No. 885,380. PATENTED APR. 21, 1908.

J. ROSS.

INCINERATING FURNACE.

APPLICATION FILED NOV. 21, 1906.

2 SHEETS—SHEET 1.

FIG. 1

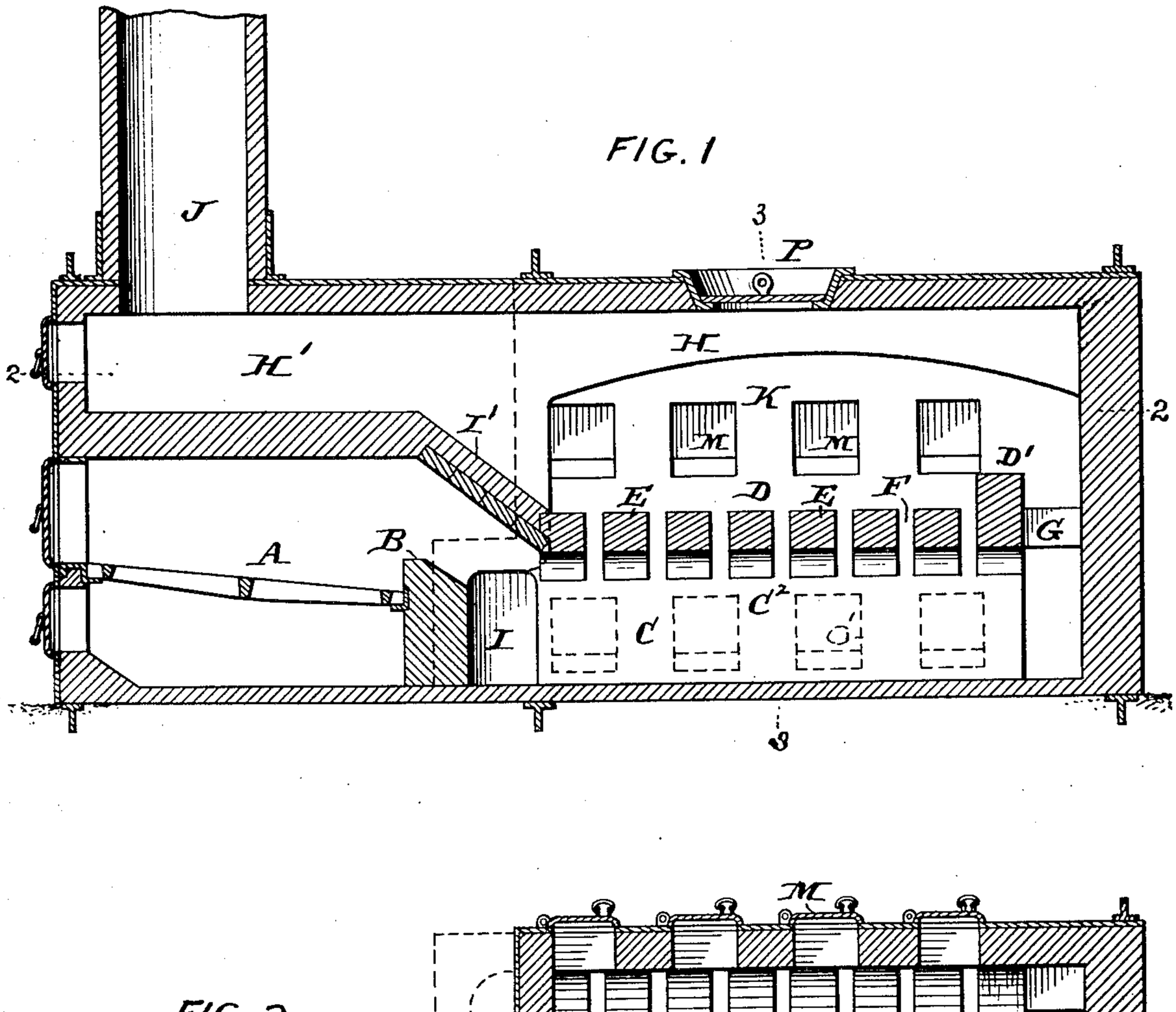
