Nov. 13, 1928. 1,691,462

J. BORGE

REFUSE BURNER AND WATER HEATER

Filed May 21, 1926 2 Sheets-Sheet 1

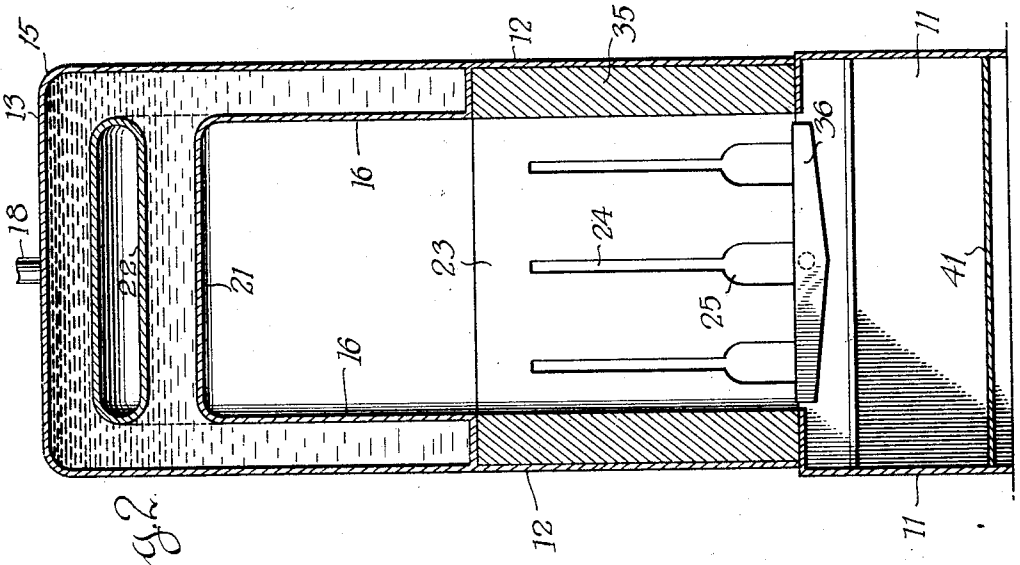


Fig. 2

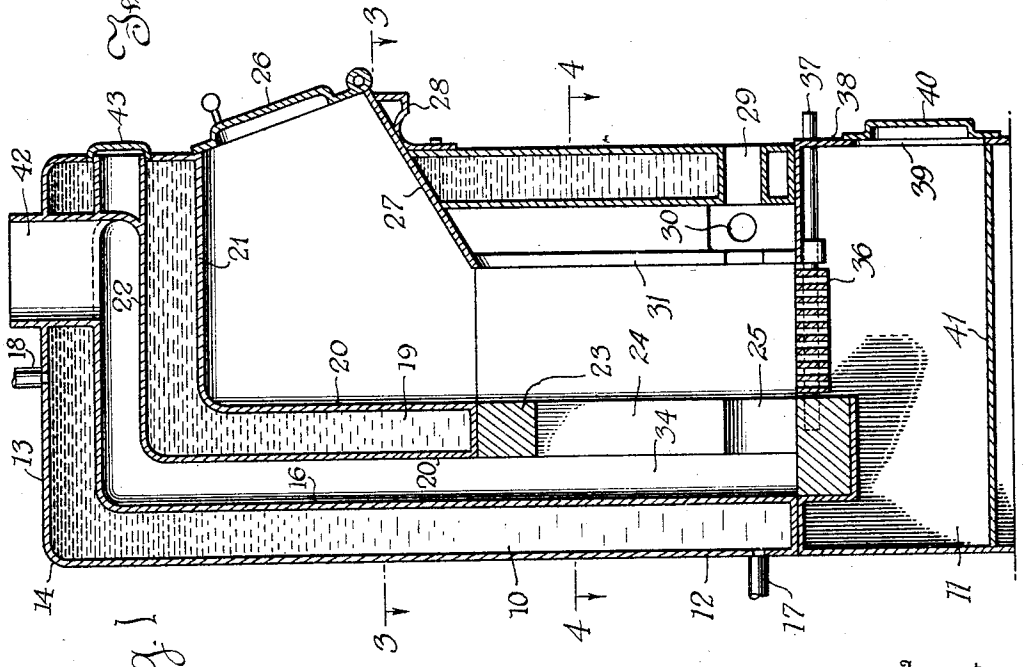


Fig. 1

Inventor

J. Borge

By L. A. Widmayer

Attorney

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Fig. 3

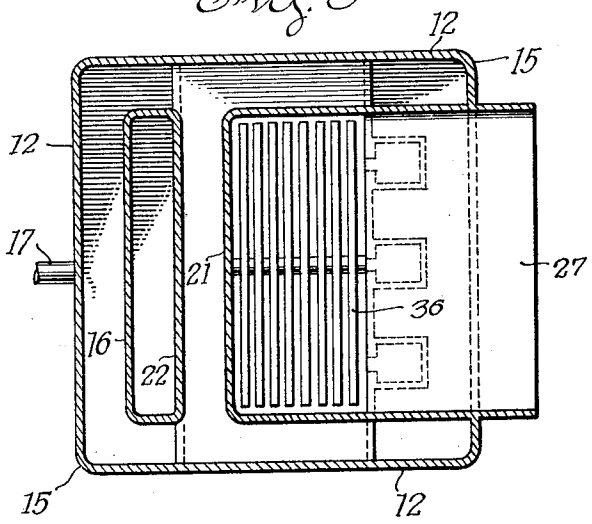
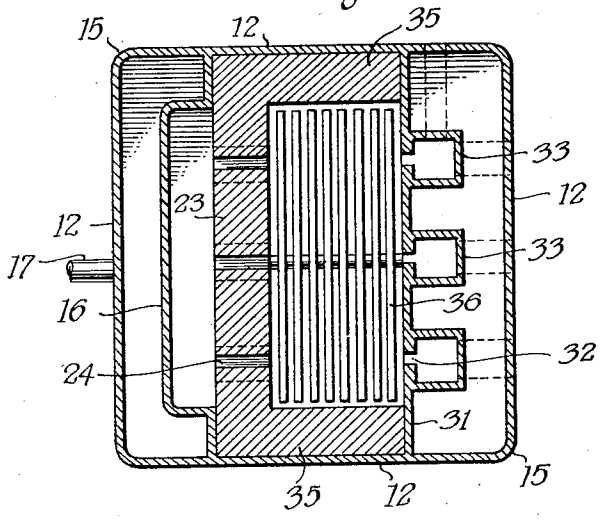


Fig. 4



Inventor

J. Borge

By L. L. Widmayer

Attorney

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UNITED STATES PATENT OFFICE.

JOHN BORGE, OF BELLPORT, NEW YORK.

REFUSE BURNER AND WATER HEATER.

Application filed May 21, 1926. Serial No. 110,659

The present invention relates to heaters, and more particularly to heaters adapted for the burning of refuse and the gases arising therefrom.

An object of the present invention is to provide a device of the character described which will burn refuse or the like without permitting any of the obnoxious gases to escape.

Another object of this invention is to provide an incinerator wherein the heat is projected against the refuse or the like above the grate bars so that the grate bars will not burn out and the ash receiver will remain comparatively cool.

A further object of this invention is to provide a device of this character which is so constructed to permit an outlet for the heat and burned gases even though the receiver be filled with refuse to capacity.

Another object of this invention is to provide an incinerator having refractory walls within the receiver for assisting in the burning of the gases.

Another object of this invention is to provide a water jacketed combustion chamber which will permit of the maximum heat being used without burning of the chamber or its component parts.

The above and various other objects and advantages of this invention will in part be described in, and in part understood from the following detailed description of the preferred embodiment thereof, wherein:

Fig. 1 is a longitudinal section taken substantially through the center of the device and showing the detailed construction of the same.

