

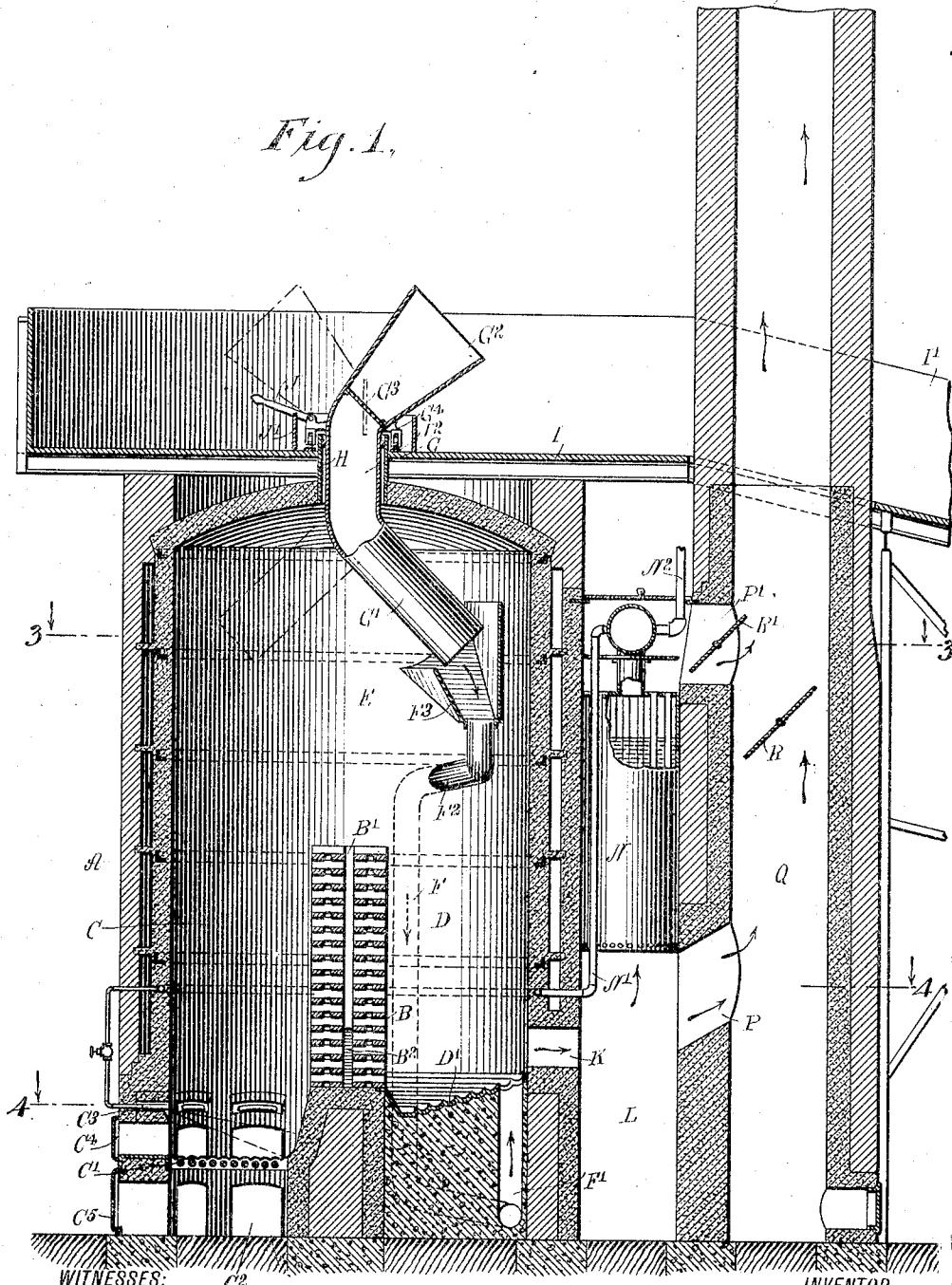
J. B. HARRIS.
GARBAGE INCINERATOR.
APPLICATION FILED SEPT. 14, 1910.

1,006,379.

Patented Oct. 17, 1911.

4 SHEETS—SHEET 1.

Fig. 1.



