Aug. 13, 1929. E. H. GRAVER 1,724,575

INCINERATOR

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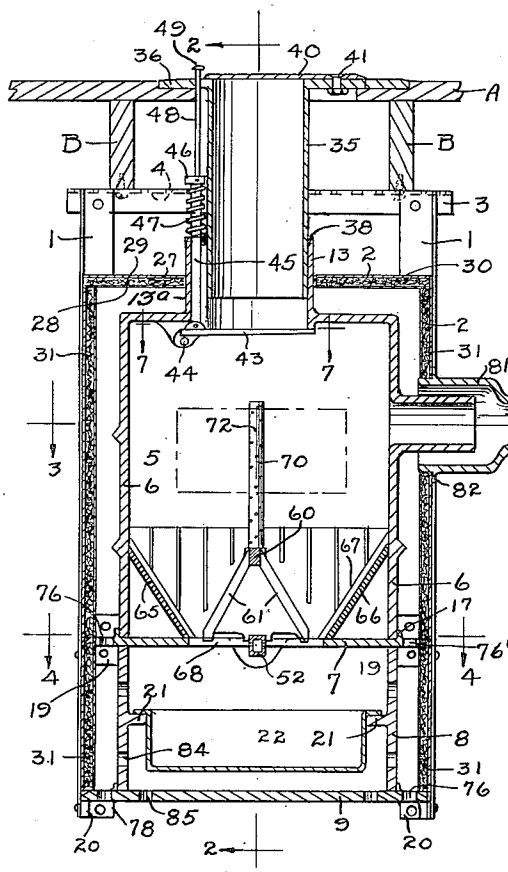


FIG.-1

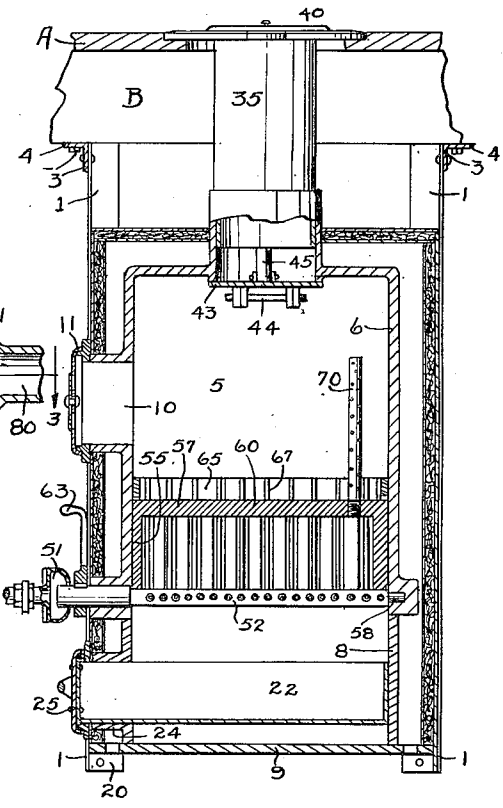


FIG.-2

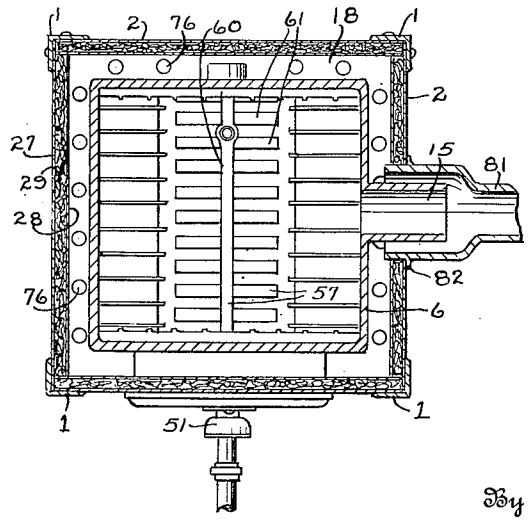


FIG.-3

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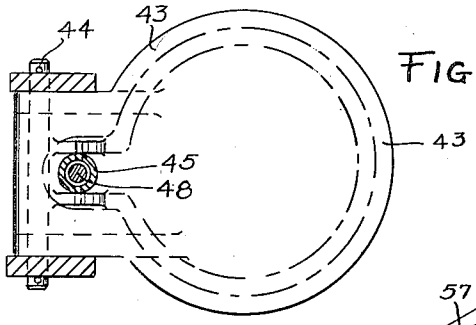