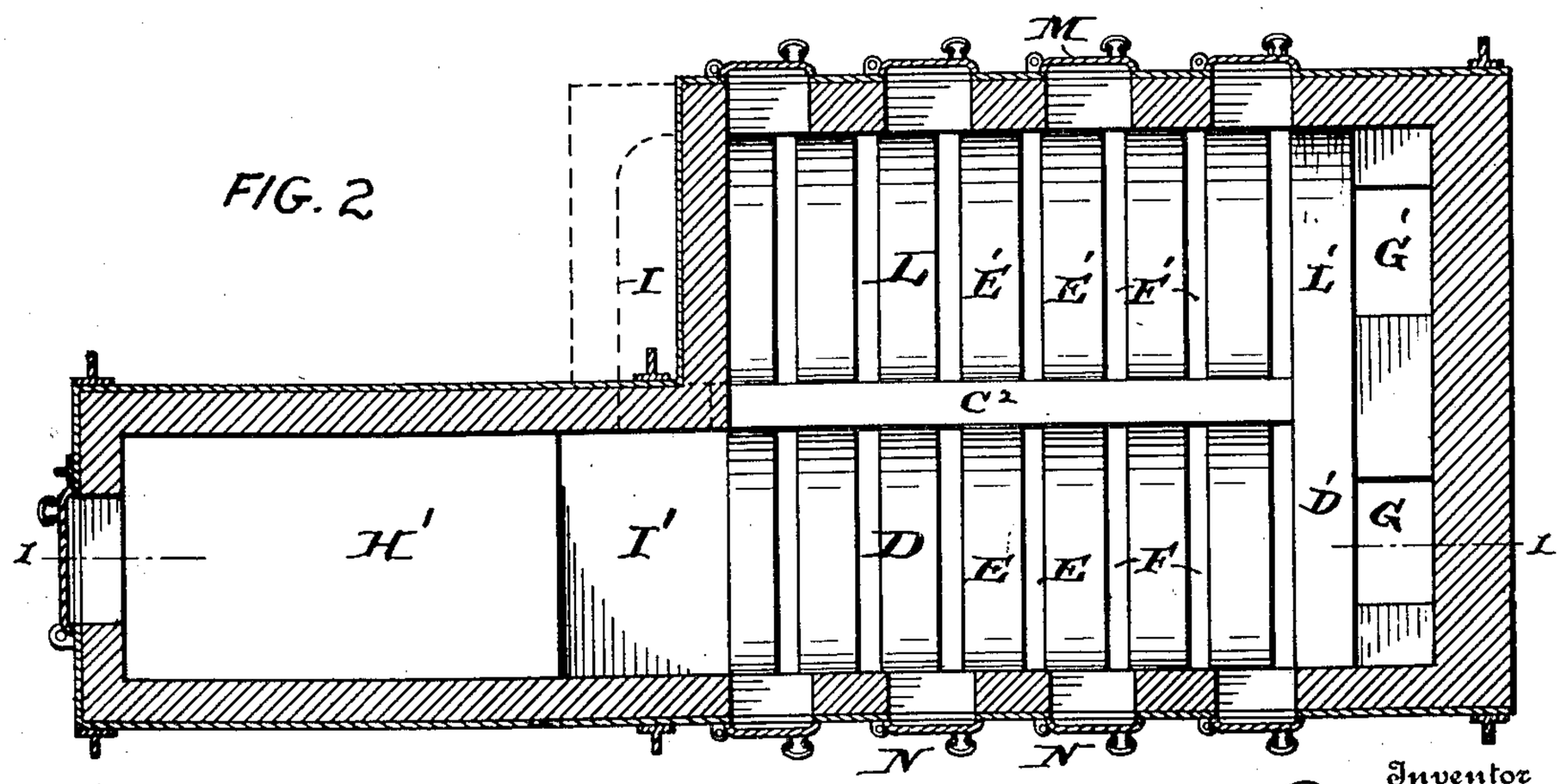


FIG. 2



Witnesses

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2 SHEETS—SHEET 2.

