

No. 667,015.

Patented Jan. 29, 1901.

W. S. HULL.  
INCINERATING VAULT.

(Application filed Aug. 6, 1900.)

(No Model.)

Fig. 1.

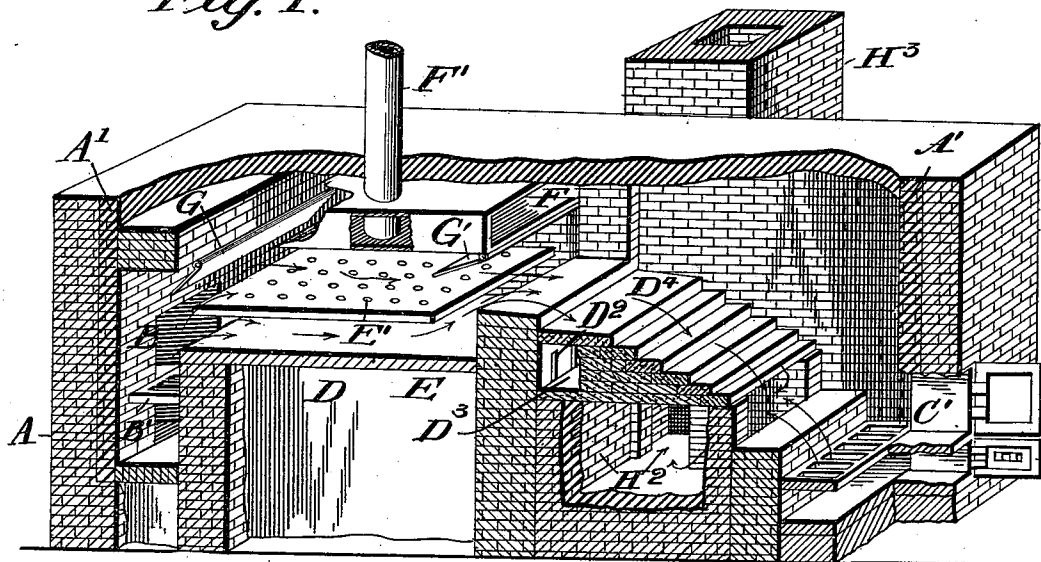
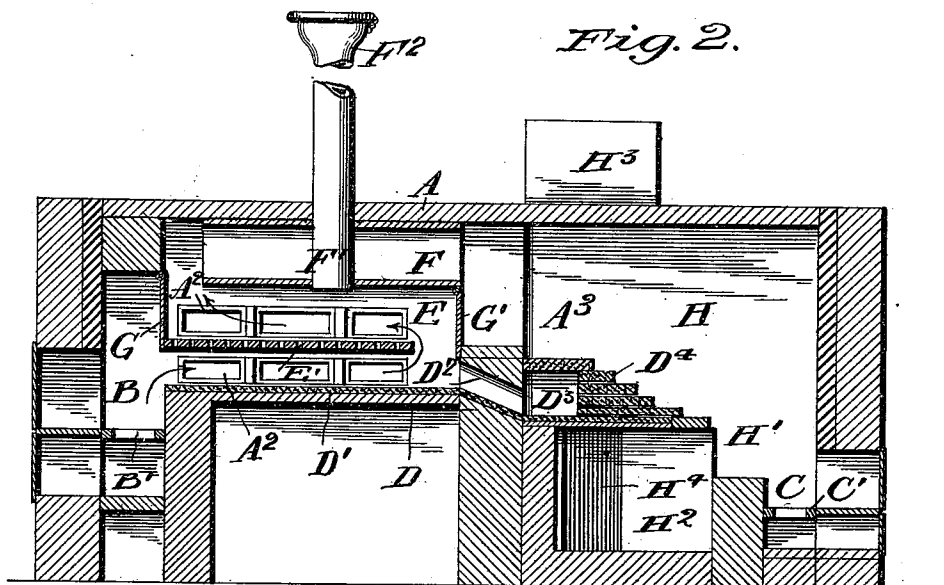


Fig. 2.



