

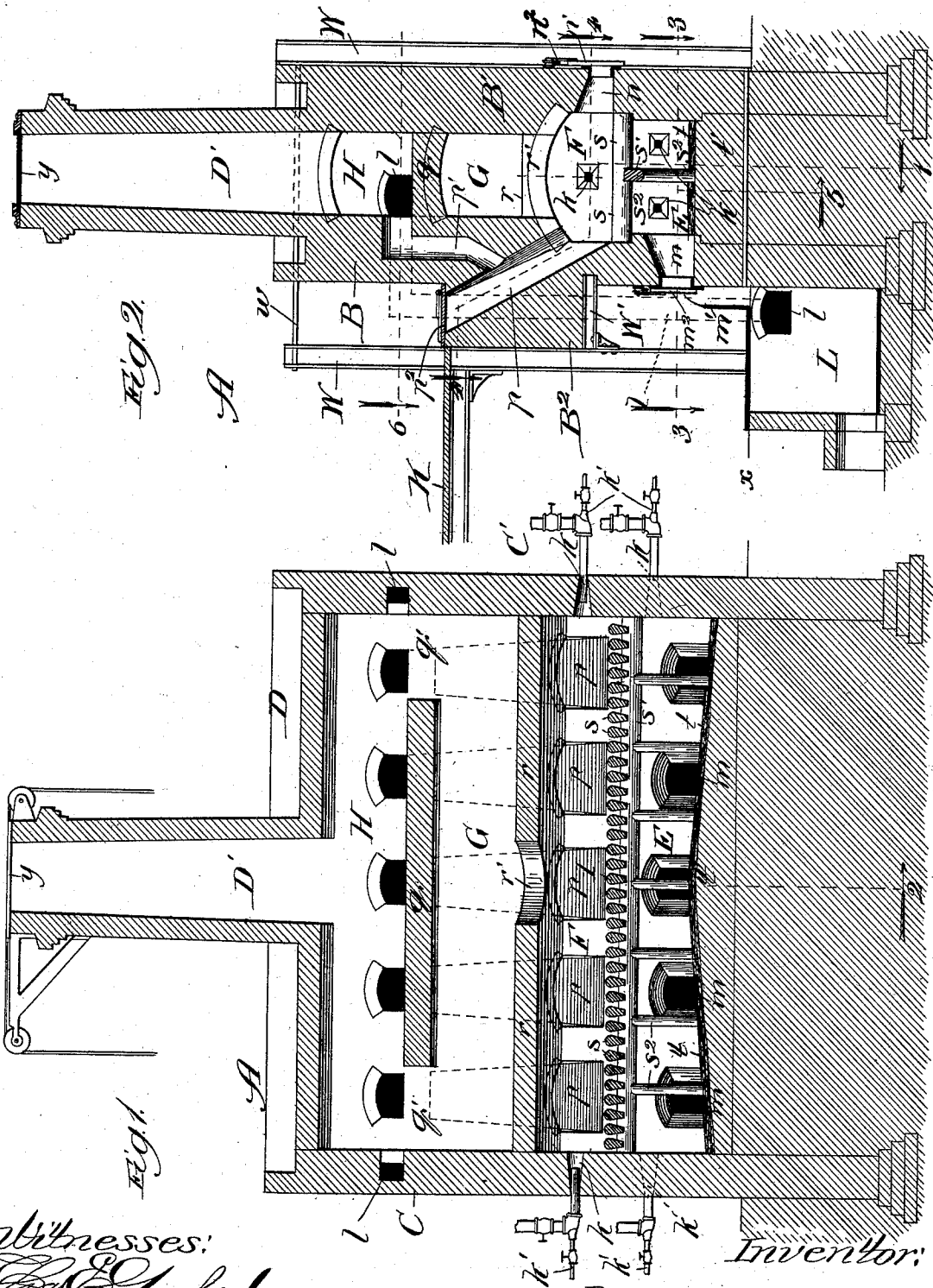
(No Model.)

3 Sheets—Sheet 1.

B. C. HEAVEY.
GARBAGE FURNACE.

No. 505,656.