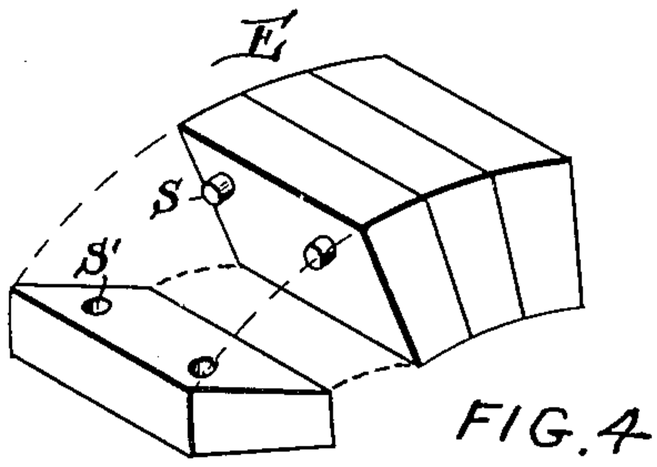

FIG. 4

FIG. 3

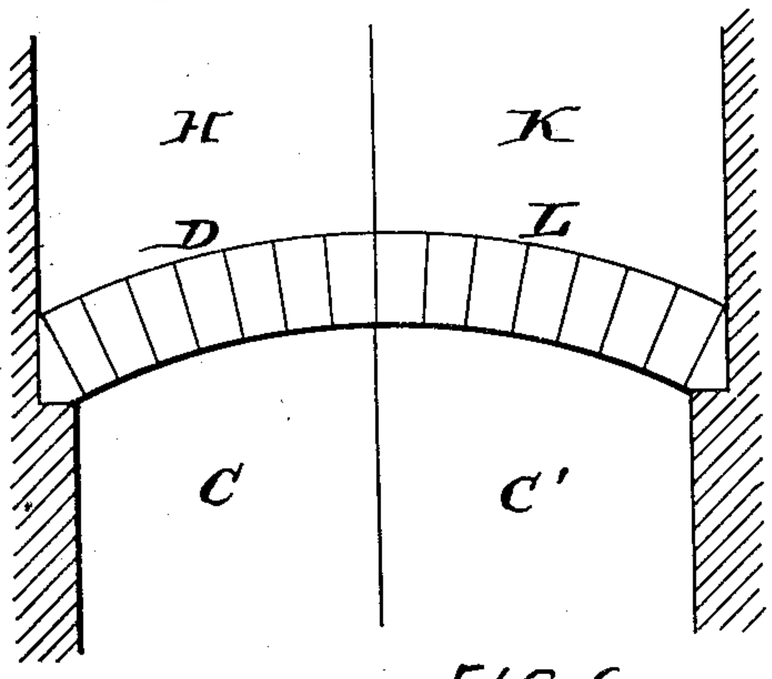

FIG. 6

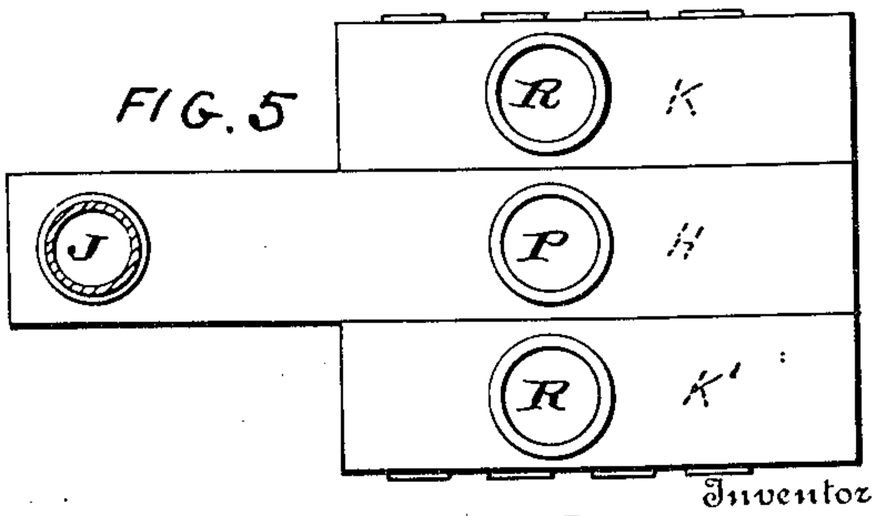

FIG. 5

Witnesses

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JOHN ROSS, OF PHILADELPHIA, PENNSYLVANIA.

INCINERATING-FURNACE.

No. 885,380. Specification of Letters Patent. Patented April 21, 1908.

Application filed November 21, 1906. Serial No. 344,402.

To all whom it may concern:

Be it known that I, JOHN ROSS, of the city and county of Philadelphia, State of Pennsylvania, have invented an Improvement in Incinerating-Furnaces, of which the following is a specification.

My invention has reference to incinerating furnaces and consists of certain improvements which are fully set forth in the following specification and shown in the accompanying drawings which form a part thereof.

The object of my invention is to provide a construction of incinerating furnace having large capacity for combustion of refuse or garbage.

My invention consists of a furnace having a direct return flue or passage for the flame provided with an incinerating arch of perforated character, combined with a lateral incinerating chamber having a perforated floor in arch form and provided with flues for the passage of the flame and products of combustion beneath and above and through said floor.

My invention further consists in a structure of flues by which the products of combustion from the furnace grate shall be divided, part passing under the incinerating arch and incinerating floor and again be united above said arch and floor before passing to the chimney.

My invention also comprehends other features of construction which, together with those above specified, will be better understood by reference to the drawings in which:

Figure 1 is a longitudinal sectional elevation of an incinerating furnace embodying my invention; Fig. 2 is a sectional plan view of the same on line 2—2; Fig. 3 is a transverse section of the same on line 3—3; Fig. 4 is a perspective view of a portion of one of the narrow arches of the incinerating arch and floor; Fig. 5 is a plan view illustrating a modified form of my invention; and Fig. 6 is a modification.

