

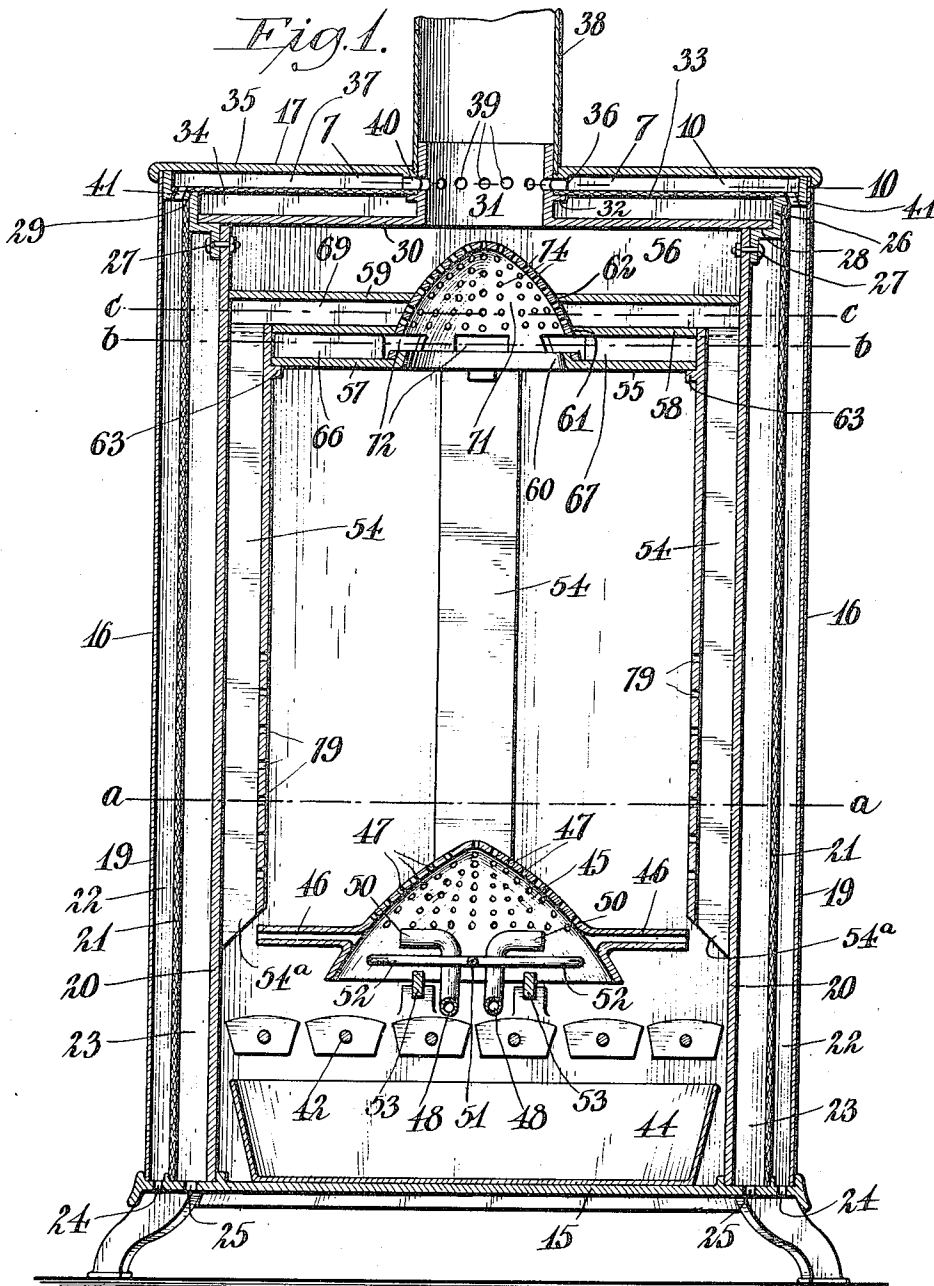
F. R. JONES.
INCINERATOR.

APPLICATION FILED APR. 29, 1915.

1,311,522.