Patented Sept. 26, 1893.



Witnesses:
Edw. C. Gaylord
Clifford A. White

Inventor:
Bernard C. Heavey,
By *Dyrenforth & Dyrenforth*
Attys.

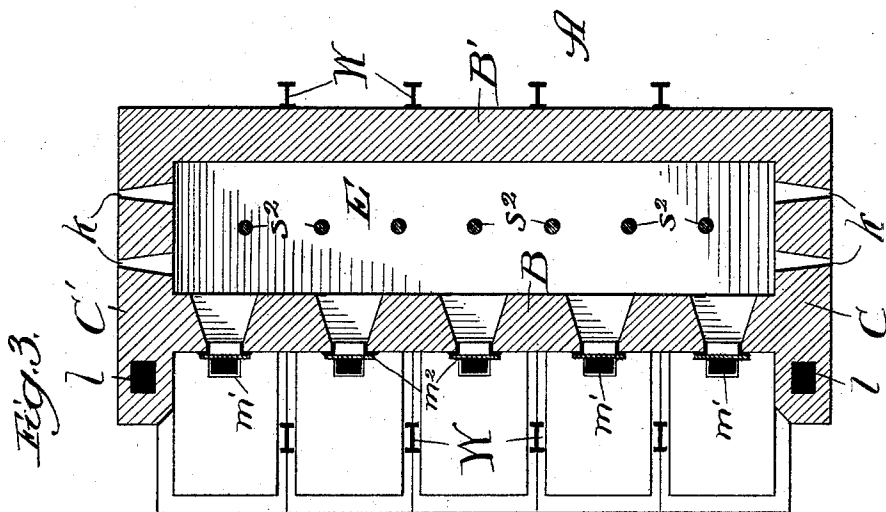