A is the furnace grate and B its bridge wall. C is a flue below the incinerating arch D and is kept at a high temperature by the products of combustion from the furnace. The products of combustion rise through end flue G and thence pass backward over the incinerating arch D and through the incinerating chamber H to the flue H′ communicating with the chimney J.

The incinerating arch is preferably composed of open work so as to permit the flame from flue C to pass upward to the underside of the garbage on the arch and also to enable the ashes from the incinerated matter to pass downward into the flue C from which they may be removed through the side doors O.

The incinerating arch D consists of a series of narrow arches E preferably of single bricks properly shaped and racked up in arch shape with a small quantity of fire clay as a binder to compensate for uneven faces of the brick. I also prefer that these arch bricks shall have on one side protuberances S and on the opposite side depressions S′ as shown in Fig. 4, so that the parts S on one brick fit into the recesses S′ on the adjacent brick thereby making the arch very strong and insured against having its bricks displaced. These narrow arches E are preferably about nine in number leaving seven transverse slotted portions or flues F opening upward through the arch and connecting chamber H with flue C. The end of the arch is provided with a bridge wall D′ to prevent the garbage passing over the end of the arch.

I′ is an inclined wall which extends obliquely upward from the forward end of the arch and connects with the flue or throat H′ leading to the chimney. The top of the chamber H is arched so as to impart more or less reverberatory action and is furnished with a man hole P of any suitable character.

K is an auxiliary or lateral incinerating chamber and may be of any width desired; it is located to one side of the incinerating arch D. This chamber is provided with a series of narrow parallel arches E′ constituting a perforated floor L, said arches being of the same general character as the arches E and separated by open spaces F′. Below this perforated arched floor L is a flue C′, which communicates at one end with the flue C adjacent to the fire bridge wall B by means of the flue I, and at the other end with the chamber K above the floor, by flue G′.