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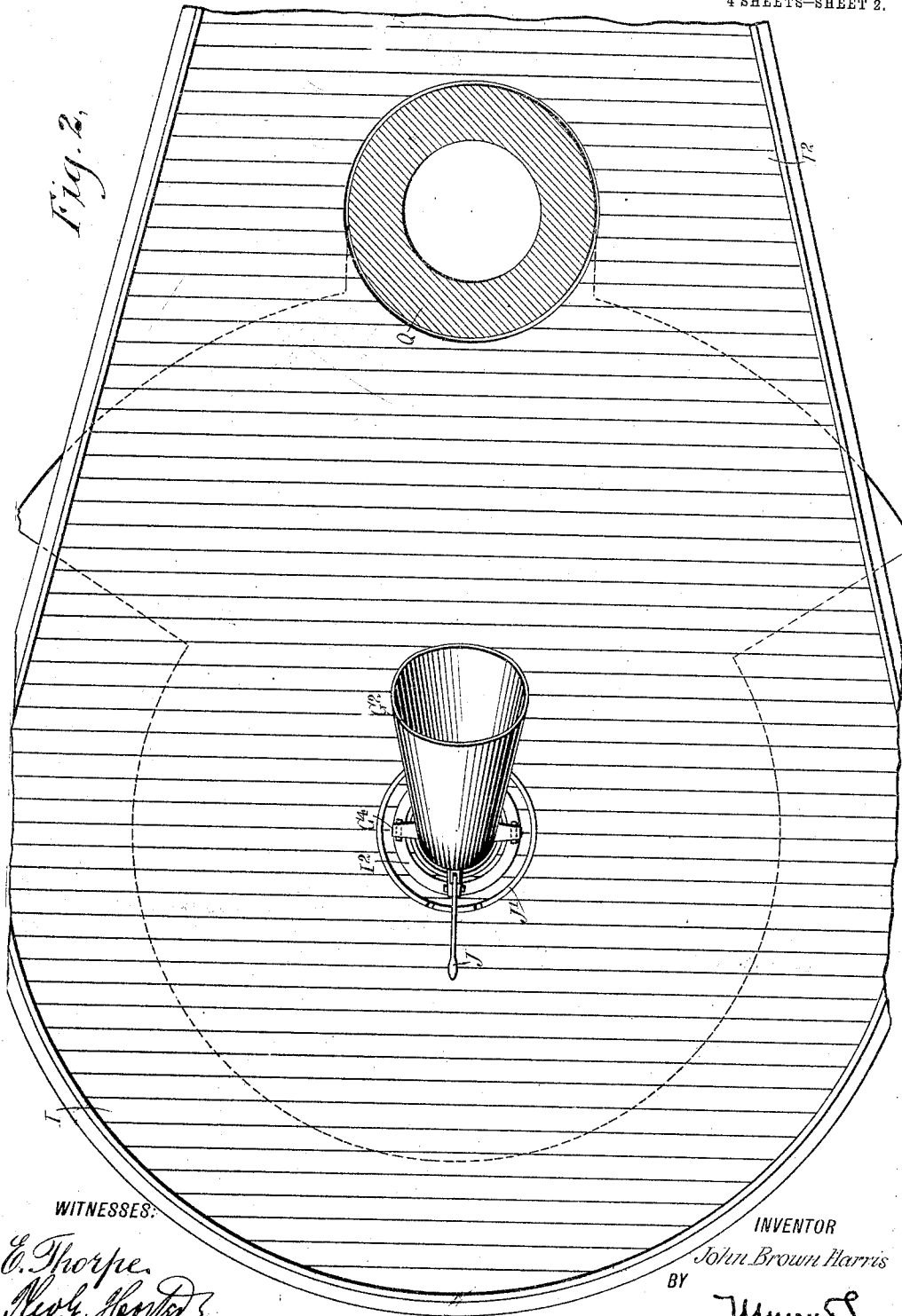
ATTORNEYS

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4 SHEETS—SHEET 2.

Fig. 2.



