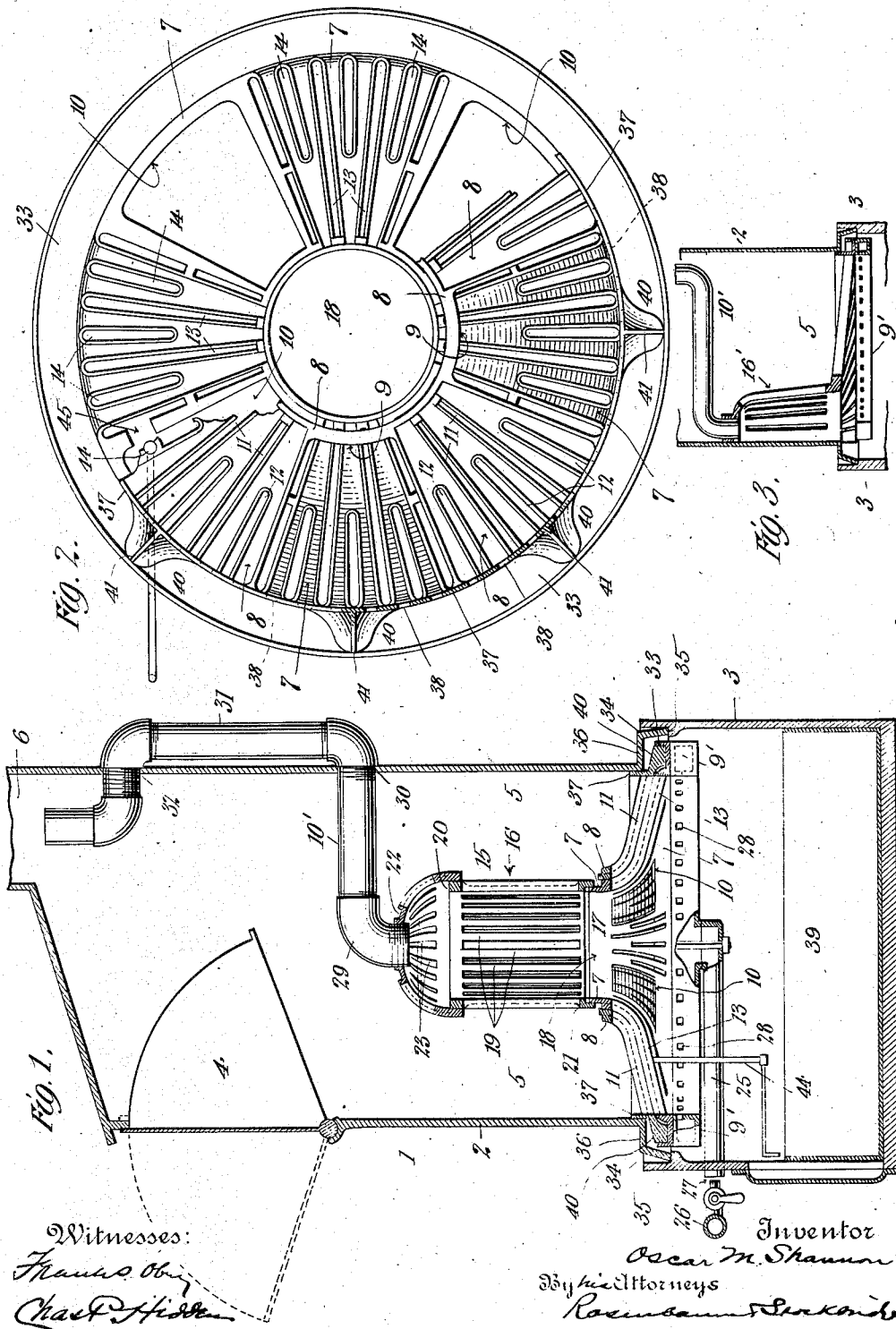


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GARBAGE CREMATORY.
APPLICATION FILED MAR. 21, 1910.

981,228.

Patented Jan. 10, 1911.



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OSCAR M. SHANNON, OF NEW ROCHELLE, NEW YORK.

GARBAGE-CREMATORY.

981,228.

Specification of Letters Patent. Patented Jan. 10, 1911.

Application filed March 21, 1910. Serial No. 550,655.

To all whom it may concern:

Be it known that I, OSCAR M. SHANNON, a citizen of the United States, residing at New Rochelle, in the county of Westchester and State of New York, have invented certain new and useful Improvements in Garbage-Crematories, of which the following is a full, clear, and exact description.

This invention relates to crematories or furnaces adapted to burn or dispose of refuse of various sorts.