The flues C and C′ are separated by a wall C^2 which supports the adjacent ends of the arches E and E′, but said flues are in communication at the end nearest the grate A and preferably also at the distant end adjacent to the flues G and G′. If desired the said wall C^2 may be continued to prevent union of the gases, before passing through said flues G and G′.

The floor L is provided with a bridge wall L′ corresponding to the bridge D′ to prevent

the garbage from falling through the opening G′. The chamber K is provided with an arched roof which is sprung in the direction of the length of the chamber H and forms therewith a groined arch structure. The roof of the chamber K is provided with a garbage receiving door R of any suitable construction, that shown consisting of a circular cast iron frame flanged at the bottom and upon which rests a circular lid or valve.

The chamber H above the arch D is preferably provided with doors N opposite the arch D and the chamber K so that rakes may be inserted for distributing the garbage over the arch. Likewise, the chamber K may be provided with side doors M to admit rakes or stokers for working the garbage on the arch L and if desired for transferring it to the arch D to complete its incineration.

The arches E and E′ are so constructed that they are very strong and being independent, may individually expand or contract to different degrees without affecting the adjacent arches. They may be quickly and cheaply repaired and the interlocking construction of the bricks renders accuracy in building and stability in use. It also obviates the necessity of relying upon cement between the bricks to hold them in place.

By making the spaces F and F′ between the individual arches E and E′ continuous across the incinerating arches D and L there is more space for action of the heat from below, less fear of clogging by the garbage and fuller opportunity for cleaning in case of stoppage than where the apertures are small in area. By having them continuous and as slots, a poker or rake may be inserted through the side doors and moved in the apertures.

The operation of my improved furnace is as follows: The products of combustion pass through flues C and C′ under the incinerating arches D and L thereby heating them; said products then pass upward through flues G G′ and travel back above the arches D and L in contact with the garbage lying upon the arches; the products then pass into flue H′ and escape by chimney J. The garbage is dumped upon the arches D and L through the doors P and R respectively and is then spread over the arches. The under part of the garbage is burned by contact with the incandescent arches and by the flame playing upward through the spaces F and F′, and the upper portions of the garbage are incinerated by the hot gases and reverberatory action of the roof of the furnace. The ashes are allowed to pass down through the apertures F F′ in the arches to the flues C C′ below. The flame passing through these flues C, C′, being very intense, any unconsumed garbage which may pass down through the apertures F F′ will be quickly consumed. The ashes may be removed by side doors O and O′.

By the use of my improved furnace all of the vapors or gases are kept within the furnace until consumed so that no noxious gases and odors pass into the atmosphere due to preliminary heating and drying before the garbage is subjected to actual incineration.

The wall C^2 is not actually required except as a support for the arches D and L and it is evident that other means of support for the adjacent ends of these arches will suggest themselves to the engineer erecting the furnace, should he desire to dispense with said wall, Fig. 6 being an example.

It will be observed that my improved furnace has an incinerating portion for directly receiving the garbage greatly wider than the flue supplying the hot products of combustion, this being to secure a large area for the garbage and to allow free flow of the heating gases when saturated with the vapors and gases emanating from the garbage. The intensity of temperature is maintained because, while the gases are rarefied (except where augmented by the burning of the garbage) the reverberatory action of the arched roofs so increase the heat that the intensity of temperature above the arches D and L is maintained at a maximum.

If desired, an additional chamber K may be arranged upon the opposite side of the arch D, and this is indicated at K′ in Fig. 5. This would still further increase the area of the incinerating part of the furnace and may be rendered effective by care in supplying adequate products of combustion from the furnace grate A.

I have shown my furnace in the form in which I have preferred to construct it for commercial use, and while I prefer the same in the form shown, I do not confine myself to the details thereof as they may be modified without departing from the spirit of my invention.