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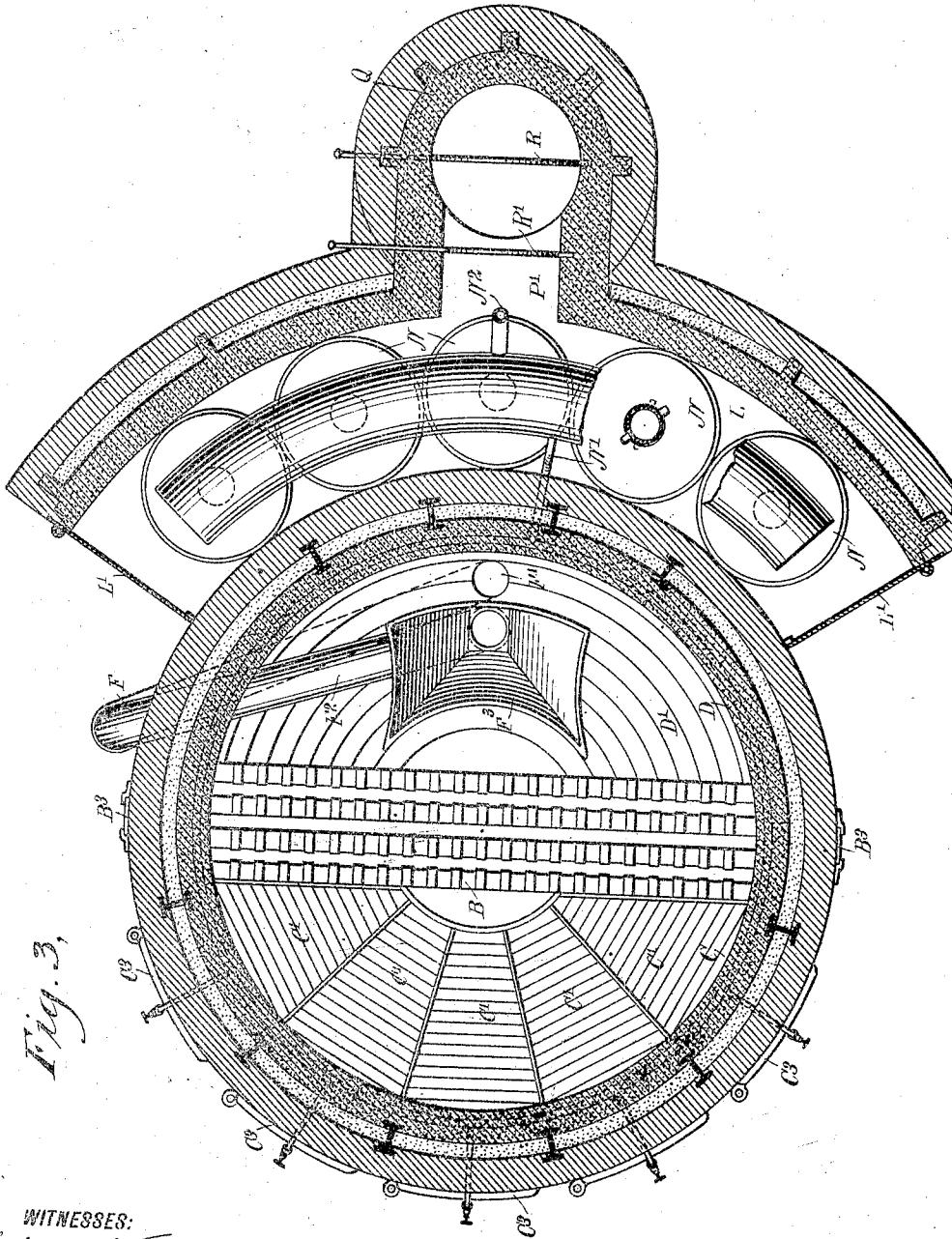
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4 SHEETS—SHEET 4.