Patented July 29, 1919.

3 SHEETS—SHEET 1.



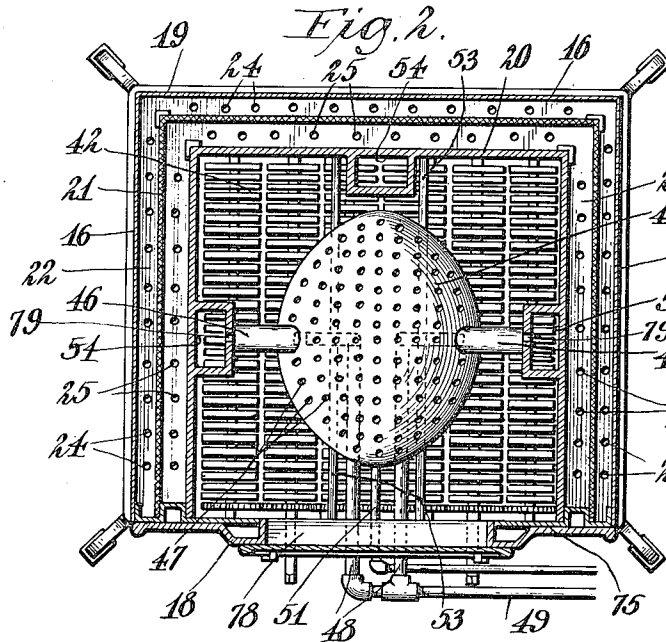
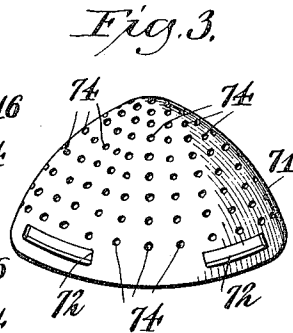
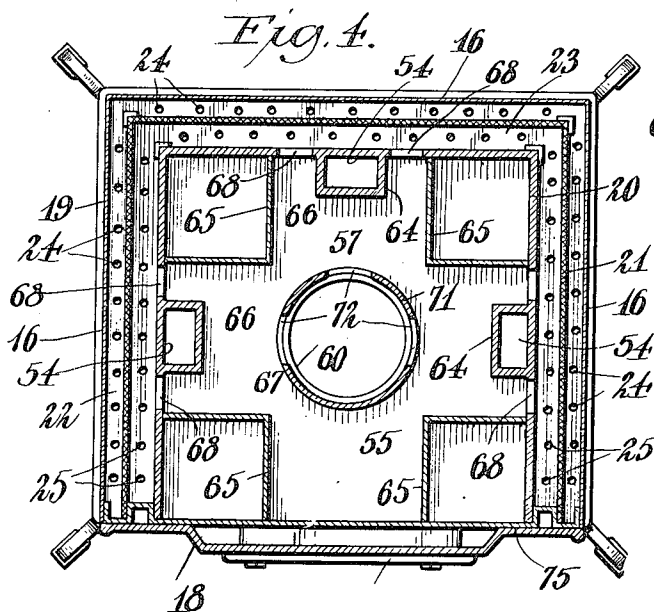
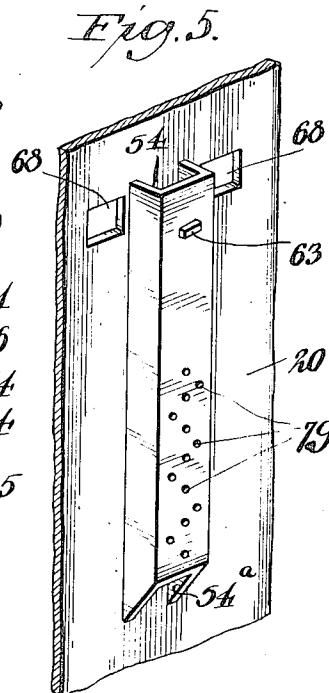
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3 SHEETS—SHEET 2.

