

(No Model.)

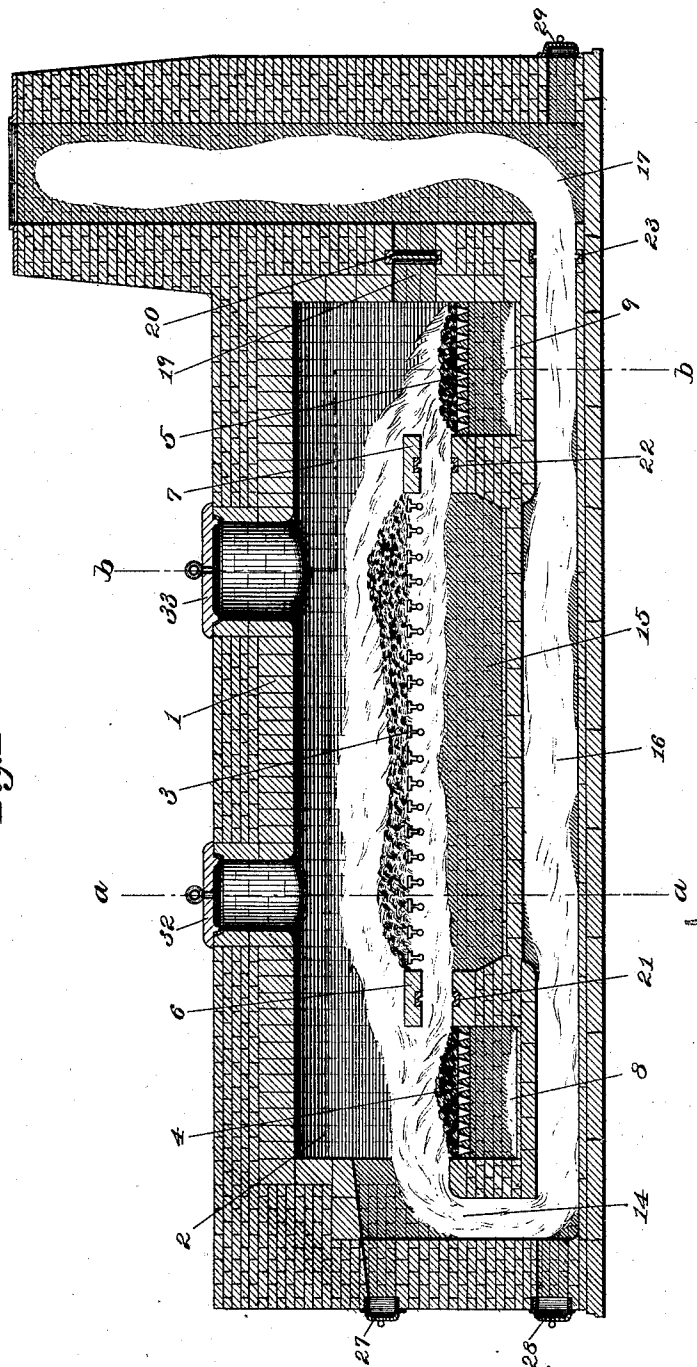
2 Sheets—Sheet 1.

G. H. WARNER.
FURNACE FOR BURNING GARBAGE.

No. 468,851.

Patented Feb. 16, 1892.

Fig. 1



Witnesses:

Henry L. Rickard.
P. A. Phelps.

Inventor:

By his Attorney
George H. Warner
Albert H. Walker

(No Model.)