The matter herein presented constitutes a disclosure of improvements in apparatus of this description, and more particularly relates to improvements in crematories of the type described in my application, Serial No. 493,113, filed April 30, 1909, whereby increased efficiency of such devices may be obtained, accelerating the destruction of the waste or refuse material to be disposed of, and thereby enabling the apparatus to incinerate a considerably larger amount of material in any given period of time. As stated in my companion application, litter from office buildings and hospitals, scraps and garbage from private dwellings, and the useless rubbish and shavings and general refuse of manufacturing processes is ordinarily carted away; but as most of it is combustible, a considerable economic saving results from burning it where it originated; thereby avoiding the trouble of storing it up for subsequent removal, the expense of such removal, and eliminating unsanitary conditions.

Referring now to the drawings which form a part hereof, and in which like characters designate like parts throughout the several views: Figure 1 is a vertical sectional view of a garbage crematory, embodying the improvements in my crematory aforesaid. Fig. 2 is a plan of the inclined or sloping grate members, the movable grating being partly broken away in order to show the corresponding portion of the fixed grating therebeneath. Fig. 3 is a fragmentary vertical section of a modified form of my invention.

The character 1 designates the body or casing of a furnace. Such furnace preferably comprises a metallic shell 2, which forms the furnace body, and a base or ash-pit casing 3 upon which shell 2 is supported; being, it may be here noted removable therefrom. A hinged hopper-like door 4 similar

to that used in my earlier form of device is capable of being closed tightly in normal use; but is further adapted to be drawn open to form a sort of receiving chute for the garbage and other material.

The furnace has a central substantially annular consumption chamber 5, in which the combustion of the garbage takes place. This consumption chamber communicates with the chimney flue 6, and has a fixed grate 7 of thin heat conducting metal, upon which is superposed a rotatable grate 8 of somewhat similar construction, the movable or rotatable element being supported by the fixed member or grate; movable grate 8 being also formed of thin heat conducting metal. The rotatable member is provided with a series of apertures 9 concentrically disposed around a common center, namely, the axis of the grate, and these apertures are adapted to be alined with a series of corresponding apertures 10 in the fixed grate. It will be observed that in this form of my invention the grates are preferably circular instead of substantially square as shown in my companion application referred to. The movable member 8 may be rotated so that the apertures 9 and 10 are each respectively closed by the grated portions of the opposite grate, and when in this position the material to be incinerated rests upon the movable grate 8 and the portions of grate 7 exposed through the apertures 9 of the movable member. It is evident that a natural up-draft is created through the openings 11 and 12 of the movable member, and corresponding apertures 13 and 14 of the fixed grate. As shown, I prefer to form alternate apertures of greater length than those intermediately disposed; the draft passing upward through the burning mass of garbage and thence out through the chimney flue.

In burning paper waste or other very combustible litter, no other provision than the foregoing will be necessary. Ordinary garbage, however, being much less combustible than paper waste can not be consumed in this simple way and other means must be afforded for promoting the combustion. Particularly is this the case with material to be consumed which comprises wet rags, vegetable refuse, and dirt and dust of sweepings. I have indicated in my companion application, a means whereby this difficulty

can be overcome. I find, however, that where the mass of matter to be consumed is particularly obdurate, as when the percentage thereof is in large part composed of damp or soggy material, much time is consumed and a considerable waste of the combustible employed, such for example as gas, is thereby necessitated. This is due largely to the fact that the mass of material disposed above the grate is in great measure protected from the heat to which it is subjected by reason of its comparatively solid structure, the lowermost surface of the mass being exposed to heat or flame; but such surface, being moist, effectually shielding the superposed portions of the mass for a considerable time from the flame. I have therefore provided means for enabling the flame to penetrate up directly into the body of the mass to be destroyed, which may be of considerable depth.

Referring more particularly to the construction herein set forth, which obviously forms but one embodiment of my invention, a burner 9', preferably a gas burner, is provided beneath the grate, against which grate the burner flame is directed. I prefer to form this burner integral with the fixed grate 7, as shown in Fig. 1; but it is not arranged directly beneath the slots in the grate aforesaid, being located out of vertical alignment with the grate openings; the flame nevertheless being caused to pass across the entire under surface of the grate and upwardly through the openings therein if these are not plugged up by the garbage. In general the means employed to this end embody the general principles employed in my previous invention, namely, the provision of a special flue pipe 10' exclusively for the burner flame. This insures a flow of the hot flame or gases entirely across the lower exposed portions of the grate, just as it does in my other form of device. In traversing this under side of the grate, the burner flame is of course sucked up through the grate openings, if these are not clogged. These flames sucked through the openings 11, 12, 13 and 14, of the grate in this way, then thread themselves upward through the interstices of the garbage mass, igniting those portions which are freely combustible, and drying, oxidizing and incinerating the less combustible portions. The heat from the burner flame is increasingly augmented by the heat from the garbage masses, which are first dried and partly carbonized, thereupon igniting and furnishing an intense heat from their own combustion. If in the progress of the action the garbage mass settles down on the grate and clogs up the openings thereof, the burner gases will still have a free path of escape through the flue 10' and the chamber 15, which I will now describe, until the combined heat of the burner and the com-

bustion of the glowing garbage has restored natural draft through the lower grate openings.