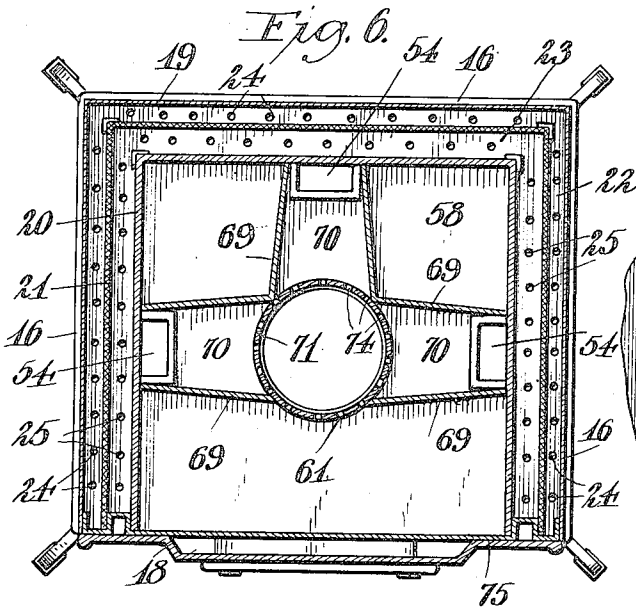
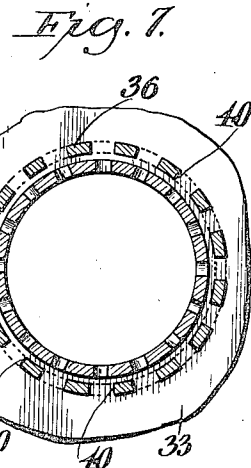
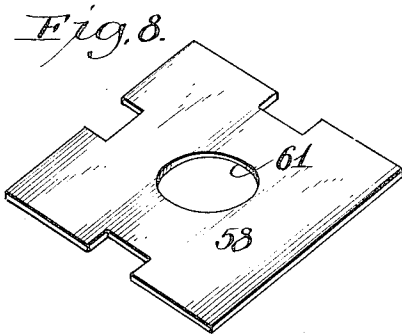
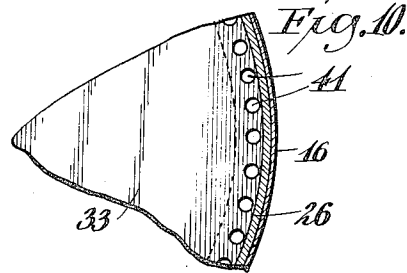
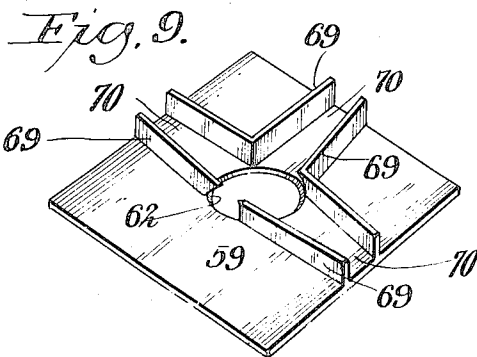
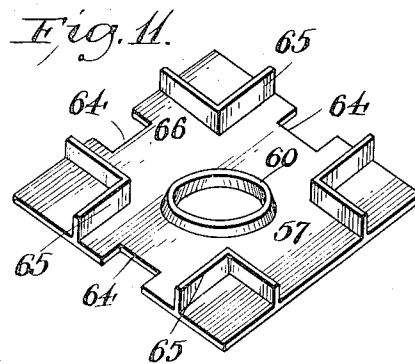


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3 SHEETS—SHEET 3.



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UNITED STATES PATENT OFFICE.

FREDERICK R. JONES, OF BUFFALO, NEW YORK, ASSIGNOR TO BUFFALO CO-OPERATIVE STOVE COMPANY, OF BUFFALO, NEW YORK, A CORPORATION OF NEW YORK.

INCINERATOR.

1,311,522.

Specification of Letters Patent.

Patented July 29, 1919.

Application filed April 29, 1915. Serial No. 24,718.