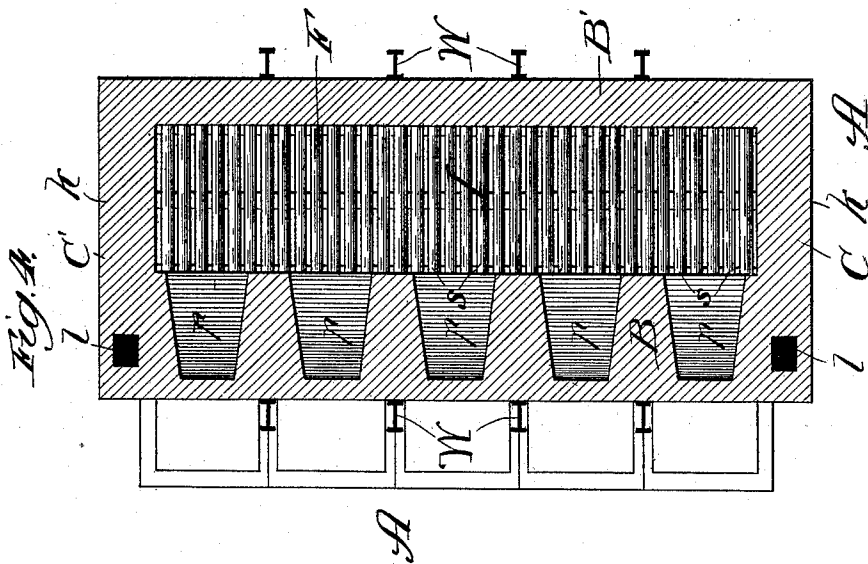
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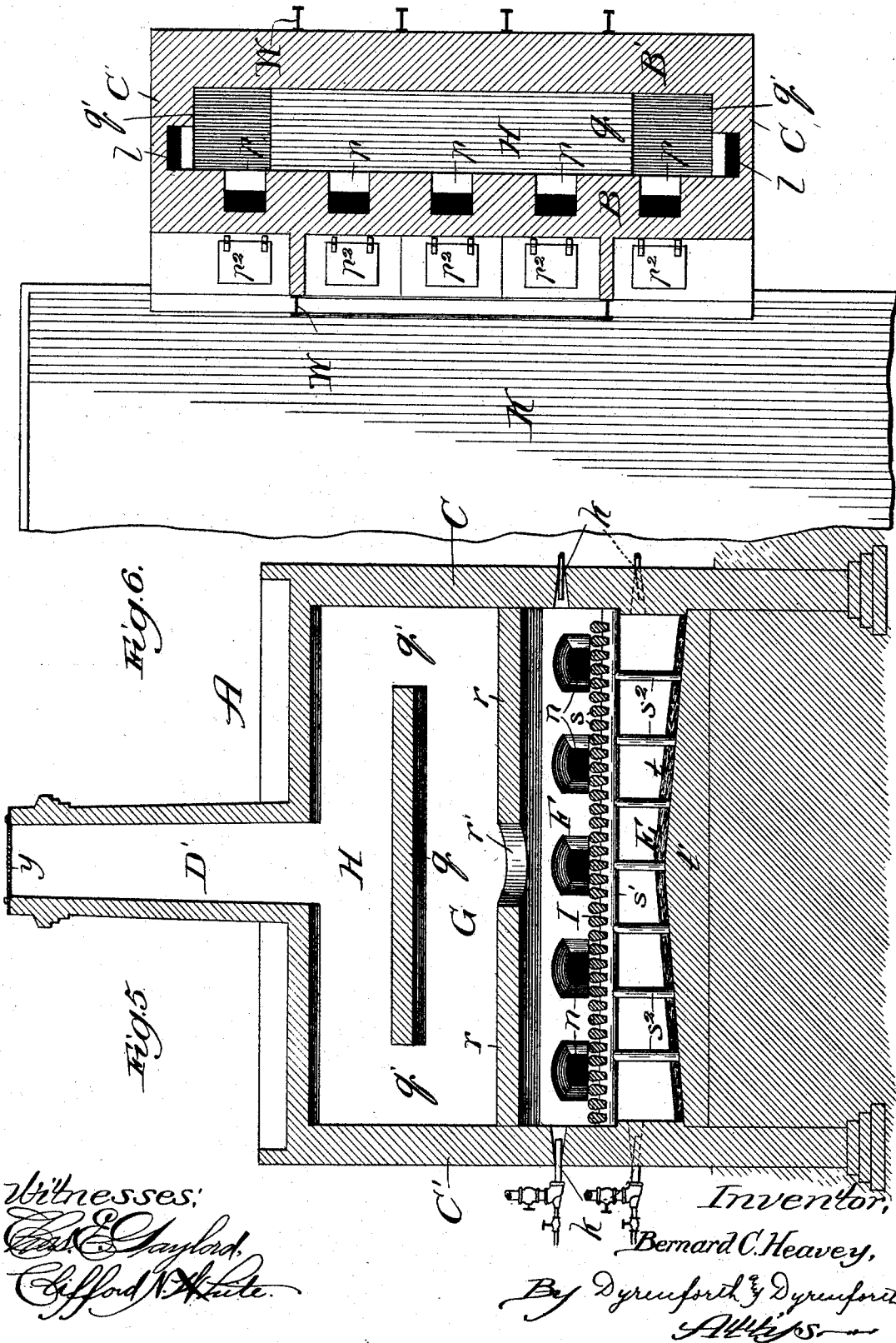
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UNITED STATES PATENT OFFICE.