Fig. 2 is a sectional view taken substantially through the center of the side walls and looking rearwardly.

Fig. 3 is a transverse section taken through the device on substantially line 3—3 of Fig. 1, and

Fig. 4 is a transverse section of the same taken on substantially line 4—4 of Fig. 1.

Referring to the drawings, 10 designates the outer casing or shell of the incinerator which may be mounted upon an ash receiver or the like 11. The outer casing 10 comprises a plurality of outer walls 12 upon which may be mounted a top 13, the meeting points of the walls 12 and the top 13 being preferably rounded off as at 14 to facilitate the casting of the casing and so that no sharp corners may be presented for easy breaking. The meeting points of the sides 12 are also rounded off as at 15. The casing 10 also has an inner shell having upstanding wall members 16 which are mounted in spaced relation to the outer wall members 12 so as to provide a water chamber therebetween. For the purpose of permitting the circulation of water through the casing 10, an inlet 17 and an outlet 18 are provided in the outer walls 12, and if desired the inlet 17 and outlet 18 may be connected to a suitable hotwater heating system which will act as a cooling medium for the heated water which is circulating therein.

Within the outer casing 10 there is provided an inner jacket or casing 19 having upright wall members 20 which are mounted in spaced relation to each other so as to provide a water chamber therebetween. The casing 19 is also provided with horizontal wall members 21 and 22 which are secured at one end to the upright wall members 20, and are similarly mounted in spaced relation to each other. The upright edges of the wall members 20 and the horizontal edges of the wall members 21 and 22 are preferably connected to the inner wall member 16 of the outer casing 10 so as to admit of the free circulation of water from the outer casing 10 to the inner casing 19.

The inner casing 19 has its lower end spaced upwardly from the bottom of the casing 10, and within this space there is mounted a wall 23 which may be constructed of firebrick or the like so as to withstand the heat generated within the incinerator. The wall 23 is provided with a plurality of vertical slotted openings 24 which preferably flare out at the base as at 25 so as to provide enlarged openings through the wall at the base thereon for purposes which will be described hereafter.

The front wall 12 of the outer casing 10 is provided with a feed door 26 which is preferably mounted in an angular position with respect to the side wall 12, and is hinged to a downwardly inclined chute 27 at the outer edge thereof. A brace 28 may be secured at one end to the outer wall 12 and at the opposite end to the chute 27, the outer end of which extends outwardly of the wall 12. Adjacent the lower end of the front wall of the casing 10 there is provided a plurality of burner openings 29 which are adapted to receive any suitable type of flame projector, and to facilitate the lighting of

the burners an opening 30 is provided at the side in which may be mounted a pilot light or the like.

An inner wall 31 is mounted within the casing 10, the upper end of the wall 31 being secured to the inner end of the chute 27. The wall 31 is preferably mounted in spaced relation to the outer wall 12, and the water in the heater is adapted to freely circulate within this space. A plurality of slotted vertical openings 32 is provided in the wall 31, and each slot 32 is provided with a box or flue 33 which extends outwardly of the wall 31. The lower end of each flue 33 opens into the opening 29 provided for the burners. The slots 32 in the wall 31 are similar to the slots 24 and are similarly provided with flaring openings adjacent the bottom thereof. The flames projected from the burners are adapted to project through the slots 32 into the refuse chamber provided by the walls 23 and 31, and after passing through the refuse the heat and burned gases are adapted to pass through the openings 24 and 25 in the wall 23 into the combustion chamber 34. As the openings 32 are entirely boxed in by the flues 33 water may circulate entirely around the flues so as to keep them in a cool condition and prevent burning out of the wall 31 adjacent the openings 32.

The wall 23 may be extended along the sides of the incinerator within the refuse chamber as shown at 35 so as to confine the heat within the refuse chamber, the bricks or the like being adapted to retain the heat.