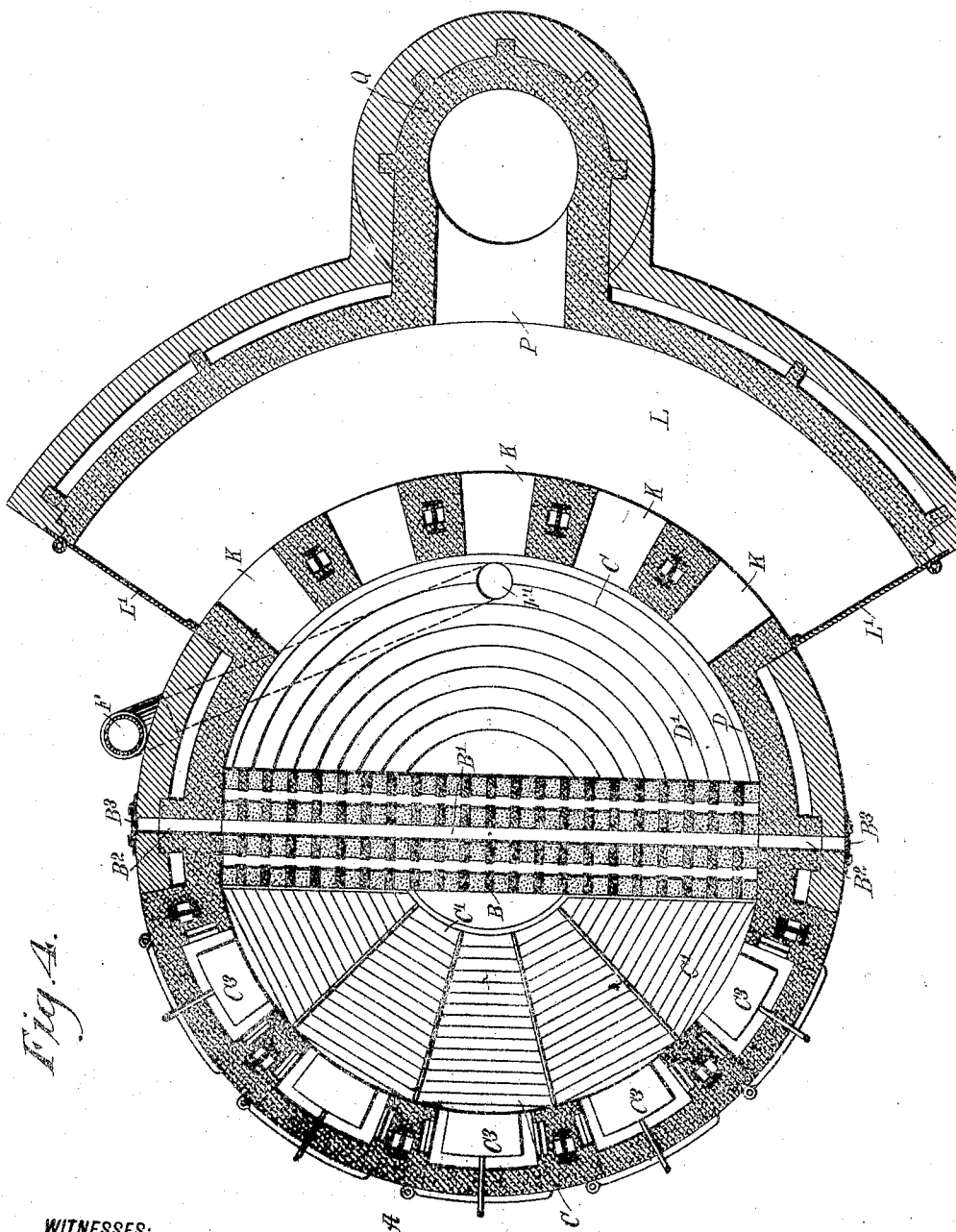


Fig. 4.

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UNITED STATES PATENT OFFICE.

JOHN BROWN HARRIS, OF NASHVILLE, TENNESSEE.

GARBAGE-INCINERATOR.

1,006,379.

Specification of Letters Patent.

Patented Oct. 17, 1911.

Application filed September 14, 1910. Serial No. 581,965.

To all whom it may concern:

Be it known that I, JOHN BROWN HARRIS, a citizen of the United States, and a resident of Nashville, in the county of Davidson and State of Tennessee, have invented a new and Improved Garbage-Incinerator, of which the following is a full, clear, and exact description.