BERNARD C. HEAVEY, OF CHICAGO, ILLINOIS.

GARBAGE-FURNACE.

SPECIFICATION forming part of Letters Patent No. 505,656, dated September 26, 1893.

Application filed September 13, 1892. Serial No. 445,759. (No model.)

To all whom it may concern:

Be it known that I, BERNARD C. HEAVEY, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Garbage-Furnaces, of which the following is a specification.

My invention relates to an improvement in furnaces for use in destroying garbage or other refuse; and my object is, first, to provide a furnace which will be thoroughly effective in reducing the garbage to an odorless ash, and in decomposing the gases arising therefrom, so that the escaping products of combustion will be completely deodorized, and second, to provide a furnace which will destroy the garbage in large quantities and with great rapidity, while employing comparatively little fuel for the purpose.

In the drawings—Figure 1, is a central longitudinal vertical section of my improved furnace, the section being taken on line 1 of Fig. 2, and viewed in the direction of the arrow; Fig. 2, a vertical cross-section of the same on line 2 of Fig. 1, and viewed in the direction of the arrow; Figs. 3, 4, 5 and 6, sectional views taken on lines 3, 4, 5 and 6, respectively, of Fig. 2 and viewed as indicated by the arrows.

The furnace A is built upon a foundation sunk into the ground to the relative depth indicated by the surface line α .

B B' are the opposite side-walls of the furnace, C C' the end-walls, and D the roof, all constructed of fire-brick.

The furnace is strengthened by vertical I-beams, W, placed at intervals against the side walls and tied together across the furnace at their upper ends by tie-rods w .

The furnace is divided internally into two combustion chambers E, F and two retort or flue chambers G, H, all located one above the other. The upper chambers, G, H, are narrower than the lower chambers, as shown. The floor t of the chamber E is highest at the center and inclines to the opposite ends. It comprises a layer of fire-brick imposed upon a bed or foundation layer of fire-clay or concrete t' . The chambers E and F are divided from each other by a horizontal fire-grate I. The grate I is composed of bars or sections s , of the shape in cross-section shown in Figs.

1 and 5, each formed of fire-clay. Each bar extends half way across between the side walls of the furnace, and the bars rest at their outer ends upon ledges formed in the said side-walls, and at their inner ends upon a fire-clay beam s' extending longitudinally and centrally of the furnace. The beam is formed of abutting sections resting at their ends upon fire-clay pillars s^2 which stand upon the foundation layer t' . Each grate-bar s , extending from one side of the beam s' , abuts against a companion bar extending from the opposite side of the beam, each pair forming a substantially continuous bar from one wall to the other of the furnace. Any one of the grate-bars may be removed when desired and replaced with another, without disturbing any of the other bars.

Between the chambers F G, is a fire-brick partition r , concave on its under side to afford an arched ceiling for the chamber F, and flat at its upper side where it forms the floor of the chamber G. Midway of its length the partition r has an opening through it r' . The chambers G H are separated by a fire-brick partition q , arched on its under side and flat on its upper side, and extending short of the opposite ends of the chambers to afford the openings q' . At its center the chamber H opens into a chimney D', which rises from the roof of the furnace.

At the side-walls B, of the furnace, and at about the height of the partition q , is a platform K, access to which is had by means of an incline, not shown. The wall B is thickened longitudinally, the thickened portion, B², resting on I-beams W', as shown in Fig. 2. Extending down from the upper surface of the thickened portion B², which is in the plane of the top of the platform K, are inclined chutes p , opening at their lower ends into the chamber F. Extending from the chutes p to the chamber H are flues p' , and covering the tops of the chutes are doors, p^2 . In the wall B' of the furnace, at the chamber F, are stoke-openings n , closed by doors n' formed of concrete plates suspended from pulleys which run upon a horizontal track n^2 on the outer side of the wall B'. Extending through the wall B at the chamber E, are stoke-openings m , provided with sliding

doors m^2 . Sunk in the ground at the side of the wall B is an ash-pit L. In front of the openings m are chutes m' , which extend from a plane somewhat above the lower sides of the openings to the ash-pit; and in the end walls C C' are flues l extending from the ash-pit to the chamber H.

Extending through the end walls of the furnace at the chambers E, F, are ports or openings k for hydro-carbon burners k' . Two ports k and burners k' are provided at each end of the chamber E, near the top and at opposite sides of the line of pillars s^2 ; and in the chamber F are an opening k and burner k' at each end. The openings k flare inward as shown. The burners I prefer to employ are those in which a stream of hydro-carbon oil is injected by means of steam. The two burners at the chamber F are in the horizontal plane and the ignited streams therefrom pass each other at the center of the chamber. The burners at the chamber E are caused to dip slightly and point toward the longitudinal center of the floor t where the latter is highest, as described.