The ash receiver 11 which is mounted below the incinerator is provided with a plurality of grate bars 36 which may be of any approved design, and which are adapted to be rocked or dumped by a pivotal rod 37 which is mounted at its inner end in the wall 23 and at its outer end extends outwardly of the wall 38 of the ash receiver 11. The front wall 38 of the ash receiver is provided with an opening 39 which is adapted to be closed by an ash door 40 which may be opened to remove the ashes from the receiver 11. If desired the receiver 11 may be provided with a bottom 41.

The combustion chamber 34 extends upwardly between the outer and inner casings 10 and 19 respectively, and is provided with an outlet 42 which extends outwardly through the outer casing and may be connected to a suitable chimney or the like for carrying the burned gases away. The forward end of the combustion chamber 34 also extends outwardly through the front wall 12, and a cap 43 is secured across this opening, so that if desired the upper end of the combustion chamber may be cleaned out in the same manner as flues of a furnace.

In the operation of this incinerator, the refuse is shoveled or dumped into the refuse chamber through the door opening, sliding down the inclined surface of the chute 27 into the refuse chamber. The lighted burners in the openings 29 are adapted to project their flames into the refuse chamber through the openings 32. While the refuse is still wet, it presents a solid mass to the projected flame from the gas burners. In order to overcome this resistance, the vertical flues 33 are provided, so that the flames may pass upwardly through these and then out through the slots 32, across the refuse chamber and into the combustion chamber 34, through the rear slots 24 and 25.

The wall 31 is protected from burning out by the circulating action of water, except at the edges of the slots 32. The purpose of this is to provide a surface sufficiently hot so as not to retard the combustion of the gas flames and at the same time to be so benefitted by the circulating water in the adjacent front casing that burning out of the fins is prevented.

It is of course understood that a certain amount of the flames will enter the mass of refuse at all times, and that there will always be a certain proportion of the flames passing upwardly within the flues 33 and over the top of the refuse through the openings 32, thus burning the gases which rise in the refuse chamber and which are not consumed by the flames at the bottom. The gases are drawn through the refuse chamber into the openings 24 and 25, and from thence into the combustion chamber 34 where they are finally consumed and pass upwardly and out of the incinerator through the opening 42.

It is, of course, understood that various changes and modifications may be made in the details of construction and design of the present preferred embodiment of this invention without departing from the spirit thereof, such changes and modifications being limited and restricted only by the scope of the following claims.

What is claimed is:

1. An incinerator comprising a pair of spaced casings, said casings being adapted to receive water therein and being connected for circulation of water therebetween, one of said casings having burner openings therein, a plurality of flues connected at one end to said burner openings, said flues having slotted openings at the inner side thereof, a refractory wall mounted within said casings and having a plurality of slotted openings therethrough, a downwardly inclined feeding chute, a door closing the outer end of said chute, and an ash receiver mounted below said casings for receiving the ashes.

2. An incinerator comprising an outer casing having a pair of spaced walls, an inner casing having a pair of spaced walls, said walls of said inner casing being connected

to said walls of said outer casing to permit the circulation of water therebetween, a refuse chamber within said inner casing, said outer casing having a plurality of burner openings therethrough, a plurality of flues secured to the forward side of said refuse chamber, said refuse chamber having a plurality of vertical slotted openings therethrough opening into said flues, said flues extending within the water chamber of said outer casing, said refuse chamber having its rear and opposite side walls constructed of heat retaining means and having vertical slotted openings through the rear wall thereof, and means for removing the burned material from the refuse chamber.

3. An incinerator comprising inner and outer casings spaced apart to provide a combustion chamber at the lower end of the incinerator and a flue leading upwardly from the combustion chamber, the inner casing having vertical rear slots substantially coextensive with the combustion chamber, burners in the front wall of the incinerator at the lower end thereof, said front wall having burner flues therein leading upwardly from the burners and having front slots opening from the flues into the interior of the incinerator opposite to said vertical rear slots substantially coextensive with the rear slots and with the height of the combustion chamber, and a grate in the lower end of the incinerator for supporting a mass of refuse therein between the front and rear slots.

In testimony whereof I affix my signature.

JOHN BORGE.