To all whom it may concern:

Be it known that I, FREDERICK R. JONES, a citizen of the United States, residing at Buffalo, in the county of Erie and State of New York, have invented certain new and useful Improvements in Incinerators, of which the following is a specification.

My invention relates to improvements in incinerators or crematories, and more particularly to apparatuses so termed for burning or destroying garbage and refuse accumulated in households, restaurants, hospitals, etc.

One of the objects of my invention is to supply an apparatus of this type with means to temporarily store garbage and refuse in a sanitary manner prior to consuming the same by fire, and to provide means for consuming the garbage and refuse by fire in a manner to eliminate smoke and odor.

Another object of my invention is the provision of an apparatus of this type in which ventilation is provided for drying out garbage and refuse stored therein prior to incinerating.

Another object of my invention is to provide an apparatus of this kind with a receptacle for the garbage and refuse, and means to direct a sheet of live flame to a point between said receptacle and the escape or draft stack of the apparatus, into which all flame, smoke and gases from the refuse must pass and whereby the same are fully consumed.

Another object is to provide means whereby a uniform concentrated wall of fire is carried to the upper part of the apparatus and to introduce heated air and cause the same to enliven said wall of fire, said wall of fire being situated in such relation to the escape or draft stack of the apparatus and to the burning refuse that all smoke and gases escaping from the refuse must pass into the wall of fire in its course toward the stack and thus be consumed.

A further object is to provide means whereby the rising smoke and gases from the refuse encounter cross currents of heated air and whereby said air and the smoke and gases are consumed at a point between the escape stack of the apparatus and the point at which said air commingles with said smoke and gases.

A further object is to provide means for temporarily checking or retarding the smoke in its passage toward the stack by subjecting it in its passage to cross currents of heated air, which causes the lighter gases contained in the smoke to separate and be consumed by the flames from a burner, thus assisting combustion and consuming the gases and smoke.

It further consists in providing a restricted passage for the escape of smoke and gases from the burning material and equipment said passage with a retarding hood to baffle back excess smoke and to concentrate a live flame within the hood into which all gases and smoke rising from the burning refuse are drawn by the draft created through the stack of the apparatus.

With these and other objects to be hereinafter described, the invention consists in the novel arrangement of features and in the construction and arrangement of parts to be hereinafter described and particularly pointed out in the subjoined claims.

In the drawings,—

Figure 1 is a central vertical section of an incinerator or crematory, disclosing the preferred embodiment of my invention under the principle involved.

Fig. 2 is a horizontal section taken on line *a-a*, Fig. 1.

Fig. 3 is a detached perspective view of the retarding hood.

Fig. 4 is a horizontal section taken on line *b-b*, Fig. 1.

Fig. 5 is a perspective view of a portion of one of the inner wall members of the apparatus.

Fig. 6 is a horizontal section taken on line *c-c*, Fig. 1.

Fig. 7 is a horizontal section taken on line *7-7*, Fig. 1.

Fig. 8 is a detached perspective view of the intermediate wall of the concentrator.

Fig. 9 is a detached inverted perspective view of the upper wall of the concentrator.

Fig. 10 is a horizontal section taken on line *10-10*, Fig. 1.

Fig. 11 is a detached perspective view of the lowermost wall of the concentrator.

Reference being now had to the drawings in detail, similar numerals of reference refer to similar parts in the several figures.

The apparatus comprises a suitable casing, herein shown as of substantially square formation, but it may be otherwise shaped, and it has a bottom wall 15, chambered side 5 and rear walls 16, a chambered top wall 17 and a front wall 18. The chambered side walls and the rear wall each have an outer wall member 19 of sheet metal or other suitable material; an inner wall member 20, 10 which is preferably cast; and an intermediate wall member 21 formed of asbestos or other suitable non-conducting material. These wall members are spaced apart to provide an outer air chamber 22 and an 15 inner air chamber 23, thus forming insulated walls.

The bottom wall is provided with a series of air inlets 24 which open into the outer air chamber 22 of the side and rear chambered walls and a series of openings 25 which 20 open into the inner air chamber 23, thus admitting air to these chambers for purposes to appear hereinafter.