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# UNITED STATES PATENT OFFICE.

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## INCINERATING-VAULT.

SPECIFICATION forming part of Letters Patent No. 667,015, dated January 29, 1901.

Application filed August 6, 1900. Serial No. 26,079. (No model.)

*To all whom it may concern:*

Be it known that I, WILLIAM S. HULL, a citizen of the United States, residing at Jackson, in the county of Hinds, State of Mississippi, have invented certain new and useful Improvements in Incinerating-Vaults, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to incinerating-vaults, and is particularly adapted for the consumption of night-soil and other refuse of a more or less moist character in which the solid matter is to be incinerated and the moisture evaporated.

The invention has for one object to provide a furnace simple in construction which can be readily and cheaply operated and within which the flame may be directed over the receiving-platform in different manners to secure the most advantageous results, while the liquid will pass through said platform and be evaporated in an adjacent chamber.

A further object of the invention is to provide a return-flue and suitably-disposed valves by means of which the products of combustion will be carried above and below the receiving-platform in the same direction or below the platform in one direction and above the platform in an opposite direction, and thence through the flue to a point of discharge.

Another object of the invention is to provide means for the rapid and complete evaporation of the moisture from the material and for the consumption of any gases which may be generated during the incinerating or evaporating processes.

Other objects and advantages of the invention will hereinafter appear in the following description and the novel features thereof will be particularly pointed out in the appended claims.

In the drawings, Figure 1 is a perspective of the vault with a side wall removed and parts broken away and in section, and Fig. 2 is a central longitudinal section through the vault.

Like letters of reference indicate like parts throughout both figures of the drawings.

For the purpose of describing the invention and the operation of the several parts refer-

ence will be made to different characters of materials; but it may here be stated that the materials used may be altered at will as found convenient, and while the main casing of the vault is here shown as of a solid material—for instance, masonry—still the same may be constructed of iron or steel and lined with fire-brick or refractory substance, so as to render the vault portable and more readily adapted for location in buildings where the space available therefor is limited.

The letter A designates a casing, which may be of any desired material—for instance, masonry—and, if desired, lined with a refractory substance, such as fire-brick A'. One end of the case or vault is provided with a fire-box B, having a grate B' and other accessories, and at the opposite end a fire-box C is formed, having therein a grate C' of any ordinary construction, and provided with the usual entrance-apertures and doors. In the following description the grate B will be designated as the "forward" or "front" end of the vault and the grate C as the "rear." Between these two grates a floor D is provided, above which a receiving-platform E is disposed. This platform may be of any suitable configuration adapted to retain thereon the solid material and permit liquid to pass through the same and fall upon the floor D, and for the purpose of accomplishing this object in the present illustration the platform E is provided with numerous perforations E'. Above this platform and adjacent to the top of the casing A is a partition forming a return-flue F, through which the feed-pipe F' extends and discharges upon the platform E, while at opposite sides of the furnace suitable doors A<sup>2</sup> are provided, by means of which communication may be had to the surface of the platform or the floor beneath the same. At the front end of the platform E a swinging damper G is provided, which is supported in any suitable manner and operated from the outside of the casing by any well-known means. In the present illustration the damper G is shown as pivoted above the platform E and adapted to contact with the edge thereof, while at the opposite end of the platform and slightly removed therefrom is a second pivoted damper G' upon the return-flue F, adapted to contact with the flue-wall A<sup>3</sup> and

prevent the direct passage of the products of combustion into the evaporating-chamber H. The feed-pipe F' may lead to any suitable source of supply. For instance, when used for the incinerating of night-soil the pipe will connect with any desired form of stool or closet F<sup>2</sup> or series of the same.

