the burner means, air draft inlet opening means formed in one wall of the housing and opening to the space between the ash pit and said horizontal grate means, outlet stack means on the upper end of the housing, inlet opening means formed through another wall of the housing opposite to said one wall for introducing incinerable material to the horizontal grate means and the ash pit, a stepped avalanche grate declining within the housing from a point beneath said last-named inlet opening means to the adjacent side of the horizontal grate means, an imperforate slide disposed beneath said avalanche grate and extending the length thereof, said slide extending downwardly from said other

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wall to the adjacent side of the ash pit, said ash pit having a bottom wall which declines from one end of the housing to the other end of the housing, an adjacent end wall of the housing being formed with an opening at the depressed end of the ash pit bottom wall, a disposal trough having an elevated end adapted to receive material from the depressed end of the ash pit bottom wall, and water pressure means comprising nozzles adapted to force water and entrained material downwardly along the ash pit bottom wall from the elevated end of the bottom wall to said trough, air pressure nozzle means opening into the housing above and along said horizontal grate means, an external gas manifold on the housing having pipes spaced therealong and extending into the housing and feeding said burner means, said housing having an open upper end, said discharge stack means comprising at least one hollow stack imposed upon said upper end of the housing, a lower perforated spark arrester and smoke disposer assembly interposed between the stack means and the upper end of and extending transversely across the housing, and an upper spark arrester and smoke dispenser disposer assembly in the upper end of the stack means and extending thereacross, said gas manifold having upwardly extending branches having lower burner nozzle means extending into the housing adjacent to and beneath the lower arrester and disposer assembly, and upper nozzle means extending into the stack means between the upper and lower arrester and disposer assemblies.

References Cited

UNITED STATES PATENTS

1,532,758	4/1925	Kay	110—8
2,384,496	9/1945	Sharpe	110—8
2,563,137	8/1951	Sharpe	110—18
3,199,475	8/1965	Siagle	110—18

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