The object of the invention is to provide a new and improved smokeless and odorless garbage incinerator, more especially designed for the use of municipalities, large manufacturing concerns, etc., and arranged to permit convenient charging of the furnace with garbage or other refuse and separation and reduction of the liquid and solid matter, to insure complete combustion of the matter and utilizing the products of combustion for the heating of boilers for generating steam to be used partly in the furnace, and a surplus for various power purposes, such as driving machinery for the production of electricity for electric lighting, etc. For the purpose mentioned use is made of a furnace, preferably disposed vertically and provided with a bridge wall for dividing the interior of the furnace into two lower compartments, and an upper combustion chamber, one of the lower compartments being arranged for volatilizing the liquid matter and the other lower compartment being arranged for reducing solid matter. Use is also made of a boiler chamber containing a plurality of boilers and connected with the interior of the compartment for volatilizing the liquid, and a chimney arranged for connection with the said boiler chamber at the top and bottom thereof, and dampers to control the exit of the products of combustion from the boiler chamber to the said chimney.

A practical embodiment of the invention is represented in the accompanying drawings forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the views.

Figure 1 is a sectional side elevation of the garbage incinerator; Fig. 2 is a plan view of the same; Fig. 3 is a sectional plan view of the same on the line 3—3 of Fig. 1; and Fig. 4 is a similar view of the same on the line 4—4 of Fig. 1.

A furnace or cupola A is preferably built of bricks, lined on the inside with fire clay and reinforced and strengthened by the use of iron beams, as indicated in the drawings,

and the said furnace is cylindrical in shape, disposed vertically, and provided in its lower portion with a bridge wall B extending diametrically and dividing the lower portion of the furnace into a burning compartment C and an evaporating compartment D, while the upper portion of the furnace forms a combustion chamber E.

The bridge wall B is built of checker brick in two parallel sections spaced apart to form a channel B', connected at its lower end with air inlets B² arranged in the side wall of the furnace A and controlled at their outer ends by doors B³, as plainly indicated in Fig. 4, so that more or less air can be admitted to the air inlets B² and to the space B', delivering air by checker brick openings to both compartments C and D and also to the combustion chamber E.

The burning compartment C is for burning solid material and is provided in its bottom with a sectional grate C' below which is the ash pit C², and in the side wall of the furnace A above the grate C' are arranged a series of steam disassociators or jets C³, preferably of the construction of the one shown and described in the Letters Patent of the United States for a smoke consuming furnace, Serial No. 880,380, granted to me February 25, 1908, so that further description of the said disassociators C³ is not deemed necessary. Fuel doors C⁴ lead to the grate C' for supplying the same with fuel for a preliminary heating of the furnace, and doors C⁵ lead to the ash pit C² for the removal of the residue of combustion, and which residue forms a product for fertilizing and other purposes.

The evaporating compartment D is used for evaporating liquid and semi-liquids, and the said evaporating compartment D is provided with an inclined bottom D' having horizontal corrugations, into the upper one of which is discharged liquid or semi-liquid matter to be evaporated, so that the said liquid or semi-liquid can run down the different corrugations to be gradually evaporated by the heat in the furnace. A supply pipe F is arranged outside of the furnace A and terminates at its lower end in a vertical member F' discharging into the upper corrugations of the bottom D', and the upper end F² of the supply pipe F extends into the combustion chamber E and supports a hopper or catch basin F³, into which is dis-

charged the liquid or semi-liquid matter to be evaporated in the compartment D.