Chamber 15 just referred to, is formed by a vertical, cylindrical grate wall 16, which is removably disposed around the flange 17 which surrounds an aperture 18 provided substantially at the center of the fixed grate. This cylindrical grate element is formed by a number of vertical bars 19 which are united at their upper and lower extremities respectively by annular rims 20 and 21. A dome-shaped cap 22 is positioned in engagement with rim 20; and this cap is in like manner provided with a series of radially disposed slots 23. It may be here observed that all of the slots in the several parts aforesaid are provided with upstanding or outstanding flanges around the respective edges thereof in the manner shown in the drawings, and in correspondence with the slot formation disclosed in my application previously filed. The purpose of these ridges or flanges is to form a series of gutters around the respective slots through which the water or other fluid in the mass to be incinerated may escape; draining it off therefore from the said mass. The entire path of the flames is hence inwardly from the burner over the lower surfaces of grates 7 and 8, upward adjacent to the inner wall of the cylindrical grate, correspondingly around the dome 23, and out through the pipe 10'. A relatively enormous grate surface is hence afforded, and the mass to be incinerated when disposed in the garbage receptacle actually molds itself into a hollow structure, and the incinerating flames are hence adapted to impinge against the lower surface of this mass and through the lateral openings of the cylindrical grate and against the entire interior wall thereof. By reason of this construction, the soggy mass hereinbefore referred to is directly attacked at its interior as well as upon the bottom thereof and is rapidly dried out and incinerated.

Another feature of importance should here be emphasized, namely, that the rotatability of the upper grate affords means for shaking down clinkers or recalcitrant matter which may be deposited upon the grate; such matter falling down into the ash-pit provided therebelow. In this form of construction I prefer to form the perforated burner tube 91 of square transverse section and generally circular outlines corresponding to the shape of the furnace or grate. I prefer to make the burner in two semi-circular sections which abut against each other at the ends thereof. At some point along the length of each of these halves or sections and beneath the same is formed an extension 25 into which a gas pipe 26 delivers, the extension having an air

inlet 27; thereby constituting a Bunsen burner. The burner perforations 28 are located on the upper inside zone or face of the burner tube so as to direct the flames radially inward beneath the grate as much as possible. The flue pipe 10' is connected to the central portion of the dome 22 by an elbow-fitting 29, pipe 10' extending thence laterally out through the wall of the receptacle as at 30, and thence upward as at 31 outside of said wall and preferably to the rear thereof, finally returning again through the upper portion of said wall at 32 to deliver into chimney 6. Pipe 31 may have a damper therein, if desired. The disposition of a portion of the pipe outside of the receptacle affords more room upon the inside of the same. Any fire or fuel bed which produces a flame will answer. It will be observed that all grate surfaces present either inclined or vertical faces to the garbage which rests thereagainst. Every point of the entire grate therefore drains outwardly and downwardly toward a common peripheral gutter 33; the flanges formed around each of the grate slots effectually preventing any fluid streams on the grate surfaces from finding an exit through such openings. The water and drippings from wet garbage are thereby mostly carried to the gutter, where they are readily evaporated by the close proximity of the burners; while any water which happens to pass through the openings in the grate will fall into the pit below, and not lodge upon and choke the burner. If desired, a drain may be provided for the gutter 33, but it will be found in practice that this not necessary, evaporation taking care of any liquid which collects in the gutter.

I particularly wish to point out a feature in my present construction which constitutes another marked improvement over the structure described in my co-pending application, to wit, the disposition of the wall 2 of the receptacle with respect to said gutter. An annular portion 34 of said wall engages a corresponding annular recess 35 at the upper edge of the base 3, the casing metal extending inwardly from the upper portion of this flange-shaped portion 34, in the manner shown in Fig. 1; to form a ledge shaped section 36, and thereafter being upwardly directed to form the body of the casing. The ledge portion 36, is disposed directly over the gutter 33. Around the periphery of the movable grate element 8 is an upwardly extending annular flanges 37, the outer surface of which flange almost contacts with the inner face of the casing wall. It will hence be seen that the gutter 33 is protected from the mass of garbage by casing portion 36 and said flange, and substantially the only entrances into the peripheral gutter are afforded by a series of apertures

38 in flange 37, such apertures permitting water to drool down from the surface of grate member 8; and through the gutters in the upper surface of grate 7.