2 Sheets—Sheet 2.

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Fig. 3

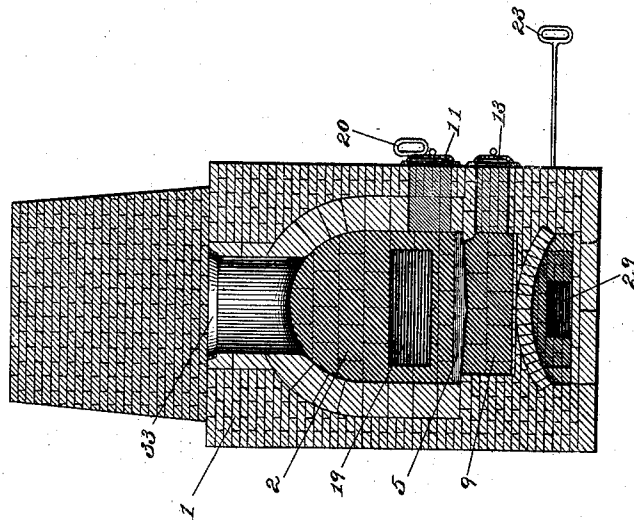
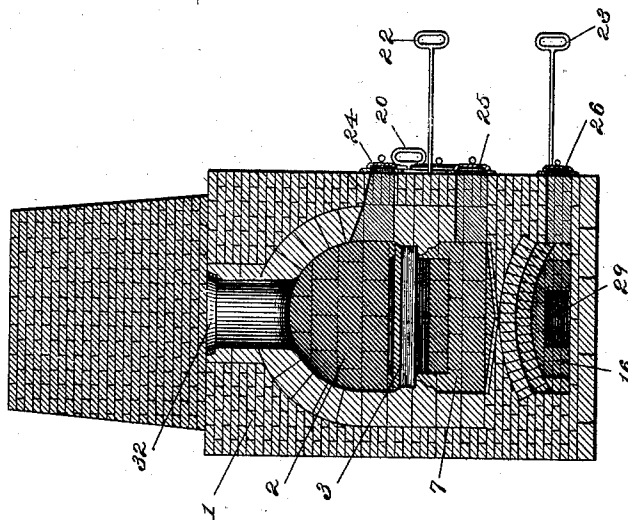


Fig. 2



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Inventor:

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UNITED STATES PATENT OFFICE.

GEORGE H. WARNER, OF HARTFORD, CONNECTICUT.

FURNACE FOR BURNING GARBAGE.

SPECIFICATION forming part of Letters Patent No. 468,851, dated February 16, 1892.

Application filed May 20, 1891. Serial No. 393,439. (No model.)

To all whom it may concern:

Be it known that I, GEORGE H. WARNER, of Hartford, Connecticut, have invented a new and useful Furnace for Burning Garbage and other Wet and Offensive Substances, of which the following description and claims constitute the specification, and which is illustrated by the accompanying two sheets of drawings.

This furnace is useful in so volatilizing and burning garbage, night-soil, and other wet and offensive substances as to cause those substances themselves to furnish fuel for their own evaporation and combustion and as to make that combustion so complete that no offensive odors or injurious gases can escape from the furnace.

Figure 1 is a central perpendicular longitudinal section of the furnace. Fig. 2 is a vertical section on the dot-and-dash line *a a* of Fig. 1, and Fig. 3 is a vertical section on the vertical parts of the dot-and-dash line *b b* of Fig. 1.

The brick-work which composes the body of the furnace is indicated by the numeral 1 and is exteriorly stayed and strengthened with iron bars and bolts in ways and places already well known in the art of building such furnaces.

The oven 2 is constructed of fire-brick and constitutes the upper part of the interior of the furnace. Its floor may also be made of fire-brick, with or without openings there-through; but the drawings represent that part of the oven as consisting of pieces of railroad-rails extending crosswise of the furnace and parallel to each other and bottom side up, and separated far enough from each other to constitute the grate, which is indicated by the numeral 3. The fire-place 4 is located at the front end of the oven, and the fire-place 5 is located at the rear end of the oven, and the grates of these two fire-places are on a lower level than that of the grate 3 and are separated therefrom by the open bridge-walls 6 and 7, respectively. The ash-pits 8 and 9 are located under the fire-places 4 and 5, respectively. The door 11 gives access to the fire-place 5, and a similar door gives access to the fire-place 4, while the door 13 gives access to the ash-pit 9, and a similar door gives access to the ash-pit 8. The downward flue 14 is connected at its upper end