FIG.-7

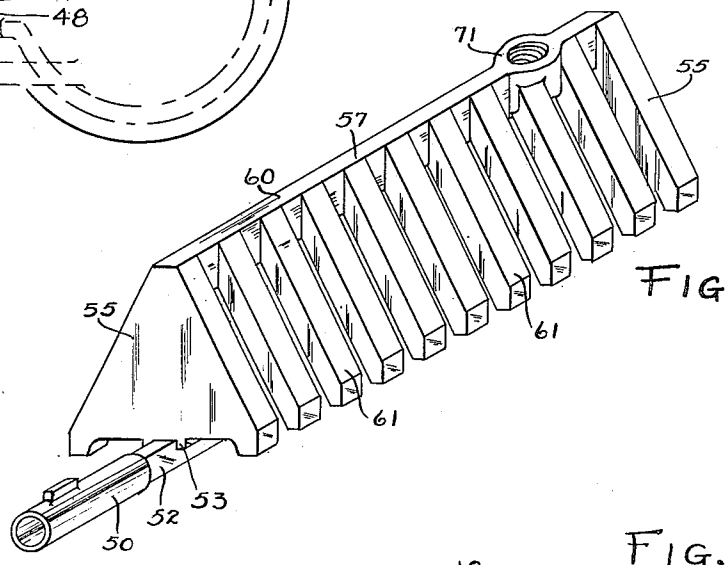


FIG.-6

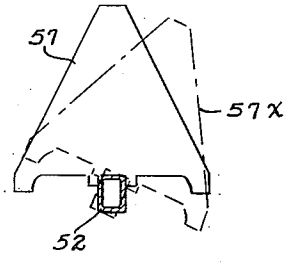
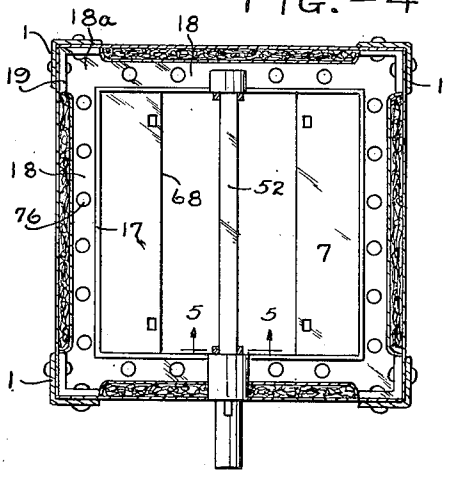


FIG.-5

FIG.-4



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UNITED STATES PATENT OFFICE.

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INCINERATOR.

Application filed February 19, 1927. Serial No. 169,432.

This invention relates to an incinerator, particularly to an incinerator adapted for use as a household appliance. An object of the invention is to provide a simple and efficient incinerating apparatus, capable of being easily and cheaply manufactured and assembled. A more specific object is to provide a compact and efficient incinerator for domestic use, that is to say, for use in a dwelling house. A further object is to provide an incinerator having constructional characteristics conducive to rapid combustion of materials not easily burned, yet which will not give off excessive heat into the room containing it.

In carrying out my invention, I employ two housings, one inside of the other and spaced apart to cut off heat radiation from the inner housing, the fire chamber, to the interior of the dwelling. Suitable means are provided as will be hereinafter explained, for setting up a circulation of air in the space between the walls of the two housings, to further prevent heat radiation, and there is means for inducing such circulation by the natural outflow of heated gases from the fire chamber.

Perhaps the most suitable method of mounting a domestic incinerator is to suspend it from the joists or beams of the first floor into the basement. Variations in joist spacing as well as variations in joist depths must be taken care of however, in order not to disturb the floor construction either by cutting or adding to the floor members. At the same time the supporting frame of the incinerator should be as rigid as possible, for strength. I provide for variations in joist spacing by using cross braces at the very top of the frame long enough to span at least two joists although widely spaced, yet adapted for narrowly spaced joists as well. Variation in floor depth is taken care of without disturbing the unitary character of the frame and without interchanging the parts of the feed tube or chute, in different installations, by making the tube collapsible, wherefore the top of the tube may be flush with the upper surface of the floor.

A feature of the invention consists in the provision of a simple grate and starting fuel supply construction by reason of which the number of parts is considerably reduced, and by which manipulation of a fuel supplying part, such as a gas burner, serves to dump or shake the grate.

Further objects and features of the invention will become apparent from the following description relating to the accompanying drawings wherein I have shown my preferred form. The essential novel characteristics are summarized in the claims.