The top wall comprises a stepped rim 26 25 bolted or otherwise secured to the upper ends of the cast wall members 20, as at 27, the stepping of this rim providing bearing shoulders 28, 29, respectively.

Against the shoulder 28 the inner wall 30 member 30 of the top wall rests, it having a short upstanding central flue 31 provided with an outstanding flange 32, the upper face of which latter is in line with the shoulder 29 of the rim 26. Resting upon said flange 35 and shoulder 29 is an intermediate wall member 33 formed of asbestos and separated from the wall 30 by an intervening dead air space 34. 35 is the outer wall member of the chambered top and at its marginal portion rests upon the upper edge of the rim 26. 40 This outer wall member has a central opening with a depending flange 36 which rests upon the asbestos intermediate wall member 33, the latter being separated from the outer 45 wall member 35 by an intervening air space 37. The short central flue of the inner wall member 30 of said chambered top passes through the central opening of the top wall member 35 and an escape or draft stack 38 50 is fitted onto the upper end of said short flue. Flue 31 may be considered as forming part of said stack and it has a series of perforations 39 which register with notches 40 formed in the depending flange 36 of wall 55 member 35. Through the shouldered portion 29 of the rim 26, air openings 41 are provided which place the air space 37 in communication with the outer air chambers 22 of the side and rear walls so that the air 60 entering said chambers through the inlets 24 passes upwardly through the openings 41, thence through the notches 36 and apertures 39 and finally escapes through the stack 38. This air keeps the exterior of the casing cool

and tends also, in the event of the furnace 65 being improperly operated, to mingle with any slight odors or traces of gas escaping from the interior so that these become unnoticeable as they escape from the upper end 70 of the stack.

The space 34 is a dead air or insulating chamber, and with the asbestos wall 33 serves to keep the top of the casing cool.

42 designates the grate between which and the bottom wall 15 an ash pit is arranged. 75 In the latter a pan 44 may be removably placed which is adapted to receive the ashes of the burned refuse. Situated above said grate, which is preferably of the shaking type, is a burner 45 of conical formation in 80 cross section. This burner is hollow and provided at opposite points with laterally-projecting gas-escape tubes 46 and it has numerous perforations 47 formed therein. 48 designates gas supply pipes which are 85 passed through the front of the incinerator and terminate within the conical burner 45, these supply pipes having their outer ends connected to a gas feed pipe 49 and their inner ends are directed laterally in line with 90 the gas-escape tubes 46, as at 50. Any other burner suitable for the purpose intended may, however, be substituted.

An auxiliary gas supply pipe 51 is provided which enters the incinerator through 95 the front wall of the same, and has two laterally-disposed branches 52 which terminate adjacent the inner extremities of the gas supply pipes 48, these branches 52 being used 100 as pilot lights to light the gas escaping from the pipes 48 within the burner when gas is fed thereto. The burner is mounted on bars 53 fastened in any suitable manner to the front and rear walls, respectively, of the 105 casing.

The inner wall members 20 are provided with vertical flues 54 which terminate at their lower ends in line with the gas-escape tubes 46 of the burner and at their upper ends a distance below the chambered top of the casing, both ends being open. The upper ends of these flues communicate with a concentrator 55 which forms the top wall of the refuse chamber and is separated from the chambered top wall of the casing by a 115 space 56 serving as an auxiliary combustion chamber. This concentrator comprises a chambered or channeled wall formed by a plate 57 supported in a manner to be presently described; a plate 58 situated above 120 plate 57 and spaced therefrom, and a plate 59 situated above plate 58 and spaced therefrom, said plates having register openings 60, 61, 62, respectively, which form a restricted passage to be considered, in a broad 125 sense, as a primary combustion chamber. The plate 58 receives support from plate 57 while the plate 59 receives support from

plate 58. The manner in which the plate 57 is supported is by means of lugs 63 extending from the flues 54, said plate being provided with notches 64 at its side and rear marginal portions through which the flues 54 extend. Said plate has also upstanding spacing flanges 65 which are preferably L-shaped to provide converging air passages 66 that lead to a central expansion chamber 67, said passages being in communication with the inner air chambers 23 of the side and rear walls by openings 68 which are arranged in the inner wall members 20 at opposite sides of the flues 54.