with the fire-place 4 and is connected below the ash-pit 8 with the horizontal flue 16. That flue extends lengthwise of the furnace under the ash-pits 8 and 9 from the downward flue 14 to the chimney 17. The chamber 15 extends lengthwise of the furnace under the grate 3 from the bridge-wall 6 to the bridge-wall 7. The short horizontal flue 19 extends from the fire-place 5 into the chimney 17 and is provided with the slide-valve 20. The slide-valves 21 and 22 occupy the openings through the bridge-walls 6 and 7, respectively, while the slide-valve 23 is placed in the end of the horizontal flue 16 adjacent to the chimney 17. The door 24 and several other doors on the same horizontal plane open into the front side of the oven 2, while the door 25 and several other doors on the same horizontal plane open into the front side of the chamber 15, and the door 26 and several other doors on the same horizontal plane open into the front side of the horizontal flue 16. The doors 27 and 28 open into the downward flue 14 opposite to the two connections of that flue with the interior of the furnace, as shown in Fig. 1, while the door 29 opens into the chimney 17 opposite to the end of the horizontal flue 16. The covers 32 and 33 inclose vertical openings through the top of the furnace into the oven 2.

The mode of operation is as follows: The covers 32 and 33 are lifted, and garbage, night-soil, dead animals, and other wet and offensive substances and bodies are dumped through the vertical openings under those covers upon the grate 3, so as to deeply cover that grate with a pile of matter to be destroyed. The valve 20 is closed, and the valves 21, 22, and 23 are opened and fires are made on the fire-places 4 and 5. Thereupon flames from the fire-place 5 pass over the wet and offensive substances in the oven 2 and dry and ignite those substances, while other flames pass from the fire-place 5 through the opening in the bridge-wall 7 under the grate 3. The steam and gases and other products which result from the flames above and the flames below the grate 3 are carried with those flames into and through the flames on the fire-place 4, and in the flames of the furnace thus mingled all the combustible gases and matter which were not entirely consumed in the oven

are burned up. The mingled flames from the fire-places pass from above the fire-place 4 into the downward flue 14, and thence into the horizontal flue 16, and then through that flue under the ash-pits 8 and 9 into the chimney 17. In the course of this passage much of the heat from the stream of flames passes upward through the floor of the chamber 15, where it aids to evaporate whatever water that floor may have received by dripping through the grate from the garbage or other matter above it, and if there is no water to be thus evaporated the heat passing upward through the floor of the chamber 15 will pass still farther upward and through the grate 3. While the stream of flame is passing through the chamber 15 it evaporates whatever water is received from above by the concave floor of that chamber. The result of the mode of operation set forth in this paragraph is to thoroughly burn up all the garbage, night-soil, dead animals, and other wet and offensive substances and bodies upon the grate 3 without emitting from the furnace any offensive odors or injurious gases and leaving on the grate 3 and on the floor of the chamber 15 nothing but non-combustible ashes.

When the fires are first lighted in the furnace, and also under some other conditions, it is desirable to give them a more direct draft than that through the downward flue 14 and the horizontal flue 16 into the chimney 17. To this end the valve 20 may be opened and the valve 23 may be closed. Thereupon the flames from the fire-place 4 pass over the wet and offensive substances in the oven 2 and dry and ignite those substances, while other flames pass from the fire-place 4 through the opening in the bridge-wall 6 under the grate 3. The steam and gases and other products which result from the flames above and the flames below the grate 3 are carried with those flames into and through the flames on the fire-place 5, and in the flames of the furnace thus mingled all the combustible gases and matter which were not entirely consumed in the oven are burned up. The mingled flames from the fire-place pass from above the fire-place 4, through the short horizontal flue 19, into the chimney 17. When the flames take the path described in this paragraph, the operation is the same as that when they take the path described in the last paragraph, and illustrated in Fig. 1 of the drawings, except that they do not now, as then, heat the floor of the chamber 15 from below.