When the solid and liquid material are dumped upon the platform E, the liquid passes through the same and is caught by the floor D. Upon this floor, however, a series of absorbent bricks or tiles are placed, which become heated and evaporate a portion of the liquid, the remainder of which will pass through the channel D<sup>2</sup> in the flue-wall A<sup>3</sup> and into the evaporating-space D<sup>3</sup>, which is suitably supplied with piles or tiers of the absorbent material—such, for instance, as shown at D<sup>4</sup>—over which the products of combustion pass, so that the liquid is readily heated and evaporated. In reference to this absorbent brick or material attention is called to my prior patent, No. 543,134, of July 23, 1895, in which the characteristics of this material are more fully set forth, and it may be further stated that the bricks or tiles are not set in mortar, but loosely piled, so that the moisture evaporated therefrom can freely pass into the evaporating-chamber H. At this point the evaporated moisture and any unconsumed gases from the solid material upon the platform are mingled and pass downward over the fire in the grate C, where they will be further ignited, and thence through a discharge-flue H' into the combustion-chamber H<sup>2</sup>, where ample opportunity is permitted for the expansion of the gases and combustion thereof, while the final gases from which the objectionable characteristics have been removed are discharged into the stack H<sup>3</sup> through a communicating opening H<sup>4</sup> at its base.

In describing the operation of this invention in connection with the incinerating of night-soil from closets, it is proper to state that the quantity of solid material to be consumed is small compared with that of the consumption of garbage and frequently a larger quantity of liquid is to be evaporated. With this end in view it is desirable to preserve or conserve the heat by passing the same through the return-flue after its passage over the receiving-platform, by which method the necessary degree of heat to produce the evaporation of the materials and the proper consumption of the solid matter can be carried on. In starting the furnace the fire will first be built in the fire-box B, thus establishing a draft toward the stack, and afterward built in the fire-box C, which assists this draft and also consumes the gases contained in the products of combustion from the front fire. If there be a large amount of solid matter in the refuse to be consumed, the dampers G and G' may be raised, as shown in Fig. 1, so that the heat and products of combustion from the front fire pass above

and below the platform E in one direction, and with a direct draft this produces the most intense heat and rapid incineration of the material. Of course in pursuing this method considerable fuel will be consumed, so that when the quantity of material to be burned is small the dampers will be closed in the position shown in Fig. 2, when the products of combustion first pass beneath the platform E, thus thoroughly heating the absorbent material upon the floor D to produce the evaporation of the liquid, thence in the opposite direction above the surface of the platform E, and finally over the partition and through the return-flue F to the evaporating-chamber H. From this point the unconsumed gases are carried, together with the resultant of the evaporated liquids, over the fire at C into the combustion-chamber H<sup>2</sup> and thence to the stack. In this connection it will be noted that the consumption of the obnoxious gases is theoretically produced by combining ten parts of air with one part of the gas, which is usually carbureted and sulfureted hydrogen. This consumption of the obnoxious gases first occurs in the return-flue F, as when the gases are generated by the burning of the solid matter they at once mix with the air drawn from the feed-pipe F' and are thoroughly mixed and combined in passing through the return-flue, so as to permit a complete combustion after they have been ignited by the fire at C and enter the combustion-chamber H<sup>2</sup>. This method of operating the furnace serves to preserve the heat by retaining the same within the furnace for a long period, and hence assist in the destruction of the gases. The arrangement of the dampers G and G' also permits the fire and products of combustion either to be passed above or below the dump-platform at will.

The operation for the evaporation of liquid will be clearly understood from the foregoing description, and particularly desirable results are secured by passing the liquid from the platform onto a loosely-laid bed of brick resting upon the waterproof floor, which floor conducts the fluids through the bridge-wall to the evaporating-chamber. The evaporation is therefore more economically and quickly performed than heretofore and the consumption of any resultant thereof, together with the gases in the solid material, thoroughly effected in the chamber before the escape to the stack, while the presence of these ignited gases beneath the evaporating-space D<sup>3</sup> and material D<sup>4</sup> materially assists in heating the same to facilitate such evaporation.