In the drawings Fig. 1 is a central vertical sectional view through the entire incinerator; Fig. 2 is a similar vertical central cross-sectional view taken on a plane at right angles to that in Fig. 1 as indicated by the line 2—2 on Fig. 1; Fig. 3 is a cross-sectional plan of the incinerator as indicated by the line 3—3 on Fig. 1; Fig. 4 is a similar cross-sectional plan as indicated by the line 4—4 on Fig. 1; Fig. 5 is a sectional detail of the grate and burner arrangement, and Fig. 6 is a perspective view of the grate and burner elements shown in Fig. 5, and Fig. 7 is a sectional detail as indicated by the line 7—7 on Fig. 1.

Referring in detail to the drawings, a floor is conventionally illustrated at A, and two supporting joists or floor beams at B. The general frame for the incinerator comprises four structural members, such as angle irons 1, which define the four corners of a substantially rectilinear outer compartment 2. Secured to the angles at their upper ends are transversely extending members 3 such as angle irons, having a series of perforations in their horizontally extending flanges 4 for receiving lag bolts or screws by which the frame work may be attached to the floor joists B. The combustion unit 5 may comprise housing sections 6, 7, 8 and 9. The section 6 serves as a fire-box proper and is arranged in the form of a hood adapted to be made from cast iron. The section 6 is provided with a tubular doorway extension 10 shown as capped by a door 11 which may be of any suitable form. A charging tube portion 13 leads from the upper wall or roof, and a short flue extension 15 leads from one of the side walls as shown in Figs. 1 and 3. The section 7, heretofore mentioned, forms the floor plate of the fire-box and supports the section 6 along its lower edges, suitable guiding ribs 17 being formed on the section 7 to hold the fire-box 6 in position. The floor plate (section 7) extends beyond

the lower edges of the fire-box section as at 18 into abutting relation to the members comprising the insulating wall 2 at its sides, though substantially through the insulating wall at its corners as at 18ª. The insulation wall sections are cut back to allow this as shown in Fig. 4. The portions 18ª (see Fig. 4) are provided with flanges 19 which are secured substantially directly to the outer frame members 1, the outer layer of metal of the insulating wall being interposed between the flanges and members 1 in order to secure the insulating walls at this point. The insulating wall construction will be more fully described later. Incidentaly all of the horizontal members of the combustion unit may if desired be formed similarly to the section 7 so far as relates to the corner construction.

The section 8 of the inner compartment comprises a four-sided box-like structure, open at each end, that is, above and below, the upper edges of the section 8 engaging the lower side of the section 7 and the lower edges resting on the bottommost plate 9 which is rigid with the frame members 1. Suitable means, such as angle blocks 20, serve as rests for the plate 9. The section 8 has ribs 21 on two of its sides adapted to support an ash pan 22, which may be slid inwardly through a tubular portion 24 of the section 8. The ash pan door closure and handle construction is indicated generally at 25.

The outer housing 2 forming the heat insulation chamber for the fire-box comprises, as shown, panels each having an inner and outer layer of material such as sheet metal between which layers is interposed suitable fibrous material, such as asbestos. The outer layer of metal is indicated throughout the drawings at 27, the inner layer at 28 and the fibrous material at 29. As shown, the panels consist of a roof member 30, side panels 31, resting at their lower edges on the plate 9 and extending past the plate 7 to the top panel which rests on the upper edges of the members 31. By reason of this construction the entire incinerator body comprising the inner and outer compartments may be built into and structurally formed with the outer frame members 1.

In assembling the various parts the members 1 may be attached to each other by means of the base-plate 9 and the angle blocks 20; the section 8 then lowered into position on the plate 9; the insulating panels of the outer compartment, namely, 31 then put into place as shown; the floor plate 7 of the fire-box then placed on top of the section 8; the section 6 of the fire-box then put into place, and the whole finally capped by the roof section 30.

The tubular extension 13 rising from the top of the fire-box 5 is shown in telescoping relation to a feed pipe 35, the outwardly flanged upper portion 36 thereof being set into the floor with its upper surface substantially flush therewith. Any suitable joint may be provided between the telescoping parts, for example, the upper edge of the member 13 may be chamfered to receive material such as gypsum cement indicated at 38. This material may be put in place irrespective of the exact relative position of the members 13 and 35, and, since there is considerable overlap between these telescoping members, the member 36 may be set flush with the floor irrespective of the depth of the joists, such as B to which the frame members 3 are secured. If the joists, for example, are not as deep as those shown, the attaching members may be carried upwardly against the lower edges of the joists while the tubular member 13, is simply slid farther onto the feed tube portion 35 of the section 6.