The solid and liquid matter to be incinerated are passed into a separating and feeding device, which separates the liquid and semi-liquid matter from the solid matter, and discharges the liquid matter into the catch basin F³, to pass by gravity onto the bottom D', as previously explained, while the solid matter is discharged into the compartment C to be burned therein. The separating and feeding device consists essentially of a tube G mounted to turn in a bushing H extending centrally in the top of the furnace or cupola A, and also extending through the floor of a platform I arranged above the cupola and having a gangway I' leading to the platform I, so as to permit the matter to be incinerated to be carried up on the platform by carts or other suitable means. The lower end of the tube G terminates in an angular discharge end G' adapted to register with the hopper F³, as plainly indicated in full lines in Fig. 1, or to deliver the solid matter to the compartment C whenever the tube G is turned to swing the angular discharge end G' into the position shown in dotted lines in Fig. 1. The upper end of the tube G terminates in a hopper G² for receiving the matter to be treated from the car or other means employed, and at the junction of the tube G with the hopper G² is arranged a tiltable sieve G³, which retains the solid matter for the time being, while the liquid and semi-liquid matter passes through the meshes of the sieve and down the tube G and its end G' into the hopper F³, to be delivered to the evaporating compartment D. When this has been done a half turn is given to the tube G and then the sieve G³ is turned into an open position so that the solid material can pass down the tube G and to the angular end G', to finally drop into the burning compartment C. The tube G is provided with track wheels G⁴, traveling on a circular track I² held on the bottom of the platform I concentric with the bushing H, and on the tube G is secured a lever J under the control of the operator for turning the tube G to cause the same to assume the two positions above described, for feeding liquid and semi-liquid matter into the compartment D and the solid matter into the compartment C. The lever J is adapted to engage with notches in a segment J' to lock the separating and feeding device in either of its two positions above described.

The lower end of the evaporating chamber D is connected by ports or openings K with a boiler chamber L of semi-circular shape and located at the outside of the furnace A adjacent to the compartment D, as will be readily understood by reference to Fig. 4. In this boiler chamber L above the openings

K are arranged vertically-disposed steam-boilers N, of any approved construction, for generating steam, part of which is used in the steam disassociators C³ by connecting the boilers N by a pipe N' with the said disassociators. The surplus or the remaining portion of the steam not used in the disassociators C³ is carried off by a pipe N² for driving machinery for the generation of electricity for electric lighting, etc. The boiler chamber L is connected below and above the boilers N by openings P and P' with a stack Q, for producing the desired draft in the furnace, and in the said stack Q is arranged a damper R, and in the opening P' is arranged a damper R' so that by the use of the dampers R and R' the products of combustion passing into the boiler chamber L can be controlled and retained in the said chamber L or allowed to pass into the stack Q according to requirement. The boiler chamber L is provided at the ends with doors L' to permit of gaining access to the said chamber and its boilers N for convenient cleaning, repairing and other purposes.

The operation is as follows: In starting the furnace, it is desirable that the same be first heated, and for this purpose a coal fire is started on the grate C' to heat up the interior of the furnace A as well as the bridge wall B. When this has been done the matter to be incinerated is discharged into the hopper G² so that the liquid and semi-liquid matter is separated from the solid matter, and the liquid and semi-liquid matter is first discharged into the hopper F³, to be fed onto the bottom D' of the evaporating compartment D, in which latter the said liquid and semi-liquid matter is quickly evaporated owing to the heat in the furnace. After the liquid and semi-liquid matter is discharged into the compartment D, the operator turns the tube G, as previously explained, and then tilts the sieve G³ into a vertical position so that the solid matter contained in the hopper G² passes down the tube G to be discharged through the end G' into the compartment C in which the solid matter is ignited and burned from the burning fuel on the grate C'. Thus additional heat is generated and the smoke and gases arising from the burning fuel in the compartment C and the vapors arising from the liquid and semi-liquid matter evaporated in the compartment D pass into the combustion chamber E, to be completely burned. To insure complete combustion, air is admitted to the combustion chamber E as well as to the compartments C and D by opening the doors B³ the desired degree, so that air passes into the said combustion chamber E and the compartments C and D by way of the air inlets B², the air space B' and the openings in the checker bricks of the two sections of the brick wall B. The products of