It will be obvious that changes may be made in the details of construction and configuration of the several parts without departing from the spirit of the invention as defined by the appended claims.

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

1. In combination with a fire-box, an incinerating-chamber communicating therewith, said chamber being provided with two gas-exits and a receiving-platform upon which the material is dumped, and damper mechanism for causing the products of combustion from the fire-box to pass directly through the incinerating-chamber both above and below the receiving-platform to one exit, or first below said platform and then indirectly above the same to the other exit; substantially as specified.
2. In combination with a fire-box, an incinerating-chamber communicating therewith, said chamber being provided with two gas-exits and a receiving-platform upon which the material is dumped, and damper mechanism located at each end of the platform for causing the products of combustion from the fire-box to pass directly through the incinerating-chamber both above and below the receiving-platform to one exit, or first below said platform and then indirectly above the same to the other exit; substantially as specified.
3. In an incinerating-vault, a fire-box, an incinerating-chamber in communication therewith, a perforated receiving-platform dividing said chamber, an evaporating-chamber in communication with said incinerating-chamber, the floor of said incinerating-chamber being adapted to convey liquids to the evaporating-chamber, damper mechanism for causing the products of combustion from said fire-box to pass directly over said platform to the evaporating-chamber, or first beneath the platform and then indirectly over the same, a fire-box in said evaporating-chamber, and a secondary combustion-chamber communicating with said evaporating-chamber at a point adjacent to the fire-box therein.
4. In an incinerating-vault, the combination of a fire-box, an incinerating-chamber in communication therewith, a receiving-platform dividing said chamber and adapted to permit the passage of liquid therethrough, a partition in the flue-space above said platform for separating the space into two exits, a feed-pipe discharging upon said platform, a damper located above the platform adjacent to said fire-box, and a damper carried by said partition at the opposite end of said platform; substantially as specified.
5. In an incinerating-vault, the combination of a fire-box, an incinerating-chamber in communication therewith, a receiving-platform dividing said chamber and adapted to permit the passage of liquid therethrough, a partition in the flue-space above said platform for separating the space into two exits, a feed-pipe discharging upon said platform, a damper located above the platform adjacent to said fire-box, a damper carried by said partition at the opposite end of said platform; a liquid-conducting floor beneath the platform, and an evaporating-chamber communicating with said floor and with the incinerating-chamber; substantially as specified.
6. In an incinerating-vault, the combination of a fire-box, an incinerating-chamber in communication therewith, a receiving-platform dividing said chamber and adapted to permit the passage of liquid therethrough, a partition in the flue-space above said platform for separating the space into two exits, a feed-pipe discharging upon said platform, a damper located above the platform adjacent to said fire-box, a damper carried by said partition at the opposite end of said platform, a liquid-conducting floor beneath the platform, an evaporating-chamber communicating with said floor and with the incinerating-chamber, a fire-box in said evaporating-chamber, a combustion-chamber beneath said evaporating-chamber and communicating with the fire-box thereof, and a stack communicating with said combustion-chamber: substantially as specified.
7. In an incinerating-vault, the combination of a casing having at opposite portions an incinerating-chamber and an evaporating-chamber communicating with each other and each with a fire-box, a receiving-platform in said incinerating-chamber and adapted to permit the passage of liquids therethrough, a conducting-floor beneath the platform adapted to convey liquids to said evaporating-chamber, an absorbent material in said evaporating-chamber arranged to receive liquids from the conducting-floor and over which the products of combustion from over the platform are adapted to pass, a combustion-chamber beneath said absorbent material, and a stack communicating with said combustion-chamber; substantially as specified.
8. In an incinerating-vault, the combination of a casing having at opposite portions an incinerating-chamber and an evaporating-chamber communicating with each other and each with a fire-box, a receiving-platform in said incinerating-chamber and adapted to permit the passage of liquids therethrough, a conducting-floor beneath the platform adapted to convey liquids to said evaporating-chamber, an absorbent material in said evaporating-chamber arranged to receive liquids from the conducting-floor and over which the products of combustion from over the platform are adapted to pass, a combustion-chamber beneath said absorbent material, a stack communicating with said combustion-chamber, a partition above said platform to provide two exit-flues, and a damper mechanism for causing the products of combustion from the fire-box to pass directly above and below the receiving-platform to one exit or first below said platform and then indirectly above the same to the other exit; substantially as specified.
9. In an incinerating-vault, the combination of a casing having at opposite portions an incinerating-chamber and an evaporating-chamber communicating with each other and each with a fire-box, a receiving-platform in said incinerating-chamber and adapted to