Each of flues 54 has a series of apertures 54^a at its lower end, through which part of the upwardly traveling flame passes to attack the refuse at the sides.

The expansion chamber 67 merges into the primary combustion chamber formed centrally in the concentrator. The flues 54 have their upper ends terminating flush with the upper surface of plate 58 which rests upon the upstanding flanges 65 of plate 57, and plate 59 is provided with depending spacing flanges 69 arranged to provide diverging fire flues or passages 70 which connect with the upper ends of the flues 54 and lead inwardly to the primary combustion chamber. This primary combustion chamber opens into the auxiliary combustion chamber 56 and has preferably situated therein a retarder 71 in the form of a hollow cone open at its lower end and provided with a number of comparatively large air-inlet openings 72 in registration with the expansion chamber 67 of the concentrator. This retarder is also provided with numerous perforations 74.

The front end of the casing comprises an inner wall and an outer facing plate 75. Said wall and plate have suitable openings through which garbage or other refuse may be introduced into the incinerator and these openings also permit access to the burner and the ash pit and are provided with doors 78.

In operation the garbage or refuse is stored within the refuse receptacle as accumulated, and by reason of the air being allowed to circulate through the several passages and openings in the apparatus, the garbage or refuse is dried out during the storing period thereof prior to igniting the garbage or refuse. The garbage or other refuse deposited into the receptacle rests upon the grate 42 and also upon the burner 45, and upon turning on the supply of gas in the feed pipe 49 it is ignited at the extremities of pipes 48 by the pilot lights 52, the flames being directed through the gas-escape tubes 46 and entering the upright tubes 54 from which they escape and enter the top chamber or passages of the concentrator.

From these they enter the retarding hood 65 through the openings 74 therein, the three flames impinging against each other and creating an intense fire. These flames meeting each other, spread across the hood and form a wall of fire within the hood. The burning gas also escapes through the numerous perforations 47 of the burner and attacks the refuse. The flames rising up through the flues 54 escape in part through the apertures 79 in said flues and attack the refuse at the sides. Ordinarily when burning a batch of green garbage or refuse, a heavy dark smoke is created and offensive gases generated. This smoke and the gases must pass up through the primary combustion chamber which the retarding hood, when used, must be considered as forming, and in their upward passage meet the cross currents of heated air entering the retarding hood through the openings 72. These cross currents of heated air temporarily check the smoke in its travel and allow the lighter gases contained therein to separate. A combustion is thus caused which is promoted by the flame directly above. This promoted combustion assists in consuming the smoke, the unconsumed smoke and products of primary combustion in passing upwardly through the hood being intercepted by the wall of fire spanning the retarding hood and being completely burned; thus insuring the consumption of all gases and smoke. Although this action may be carried out without the use of the retarding hood, the latter is intended to check or retard the passage of the smoke through the concentrator. Said retarding hood is adapted to baffle excess smoke and the wall of fire therein creates an agitation of the smoke so that it is thoroughly mixed with the heated air before it passes into the fire.

In the auxiliary combustion chamber the final purification of any smoke that may escape the primary combustion chamber will take place. The intense heat created in the primary combustion chamber escapes eventually to the auxiliary combustion chamber, but this intense heat is not imparted to the top wall of the casing, since insulation is provided by the dead air chamber 34, the fresh air space 37 therein and the asbestos intermediate wall member 33. The passage of air through the apparatus, as above described, prevents smothering of the fires or burners, and as constructed, the flames from the burner reach the concentrator through small concentrating upright flues or channels 54 at the sides and back so that the flames are confined and carried to a considerable distance. These flues also become highly heated and burn channels through the garbage around the flues through which the flames from the burner can work.

Under the principle involved, the construction herein disclosed may be variously modified without departing from my invention or sacrificing any of the advantages of my invention.