combustion pass through the openings K into the boiler chamber L for heating the boilers N, with a view to generate steam for the purpose previously mentioned, it being understood that the final passage of the products of combustion into the stack Q are controlled by the positions of the dampers R and R', thus, if desired, the damper R' can be closed to retain the heat in the upper portion of the boiler chamber L, while the incoming products of combustion can directly pass from the openings K through the chamber L and opening P into the stack Q and up the same, past the now open damper R. When the damper R is closed and the damper R' is open then the products of combustion pass up the chamber L to heat the boilers N and to finally pass by way of the opening P' into the smoke stack Q. When treating semi-liquid fecal or putrid matter, the latter on reaching the bottom D' is quickly vaporized, and the vapors rise in the chamber D and pass up into the combustion chamber E, in which the vapors are gradually burned, and very little of the said vapors pass out through the openings K and to the stack Q, so that the incinerator is rendered practically odorless. It is understood that when evaporating such fecal or putrid matter sulfureted hydrogen gases are liberated, and which, on account of being lighter than the carbon dioxid gases of combustion, are forced up into the combustion chamber E and form a higher strata of gases than the carbon dioxid. Now the flames leaping up into the combustion chamber E continually dry and rarefy the sulfureted gases and gradually burn the same into CO₂ and SO₂, and finally the residue sinks down in the furnace and passes out through the openings K into the boiler chamber L to finally reach the stack Q.

It is understood that by the use of the incinerator garbage, waste paper, leaves, carcasses of dogs, cats, rats and other animals can be readily disposed of, to produce incinerated matter for use as a fertilizer and the like, and also to produce steam for power or heating purposes, thus rendering the incinerator exceedingly economical for the use of municipalities, large manufacturing concerns and the like.

Having thus described my invention, I claim as new and desire to secure by Letters Patent:

1. A garbage incinerator, comprising a vertically-disposed furnace having a bridge wall separating the lower portion of the furnace into compartments, one for volatilizing liquid matter and the other for burning solid matter, the portion of the furnace above the bridge wall and the said compartments forming a combustion chamber, and a separating and feeding device mounted to turn and having an angular discharge mem-

ber for directing the liquid matter into one compartment and the solid matter into the other compartment.

2. A garbage incinerator, comprising a vertically-disposed furnace having a bridge wall separating the lower portion of the furnace into compartments, one for volatilizing liquid matter and the other for burning solid matter, the portion of the furnace above the bridge wall and the compartments forming a combustion chamber, and a rotatable separating and feeding device arranged on the top of the furnace for separating the solid matter from the liquid matter, the said device having a member extending within the combustion chamber for feeding the liquid matter into the compartment for volatilizing the liquid and for feeding the solid matter into the other compartment for burning the solid matter.

3. A garbage incinerator, comprising a vertically-disposed furnace having a bridge wall separating the lower portion of the furnace into compartments, one for volatilizing liquid matter and the other for burning solid matter, the portion of the furnace above the bridge wall and the said compartments forming a combustion chamber, the said compartment for the liquid matter having a step-like bottom, inclining downward and inward from the wall of the furnace toward the bridge wall, and a feed pipe for discharging the liquid matter onto the upper part of said bottom.

4. A garbage incinerator, comprising a vertically-disposed furnace having a bridge wall separating the lower portion of the furnace into compartments, one for volatilizing liquid matter and the other for burning solid matter, the portion of the furnace above the bridge wall and the said compartments forming a combustion chamber, the said compartment for the liquid matter having a step-like bottom inclining downward and inward from the wall of the furnace, and a feed pipe having an upwardly extending member for discharging the liquid matter onto the upper part of said bottom, and the said compartment for the solid matter having a sectional grate in its bottom and a plurality of steam jets in the side wall of the said compartment for supplying the said compartment with steam.

5. A garbage incinerator, comprising a vertically-disposed furnace having a bridge wall separating the lower portion of the furnace into compartments, one for volatilizing liquid matter and the other for burning solid matter, the portion of the furnace above the bridge wall and the said compartments forming a combustion chamber, and a rotatable separator and feeder arranged on the top of the furnace and having a receiving hopper outside the furnace and an angular discharge within the said

combustion chamber to direct the liquid matter into one compartment and the solid matter into the other compartment.

6. A garbage incinerator, comprising a vertically-disposed furnace having a bridge wall separating the lower portion of the furnace into compartments, one for volatilizing liquid matter and the other for burning solid matter, the portion of the furnace above the bridge wall and the said compartments forming a combustion chamber, a rotatable separator and feeder arranged on the top of the furnace and having a receiving hopper outside the furnace and an angular discharge within the said combustion chamber to direct the liquid matter into one compartment and the solid matter into the other compartment, and a strainer in the said separator and feeder intermediate the hopper and discharge end for separating the liquid matter from the solid matter.