In order that the feed tube may be charged while the incinerator is operating, without allowing disagreeable fumes to escape into the room above the floor A, I employ a trap-door at the bottom of the feed tube as well as a top closure for the tube. The top closure comprises a cap 40 substantially flush with the floor and swingable laterally by reason of a simple pivot hinge 41 secured to the flange 36.

The bottom closure for the tube comprises as shown a swinging door 43 maintained in closed position against the weight of any reasonable quantity of material deposited in the tube. Thus the cap may be opened, material deposited in the tube, the cap again closed and finally the swinging door opened to permit the material to drop into the fire-box, wherefore charging of the incinerator may be accomplished without permitting fumes to escape into the room above the incinerator. As shown the door 43 is hinged at 44 to suitable ears carried by the fire box section 7. Means for maintaining the door closed comprises a tube 45 projecting through a side recess 13ª in the tube 13, the tube being pivotally secured to the door near its main pivot in order that a short downward movement of the tube will open the door a sufficient degree to allow material to be discharged. Surmounting the tube is an abutment 46 against which a compression spring 47 reacts to maintain the tube thrust upwardly. An operating bar 48 extends from above the floor through the tube and bears at its lower end against the top surface of the door 43 (see Fig. 7). Downward pressure, as by the operator's foot, on a button 49 surmounting the bar 48 thus serves to open the door 43.

One of the features of my invention resides in providing a grate structure in con-

nection with a gas burner, the arrangement being such that manipulation of the burner effects a dumping or shaking of the grate. To this end I provide a grate structure in the general form of a W, the intermediate portions of the W being the movable portions as shown. The movable grate and burner is best illustrated in Figs. 5 and 6 wherein the burner portion includes a pipe 50 cylindrical at its ends for mounting in suitable bearings, and to which may be fitted as shown at 51 (Fig. 2) a mixing chamber for gas and air. The pipe 50 has a squared portion 52 engaging lugs 53 formed on the under side of the end members 55 of the movable grate section indicated generally at 57. The extreme inward end 58 of the pipe 50 engages a recess in an enlargement in the cast iron fire-box rear section, the outer end being similarly supported. Joining the end members 55 of the movable grate section is a central rib 60, and from this rib individual grate members 61 extend downwardly in the form of a V (inverted). The pipe 50 extends through the wall of the fire-box and the insulating wall 2 to the mixing chamber, and a handle 63 is shown as connected to the pipe intermediately of the wall 2 and the mixing chamber.

It will be seen that when this handle is oscillated, the movable grate section may be caused to assume positions such as is indicated at 57^x in Fig. 5 on either side of the normal vertical plane. The stationary grate sections comprise inclined members 65 and 66, having suitable ribs 67, these members, as shown, being inclined toward a discharge opening 68 in the section 7 of the fire-box, the opening being disposed over the ash pan 22.

In the use of an incinerator, it is often the case that a great deal of material is deposited into the incinerator before being ignited, and for this and other obvious reasons the grates sometimes become so clogged that rapid reduction of the material to be consumed is prevented because no air can get through. I provide against this contingency by reason of a pipe 70 threaded into an enlargement 71 on the connecting member 60 of the movable grate section, the pipe extending through this enlargement so that it communicates with the space beneath the movable grate. The walls of the pipe may be perforated as at 72. It follows that although material is banked and packed upon the grates to such an extent that shaking will not loosen it, the gas from the burner will escape through the pipe, and therefore, combustion will be set up at the very top of the material to be reduced.

A further feature of my invention consists in the provision of means for inducing a circulation of air in the spaces between the walls of the two housings, thus further cutting down the effect of radiation from the fire-box. This consists in providing a main flue pipe 80 having an enlargement 81 joining the insulating wall by suitable flanges as at 82, the enlargement telescoping over the outer end of the flue pipe member 15 on the fire-box but spaced apart therefrom. By this arrangement a venturi effect is had whereby the outward flow of gases through the short flue pipe section 15 and into the main flue pipe 80 induces a suction between the outer surfaces of the section 15 and the inner surfaces of the enlargement 81 which draws air upwardly through the air space between the two housings. This air escapes through the flue. Suitable openings such as 76 and 78 lead through the plates 7 and 9 respectively, near their edges, to feed air to the air space. Draft for the fire may be provided by openings 84 and 85 in the sections 8 and 9 respectively.