I have provided this construction since I find that in my previous form of device hereinbefore referred to a portion of the refuse material around the walls of the receptacle largely escapes the action of the flame and incinerates but slowly, by reason of the fact that the flames from the burners do not impinge directly against such portion, but inwardly thereof. By bringing the wall of the casing inward over the gutter and closely adjacent to the outer ends of the slots in the grate members 7 and 8, the flames passing through such portions of the slots will reach the matter disposed thereabove and lying closely adjacent to the casing wall. Hence, no portion of the refuse material can escape the action of the flame. Below the grate 7 there is the usual ash pan 39 to collect the comminuted incinerated products of combustion which escape or are shaken down through the grate openings. In ordinary use the combustion will be found so complete as to reduce almost all garbage to this condition. The composition of the flue gases depends on the temperature attained in the furnace, and if this is reasonably high, as it always is, nothing will escape except steam, air and carbon dioxide, none of which are in the least objectionable in the atmosphere. Of course in time, particles of incinerated material will pass down through apertures 38 upon the grate surfaces into gutter 33, and in order to rid the said gutter of such material, I have provided a series of extensions 40, which are preferably integrally formed with the movable grate section 8. These projections or extensions are of somewhat peculiar contour, preferably having a ridge 41 radially disposed outward from the lower portion of flange 37, the material of the said extensions tapering then downwardly and somewhat outwardly toward the bottom of the part to provide warped, propeller-like surfaces upon either side of extension 40. These extensions act as scrapers, and not only scrape up the accumulated material from the bottom and sides of the gutter, but also serve to dislodge and push the same over the outer gutter wall, down into the ashpit. This form of my crematory furnace incinerates garbage most completely without throwing off noxious gases and by reason of the arrangement shown, or some equivalent thereof, the flame or source of heat can never be suppressed. Means are provided for moving the movable grate section and thereby cleaning out the peripheral gutter in manner aforesaid; such means in the construction shown consisting of a downwardly projecting stud or bolt 44 which is movable

through one of the apertures 10 in grate 7, into a pocket or recess 45 formed in one side thereof; this recess being provided to allow of sufficient movement of the grate 8.

5 I have in this construction, as in the preceding one, provided a device which constitutes a combined furnace and retort; the retort being constituted in the sense that the apparatus has a chamber heated by an
10 exterior burner or fire. The grate becomes red hot in use and the retort action is most practical. It is also a furnace, since the flame passes up, through and into the mass. As in my preceding device, the air supply
15 is heated which tends to produce a more intense and thorough combustion than when it is cold.

The particular features of invention which I wish to cover in this application are the
20 provision of means for applying a retort action not only to the lower surface of the mass to be incinerated, but up through and into the body of the same; the peculiar construction of furnace which is afforded by a
25 device of this character; the provision of a movable grate in combination with retort furnaces of the type in question; the provision of means whereby the bulk of the mass of material to be incinerated may be instantly attacked by the flame; the provision
30 of means for sweeping out the fluid-collecting gutter; the provision of such sweeping means in connection with a movable element of the grate; and finally the construction
35 of ashpit and furnace casings whereby the latter may be readily removed from the former for the purpose of cleaning the various parts of the apparatus.

My device may be lined with firebrick or
40 refractory material in similar fashion to that used in connection with my earlier form of apparatus; but I find in practice that a proper metallic casing efficiently withstands the action of the heat generated in the apparatus, and hence the device may in most
45 cases be used without such lining.

Referring to Fig. 3, I have there shown a form of furnace in which the substantially
50 vertical elements of the grate which afford the means for laterally attacking the mass to be incinerated, are disposed not centrally of the grate but to one side thereof to form the wall 16'. This form of structure is not so well adapted for the purpose in question, but
55 as it involves some of the principles underlying my invention, it and like devices should be regarded as coming within the purview of certain of the claims hereunto appended.

60 It will be understood that in the claims, the terms horizontally, vertically and the like, are to be considered sufficiently broad to cover deviations from the horizontal or vertical which would not materially affect
65 the operation of the parts.

What I claim, is:

1. In a garbage crematory, a chamber adapted to receive garbage, a grate at the bottom of said chamber having a gutter therearound for liquid matter, means for
70 normally preventing said gutter from being filled by the matter to be incinerated, and means disposed adjacent said gutter for directing jets of flame across the surface of said grate.