Under some conditions it is desirable to conduct all the flames from the fire-place 5 or the fire-place 4, as the case may be, over the grate 3, instead of dividing those flames and sending part over and part under that grate. To accomplish this result the valves 21 and 22 are closed, and, indeed, this result can be accomplished by closing either of those valves when the grate 3 is entirely covered with garbage or other matter, so as to give no passage to the flames therethrough. For

this reason either of those valves may be omitted from the furnace without materially affecting its merit or mode of operation. Indeed, both of those valves may be omitted, and the opening through the bridge-walls 6 and 7 be left always unclosed, so that the flames will divide and pass both above and below the grate 3 at all times when the furnace is in operation. The short horizontal flue 19 and the valve 20 may also be omitted from the furnace and the flames uniformly directed through the downward flue 14 and the horizontal flue 16 in the path shown in Fig. 1 of the drawings. In this case the valve 23 may also be omitted and the furnace constructed without any valve whatever, unless a valve or damper is placed in the chimney or elsewhere to regulate the strength of the draft. Moreover, the downward flue 14 and the horizontal flue 16 may be omitted from the furnace and the direct horizontal flue 19 retained to give uniform egress therethrough from the oven 2 to the chimney 17; but the retention of the downward flue 14 and the horizontal flue 16 is much to be desired, because they furnish a much longer path than does the flue 19 for the passage of the flames and so retain in the furnace a large amount of heat, which, when the flames pass through the flue 19, is carried up the chimney into the exterior air.

The principal distinguishing characteristic of this invention consists in placing the grate 3 on a horizontal plane much higher than that occupied by the fire-places 4 and 5 and in making openings from those fire-places to the space under that grate, so that the flames which pass from one fire-place to the other pass partly below and partly above the grate 3 and the garbage thereon, and experience in building various forms of garbage-furnaces, including several like that shown in the drawings, proves that characteristic to be one of marked utility. This merit resides in the fact that the garbage and other material to be burned is entirely surrounded by intense flames coming directly from the adjacent fire-place, and is thus more promptly and rapidly burned up than would otherwise be the case.

Another valuable feature of my invention resides in the downward flue 14, which draws the flames from the fire-place 5 entirely across the fire-place 4, and through the flames thereon and around and under the fire-place 4, and therefore I claim that feature in combination with the principal distinguishing characteristic of this furnace, in addition to claiming that distinguishing characteristic alone.

I claim as my invention—

1. The combination of the oven 2 with the fire-places 4 and 5 at opposite ends thereof, and with the grate 3 or other floor of the oven between them and above them, and with openings extending from above those fire-places into the chamber 15 below that grate, all substantially as described.

2. The combination of the oven 2 with the fire-places 4 and 5 at opposite ends thereof, and with the grate 3 or other floor of the oven between them and above them, and with openings extending from above those fire-places into the chamber 15 below that grate, and with the downward flue 14 and the horizontal flue 16, giving an outlet to the flames from the fire-places and the oven and the chamber around and under the fire-place 4, and thence under the floor of the chamber, and thence under the fire-place 5 into the chimney 17, and with the flue 19 adapted to give another outlet to the flames from the fire-places and the oven and the chamber, and with one or more valves in each of those outlets adapted to open and close them, respectively, all substantially as described.

3. The combination of the oven 2 with the fire-places 4 and 5 at opposite ends thereof, and with the grate 3 or other floor of the oven between them and above them, and with openings extending from above those fire-places

into the chamber 15 below that grate, and with the downward flue 14 and the horizontal flue 16, giving an outlet to the flames from the fire-places and the oven and the chamber around and under the fire-place 4, and thence under the floor of the chamber, and thence under the fire-place 5 into the chimney 17, and with the flue 19 adapted to give another outlet to the flames from the fire-places and the oven and the chamber, and with one or more valves in each of those outlets adapted to open and close them, respectively, all substantially as described.

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