permit the passage of liquids therethrough, a conducting-floor beneath the platform adapted to convey liquids to said evaporating-chamber, an absorbent material in said  
 5 evaporating - chamber arranged to receive liquids from the conducting-floor and over which the products of combustion from over the platform are adapted to pass, a combustion-chamber beneath said absorbent material, a stack communicating with said combustion-chamber, a partition above said platform to provide two exit-flues, a damper pivoted to said partition at the rear end and adapted to close one of said exits, and a damper pivoted above the forward end of said platform and adapted to close the flue-space directly over the same from direct communication with the fire - box; substantially as specified.  
 10 10. In an incinerating-vault, the combination of a casing having at opposite portions an incinerating-chamber and an evaporating-chamber communicating with each other and each with a fire-box, a receiving-platform in  
 15 said incinerating-chamber and adapted to permit the passage of liquids therethrough, a conducting - floor beneath the platform, adapted to convey liquids to said evaporating-chamber, an absorbent material in said  
 20 evaporating - chamber arranged to receive liquids from the conducting-floor and over which the products of combustion from over the platform are adapted to pass, a combustion-chamber beneath said absorbent material, a stack communicating with said combustion-chamber, a partition above said platform to provide two exit-flues, a damper pivoted to said partition at the rear end and adapted to close one of said exits, and a damper pivoted above the forward end of said platform and adapted to close the flue-space directly over the same from direct communication with the fire - box; substantially as specified.  
 25 11. The combination of a fire-box, an incineratory chamber and an evaporating-chamber, said incinerating - chamber being provided with a horizontal receiving-platform, an inlet from the fire-chamber, and gas and liquid exit openings communicating with the evaporating-chamber, and the evaporating-chamber having an exit for the products of combustion, and absorbent material above said exit, the lower exit from the incinerating-chamber adapted to conduct the liquid matter to the absorbent material and the upper exit from said chamber leading to the evaporating - chamber above said absorbent material.  
 30 In testimony whereof I affix my signature in presence of two witnesses.  
 35

bustion-chamber, a partition above said platform to provide two exit-flues, a damper pivoted to said partition at the rear end and adapted to close one of said exits, a damper pivoted above the forward end of said platform and adapted to close the flue-space directly over the same from direct communication with the fire-box, and a flue-wall between the incinerating and evaporating chambers provided with openings adapted to permit the passage of liquids from the conducting-floor to the absorbent material in the evaporating-chamber; substantially as specified.

11. The combination of a fire-box, an incineratory chamber and an evaporating-chamber, said incinerating - chamber being provided with a horizontal receiving-platform, an inlet from the fire-chamber, and gas and liquid exit openings communicating with the evaporating-chamber, and the evaporating-chamber having an exit for the products of combustion, and absorbent material above said exit, the lower exit from the incinerating-chamber adapted to conduct the liquid matter to the absorbent material and the upper exit from said chamber leading to the evaporating - chamber above said absorbent material.

In testimony whereof I affix my signature in presence of two witnesses.

WILLIAM S. HULL.

Witnesses:

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 J. C. GREEN.