Having thus described my invention, what I claim is,—

1. A refuse incinerator comprising a refuse receptacle, a burner in said refuse receptacle, a concentrator serving as the top of said refuse receptacle and having a central passage therethrough, concentrating flues arranged vertically within said receptacle into which flames from said burner are directed, said concentrator having passages connecting said central passage with said flues, and air passages leading to said concentrator below said last-mentioned passages.

2. A refuse incinerator comprising a casing having an escape stack and side walls each having three spaced wall members forming inner and outer air chambers, air openings at the lower end of each of said air chambers, connection between the outer air chamber and the escape stack, and a concentrating device including a cone-shaped element serving as the top of said refuse receptacle and having air passages in communication with the inner air chambers of said walls, said concentrating device having a central passage therethrough into which open the air passages formed therein.

3. A refuse incinerator comprising a casing, an escape stack connected to said casing, a refuse receptacle, a burner within said receptacle, and a chambered top wall for said receptacle having a central opening for the passage of the products of combustion from said refuse receptacle, a retarding hood fitting into said central opening and having perforations therein and also openings in line with the chambers of said top wall, flues connected at one end of each to one of the chambers of said top wall and terminating at their other ends in proximity to said burner, and air passages connecting the other chamber of said top wall with the outer air.

4. A refuse incinerator comprising a bottom wall, heat insulated side walls and a heat insulated top wall, a refuse receptacle, a concentrating wall serving as the top of said refuse receptacle and being spaced from said insulated top wall, said concentrating wall having a central passage for the passage of the products of combustion from the refuse receptacle and fire and air passages leading to said central passage, the fire passages being arranged above the air passages, and flues on said side walls extending from said fire passages to points adjacent said burner, the heat insulated side walls being provided with air passages having connection with the air passages of said concentrat-

ing wall and having openings leading to the outer air.

5. A refuse incinerator comprising a refuse receptacle, a burner within said receptacle, a concentrator serving as the top of said receptacle and including a perforated cone-shaped member and horizontal superposed passages leading to said cone-shaped member, means for introducing air to the lower of said superposed passages, and upwardly extending passages between the burner and the upper of said superposed passages, said passages serving to concentrate the flames from the burner and the introduced air and direct the same into said concentrator.

6. A refuse incinerator comprising a refuse receptacle, a burner in said refuse receptacle, a concentrator serving as the top of said refuse receptacle and having a central passage therethrough for the passage of the products of combustion from said refuse receptacle, and fire flues or passages extending from the sides to said central passage, said fire flues having their walls converging inwardly to said central passage, and flues extending from said fire flues to a point near said burner.

7. A refuse incinerator comprising a casing having air chambered walls provided with air inlets, a refuse receptacle within said casing, a burner at the lower end of said refuse receptacle, fire flues extending upwardly from said burner and arranged to direct the flames passing therethrough toward each other so that they meet to form a wall of fire, and means for introducing air into the casing from said air chambered walls in planes beneath said wall of fire whereby the unconsumed products and the introduced air are caused to enter said wall of fire.

8. A refuse incinerator comprising a casing having chambered walls, and means to introduce exterior air to the chambers of said walls, a refuse receptacle within said casing, a concentrator serving as the top of said refuse receptacle, a burner at the lower end of said refuse receptacle, vertically-disposed flues extending along the walls of said casing and having horizontally-disposed portions leading inwardly to direct the flames from said burner into said concentrator, and air openings connecting a chamber of said chambered walls with said concentrator, said openings being at opposite sides of said flues in a plane beneath the horizontally-disposed upper portions of said flues.

9. A refuse incinerator comprising a casing having chambered walls and openings for admission of air into the chambers of said walls, a refuse receptacle within said casing, a burner at the lower end of said

refuse receptacle and a concentrator serving as the top of said receptacle comprising three horizontally-disposed walls spaced from each other, said walls having alined openings, the
5 lowest wall having upstanding flanges forming air passages and the uppermost wall having depending flanges forming fire passages, flues extending from said fire passages to points adjacent said burner, and air openings connecting a chamber of the side walls 10 with said air passages, the air and fire passages of said concentrator leading to the alined openings therein.

In testimony whereof I affix my signature.

FREDERICK R. JONES.