From the above description, it will be seen that I have provided an incinerator which is comparatively cheap in construction, which may be easily built up in sections, and which will serve as a complete and efficient domestic incinerating unit. It will be further seen that the incinerator structure provides against the radiation of heat into the basement or room where it is kept; and that the incinerator may be easily secured to floor joists irrespective of their spacing, while the feed pipe may be set flush with the floor irrespective of the depth of such floor joists, without interchange of parts for different installations. It will be further seen that by my arrangement gases are effectively prevented from entering the dwelling and that a rapid and steady reduction of the material will be had, irrespective of packing of the material about the grates.

I claim:

1. An incinerator comprising a fire chamber, including side top and bottom walls, a heat insulating chamber including side and top walls spaced apart from the fire chamber walls, means rigid with the insulating chamber walls for suspending the incinerator from the floor joists or beams, and telescoping tubular means disposed intermediate the incinerator suspension means for charging the incinerator from above the floor, said telescoping means permitting the upper end thereof to be flush with the floor irrespective of variations in the depth of such joists or beams.

2. A domestic incinerator comprising frame members, a fire-box, a heat insulating wall embracing the fire-box and separated therefrom with an air space between, means for suspending said frame members from beneath a floor, and adjustable fire-box charging means extending upwardly from

the fire chamber, through the insulating wall to such floor whereby the incinerator may be charged from a room above such floor.

3. A domestic incinerator comprising a fire chamber of heavy metal construction, a heat insulating wall embracing the fire chamber walls and separated therefrom with an air space between, frame members extending vertically along the exterior of said insulating wall and beyond the uppermost portion thereof, said frame members being connected with the fire chamber construction, means for suspending said frame members from beneath a floor, adjustable tubular means extending upwardly from the fire chamber through the insulating wall and such floor, whereby the incinerator may be charged.

4. In combination with an incinerator, an outer frame structure comprising vertically extending members, bars connecting adjacent members, said bars having a series of perforations to receive fastening members adapted to secure the bars to floor joists, whereby the incinerator may be suspended from differently spaced joists, and adjustable tubular means communicating at the lower end thereof with the incinerator combustion chamber, the upper end of said adjustable means being adapted for attachment directly to the floor supported by such joists.

5. In an incinerator the combination of an incinerator structure, means for securing the incinerator to the under-side of a floor structure whereby the incinerator may be suspended beneath the floor structure, a chute extending through the floor structure for charging the incinerator chamber including a door disposed at the upper surface of the floor for closing the chute and means permitting relative adjustment between the chute and the incinerator structure.

6. In an incinerator, adapted to be disposed beneath an overlying floor, a charging chute extending from a flush position of the surface of such floor into the incinerator, a shiftable member for closing the inner end of the chute, constantly acting means for maintaining the member normally in closed position, and means connected with the member and extending through the floor for opening the member to allow passage of material through the chute into the fire-box.

7. In an incinerator, a fire-box comprising side walls and end closure portions, a heat insulating wall in separated relation to the fire-box to provide an air space, a supporting frame exteriorly of the insulating wall and secured thereto, one of the end closure portions being a separate member having flanged portions extending through the insulating wall and secured to the frame members.

8. In an incinerator, a fire chamber comprising side walls and end closure portions, an outer supporting frame work comprising vertically extending members in spaced apart relation to the fire chamber side walls, heat insulating wall members joined to the frame members and separated from the fire chamber walls to provide an air space, said heat insulating members extending past the edges of the said end closure portions and being cut away opposite the frame members, one of said end closure portions having portions extending through the cut away portions of the insulating wall and secured substantially directly to the frame members.

9. In an incinerator adapted to be positioned beneath the floor, tubular charging means extending through the floor and into the top of the incinerator, means adjacent the top surface of the floor structure for closing the upper end of the tubular means, and vertically swingable means within the incinerator closing the lower end of said tubular means whereby the tubular means may be charged with material to be consumed while preventing the escape of fumes from the incinerator through the tubular means and into the room above the incinerator.

10. In an incinerator adapted to be positioned beneath the floor structure, tubular means leading from within the top of the incinerator through such floor, a swingable plate substantially flush with the floor and closing the upper end of said tubular means, a movable door within the incinerator, and means extending through the floor and incinerator for normally retaining the door in closed position over the inner end of the tubular means.

11. In an incinerator, adapted to be positioned beneath an overlying floor structure, a charging chute adapted to extend through such floor into the incinerator, a swingable member positioned to close the inner end of the chute, a rigid member extending alongside the chute and pivotally attached to the swingable member, a spring acting against the rigid member and tending to maintain the door in closed position, and means projecting through the floor and connected to the rigid member for opening the swingable member against the action of the spring.

In testimony whereof, I hereunto affix my signature.

EDWIN H. GRAVER.