Having now described my invention, what I claim as new and desire to secure by Letters Patent, is:—

1. In an incinerating furnace, the combination of a grate, a lower flue leading therefrom through which the flame passes, an incinerating arch having openings through it arranged above the lower flue, an incinerating chamber immediately above the incinerating arch and connected with the lower flue at its end most distant from the grate, a chimney flue leading from the incinerating chamber to the chimney, a lateral incinerating chamber opening laterally from the incinerating chamber above the incinerating arch and provided with an incinerating arched floor having openings through it, flues for causing hot gases to pass under and then over the arched floor of the lateral chamber, and means for charging the furnace with garbage.

2. In an incinerating furnace, the combi-

nation of a grate, a lower flue leading therefrom through which the flame passes, an incinerating arch having openings through it arranged above the lower flue, an incinerating chamber immediately above the incinerating arch and connected with the lower flue at its end most distant from the grate, a chimney flue leading from the incinerating chamber to the chimney, a lateral incinerating chamber opening laterally from the incinerating chamber above the incinerating arch and provided with an incinerating arched floor having openings through it, flues for causing hot gases to pass under and then over the arched floor of the lateral chamber, means for charging the furnace with garbage, and doors in the side of the lateral incinerating chamber both above and below its arched floor.

3. In an incinerating furnace, the combination of an incinerating arch having openings through it, a main incinerating chamber above the arch, a chimney flue leading from the main incinerating chamber, a grate, a combustion flue extending from the grate and arranged directly under the incinerating arch and also communicating with the incinerating chamber above the arch at the end most distant from the grate, a lateral incinerating chamber opening laterally to one side from the main incinerating chamber and having a floor composed of arches with open spaces between them, and flues for conducting gases from the grate thence under the arched floor of the lateral incinerating chamber and to a point above it, and means for charging the floor with garbage.

4. In an incinerating furnace, the combination of an incinerating arch having openings through it, a main incinerating chamber above the arch, a chimney flue leading from the main incinerating chamber, a grate, a combustion flue extending from the grate and arranged directly under the incinerating arch and also communicating with the incinerating chamber above the arch at the end most distant from the grate, a lateral incinerating chamber opening laterally to one side from the main incinerating chamber having a floor composed of arches with open spaces between them and having a continuous reverberatory roof, and flues for conducting gases from the grate thence under the arched floor of the lateral incinerating chamber and to a point above it whereby the gases pass in the same direction under both the incinerating arch and floor of the lateral incinerating chamber, and means for charging the floor with garbage.

5. In an incinerating furnace, an incinerating chamber having an incinerating arched floor with a flue formed beneath the arched floor for supplying hot gases to heat it and said flue communicating at one end with the incinerating chamber to supply hot gases thereto, a grate for supplying products of combustion and hot gases to the other end of the said flue, and an upper flue leading from the other end of the incinerating chamber for carrying off the products of combustion, combined with a lateral incinerating chamber opening laterally from and arranged at the same level as the incinerating chamber above the incinerating arched floor said lateral incinerating chamber having itself a floor composed of arches with open spaces between them, flues for conducting gases from the lower flue thence under the arched floor of the lateral chamber and to a place above it, means for charging the arched floor of the lateral incinerating chamber with garbage, and doors opening into the lateral incinerating chamber through its side above the floor and also opening through its side below the floor.

6. In an incinerating furnace, a return passage through which the flame passes one part of which forms an incinerating chamber and another part a lower flue and said parts being separated by an incinerating arch having openings through it connecting the said chamber and flue protions, combined with a lateral chamber K having an arched roof and floor L and arranged laterally to one side of the incinerating chamber portion of the return passage and in which lateral chamber the floor is composed of a series of parallel arches E′ separated by spaces F′ and forming a flue beneath them, a charging door and side doors for the lateral chamber, flues for leading hot gases under the floor of the lateral chamber and also over the end thereof into the lateral chamber, and a furnace for supplying hot gases to the flues and under the arched floors of the incinerating chamber and the lateral chamber.

In testimony of which invention, I have hereunto set my hand.

JOHN ROSS.

Witnesses:
R. M. HUNTER,
R. M. KELLY.