2. In a garbage crematory, a chamber adapted to receive garbage, a grate comprising elements disposed at the bottom of said chamber, and grate elements extending up
80 into the interior thereof, a chimney flue communicating with said chamber, a supplemental flue extending up beyond the zone of incineration and connecting the chimney flue with the space below the grate, and means
85 for causing jets of flame to impinge against the entire surface of the bottom of the grate, and unobstructedly against the upwardly disposed elements of said grate.

3. In a garbage crematory, a chamber adapted to receive garbage, a grate extending abruptly upwardly into the interior of
90 said chamber, a chimney flue communicating with said chamber, an extended supplemental flue connecting the chimney flue with the space inside of said grate, and means for
95 producing flames and for causing such flames to impinge against said grate, the course of said flames up into the space inside of said grate being unobstructed.

4. In a garbage crematory, a chamber adapted to receive garbage, a grate comprising
100 elements disposed at the bottom of said chamber, and grate elements extending abruptly upwardly into the interior thereof, a chimney flue communicating with said
105 chamber, a supplemental flue directly connecting the chimney flue with the space below the grate, and means for producing flames and for causing flames to impinge against the entire extent of said grate.

5. A refuse incinerator comprising a burner chamber and an incinerator chamber, a grate arranged between said chambers, and having an annular gutter around its
110 periphery located in an enlarged portion of the combustion chamber out of alinement with the main portion of the incinerator wall, said gutter being adapted to receive liquids shed from the grate.

6. A refuse incinerator comprising a
120 burner chamber and an incinerator chamber, a grate arranged between said chambers, and having an annular gutter around its periphery located in an enlarged portion of the combustion chamber out of alinement with
125 the main portion of the incinerator wall, said gutter being adapted to receive liquids shed from the grate, and an annular burner beneath said gutter.

7. In a garbage crematory, a chamber 130

adapted to receive garbage, a flue leading therefrom a grate having substantially vertical faces located in the interior of said chamber, said grate further comprising 5 obliquely disposed grate elements leading toward the vertical faces of said grate, a flue communicating with the space adjacent said vertical faces, a burner having jets impinging against the grate at points remote 10 from said flue, whereby the flame and products of combustion traverse the face of said grate substantially in direct contact therewith.

8. In a garbage crematory, a chamber 15 adapted to receive garbage, a flue leading therefrom, a grate having upwardly flanged perforations located at the bottom of said chamber, a second grate having corresponding perforations therein, one of said grates 20 being movable with respect to the other, a flue communicating with the space below said grates, and a burner having jets impinging against said grates at points remote from said flue, whereby the flames and 25 products of combustion traverse the faces of said grates in substantially direct contact therewith.

9. A refuse incinerator comprising a burner chamber and an incinerator chamber, a grate arranged between said chambers, said grate having both lateral and upright 30 portions, in combination with a flue and a burner, the flue connecting with the top of the upright portion of the grate and the burner being located beneath and at the 35 outer periphery of the lateral portion of the grate.

10. In a refuse incinerator, a casing, a grate dividing the casing into an incinerating and a burner chamber, said grate having 40 an annular lateral portion extending to the casing wall and also having a contiguous upright axial portion projecting into the

combustion chamber, a flue leading from the combustion chamber, a second flue leading 45 from the top of the axial portion of the grate, and a burner located in the burner chamber at the periphery of the lateral portion of the grate.

11. In a garbage crematory, an incinerating chamber having the bottom thereof 50 formed by a grate, said grate comprising grate portions disposed at the bottom of said chamber and further comprising grate portions supported by said bottom portions and 55 extending up substantially vertically therefrom, an exit flue communicating with the space adjacent the vertical portions, and means for causing jets of flame to impinge against the grate at points remote from the 60 exit flue, whereby the flames of combustion travel across the under surface of said grate and upwardly adjacent the vertical portions thereof in direct contact therewith.

12. In a refuse incinerator, a casing, a 65 grate dividing the casing into an incinerating and a burner chamber, said grate having inclined laterally extending elements constituting a lateral section, and contiguous substantially vertical elements, the latter 70 forming an upright cage extending into the incinerating chamber, a flue leading from the combustion chamber, and a burner located in the burner chamber adjacent the periphery of the laterally extending grate section, flames from the burner passing upward 75 over the inclined section and into the cage substantially in direct contact with the walls thereof.

In witness whereof, I subscribe my signature, in the presence of two witnesses. 80

OSCAR M. SHANNON.

Witnesses:

WALDO M. CHAPIN,
WILLIAM C. LARY.