7. A garbage incinerator, comprising a vertically-disposed furnace having a bridge wall separating the lower portion of the furnace into compartments, one for volatilizing liquid matter and the other for burning solid matter, the portion of the furnace above the bridge wall and the said compartments forming a combustion chamber, a rotatable separator and feeder arranged on the top of the furnace and having a receiving hopper outside the furnace and an angular discharge within the said combustion chamber to direct the liquid matter into one compartment and the solid matter into the other compartment, and a platform above the said furnace and on which the said separator and feeder is mounted to turn.

8. A garbage incinerator, comprising a vertically-disposed furnace having a bridge wall separating the lower portion of the furnace into compartments, one for volatilizing liquid matter and the other for burning solid matter, the portion of the furnace above the bridge wall and the said compartments forming a combustion chamber, a rotatable separator and feeder arranged on the top of the furnace and having a receiving hopper outside the furnace and an angular discharge within the said combustion chamber to direct the liquid matter into one compartment and the solid matter into the other compartment, a platform above the said furnace and on which the said separator and feeder is mounted to turn, and manually-controlled means at the said platform for turning the said separator and feeder.

9. A garbage incinerator, comprising a vertically-disposed cylindrical furnace having a volatilizing compartment for volatilizing liquid matter and a compartment for burning solid matter, the bottom of the volatilizing compartment being inclined downward from the wall of the furnace in direction of the center thereof and corrugated in

step form, and a liquid supply pipe discharging onto the upper part of the said bottom.

10. A garbage incinerator, comprising a vertically-disposed cylindrical furnace having a bridge wall separating the lower portion of the furnace into compartments, one for volatilizing liquid matter and the other for burning solid matter, the bottom of said volatilizing compartment being inclined and corrugated in step form, a liquid supply pipe discharging onto the upper part of the said bottom, a segmental boiler chamber containing boilers arranged at that portion of the side wall of the furnace, adjacent to the volatilizing compartment, the said side wall of the furnace having openings connecting the volatilizing compartment with the said boiler chamber, a chimney connected with the said boiler chamber above and below the said boilers, and dampers for controlling the movement of the products of combustion from the said boiler chamber into the said chimney.

11. A garbage incinerator, comprising a vertically-disposed furnace having a bridge wall separating the lower portion of the furnace into compartments, one for volatilizing liquid matter and the other for burning solid matter, the portion of the furnace above the bridge wall and the said compartments forming a combustion chamber, the said compartment for the liquid matter having a step-like bottom and a feed pipe for discharging the liquid matter onto the said bottom, and the said compartment for the solid matter having a sectional grate in its bottom and a plurality of steam jets in the side wall of the said compartment for supplying the said compartment with steam, and a segmental boiler chamber containing boilers arranged at that portion of the side wall of the furnace adjacent to the said compartment for the liquid matter, the said side wall of the furnace having openings connecting the said liquid matter compartment with the said boiler chamber.

12. A garbage incinerator, comprising a vertically-disposed furnace having a bridge wall separating the lower portion of the furnace into compartments, one for volatilizing liquid matter and the other for burning solid matter, the portion of the furnace above the bridge wall and the said compartments forming a combustion chamber, a feed pipe for discharging the liquid matter into the said evaporating compartment, the said feed pipe opening into the said combustion chamber and terminating in a hopper located above the compartment for the liquid matter, and a turnable separator and feeder arranged on the top of the furnace and having a receiving hopper outside of the furnace and an angular discharge inside the furnace, the said angular discharge

being adapted to discharge into the said feed pipe hopper.

13. A garbage incinerator, comprising a vertically disposed furnace having a bridge wall separating the lower part of the furnace into compartments, one for evaporating liquid matter and the other for burning solid matter, the portion of the furnace above the bridge wall and the said compartments forming a combustion chamber, a feed pipe for discharging the liquid matter into the evaporating compartment, the said feed pipe opening at its upper or inlet

end into the said combustion chamber and terminating at said end in a hopper, and a separator and feeder having a discharge member adapted to discharge into the said hopper.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JOHN BROWN HARRIS.

Witnesses:

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MYRTLE HAGAR.