In operation the inflowing stream of oil is ignited at the burners, and the intense heat of the flames operates in a comparatively short time to raise the inner surface of the walls, floor t , grate, and partitions r q to a great heat. The garbage to be burned is hauled in wagons upon the platform K, and dumped directly into the chutes p , the doors p^2 being opened for the purpose. From the chutes p the garbage falls upon the grate I, where it is subjected to the heat from the surrounding walls, and to the streams of flame from the two upper burners. The garbage is spread over the grate by means of pokers or stirrers inserted through the stoke-openings n , and as it is stirred and crumbles under the heat it drops between the grate bars to the chamber E, where it is subjected to the flames from the lower burners k' . The gases which arise from the garbage are subjected to the flames from the burners, and are rapidly decomposed. The gaseous products of combustion from the chambers E and F rise through the opening r' to the chamber G and pass thence through the openings q' to the chamber H, and out at the chimney. Any gases and vapor not destroyed in the chambers E, F, will when subjected to the intense heat of the chambers or flues G, H, be completely decomposed, so that the products of combustion escaping at the chimney will have no appreciable odor. All the air necessary for supplying combustion enters at the ports k , and the draft through the furnace may be regulated by a suitable damper y at the top of the chimney. As ashes accumulate in the chamber E, they may be withdrawn, by means of suitable scrapers, inserted through the stoke-openings m , into the flues m' and caused to fall into the ash-pit L. Any gases arising from smoldering ashes in the ash-pit will rise through the end flues l to the chamber H and be de-

composed by the heat of that chamber before escaping through the chimney to the atmosphere.

The furnace illustrated in the drawings covers an area of about thirty feet by thirteen feet, and is about twenty feet high, from the ground line to the roof. The combustion chambers are about twenty-five feet long, the chamber E about six feet wide, the chamber F about five and one-half feet wide, and the chambers or flues G H about four feet wide; and the furnace has a cremating capacity of about five tons of ordinary garbage per hour.

The burners employed consume comparatively little oil, but the heat generated thereby, and by the garbage during combustion, maintains all the chambers at a temperature which insures thorough decomposition of the most refractory garbage and deodorization of the gases arising therefrom.

Garbage wagons may be drawn by teams upon the platform K, and the wagon-contents dumped immediately into the chutes p .

Hot products of combustion are prevented from escaping at the chutes p , when the doors p^2 are opened, by the draft through the flues p' .

The floor t of the chamber E is caused to incline downward from the center to the ends, as shown, for the reason that the heat of the streams of flame is so intense at the burners, that the most refractory fire-bricks are apt to be deleteriously affected thereby. The floor being lower at the ends, the danger of injury to the floor near the burners, where the heat is most intense as stated, is diminished.

While the furnace shown is of the preferred construction, it may be modified without departing from the spirit of my invention as defined by the claims.

What I claim as new, and desire to secure by Letters Patent, is—

1. In a furnace for burning garbage and the like, the combination of the combustion chambers E, F, extending one above the other, a grate between said chambers, feed-chute extending to the chamber F, door for said chute, burners and stoke openings at both said chambers, a retort G above the chamber F and communicating therewith through a central opening r' , outlet flues extending from opposite ends of the said retort and means for controlling the draft through the furnace, substantially as described.

2. In a furnace for burning garbage and the like, combustion-chambers E, F, and retorts G, H, extending one above the other, a grate between the chambers E, F, a central opening between the chamber F and retort G, end openings between the retort G and retort H, a central outlet for the retort H, and burners and stoke-openings at both the chambers E, F, substantially as described.

3. In a furnace for burning garbage, and the like, the combination with the combustion chamber F and retort-chamber above the

same, of a garbage chute at one side of the furnace extending to the chamber F, and a flue extending from between the ends of the chute to the retort chamber, substantially as
5 described.

4. In a furnace for burning garbage, and the like, the combination of an ash-pit, combustion chambers E, F, grate between said chambers, burners and ports at opposite ends
10 of said chambers, retort and outlet therefor

communicating with said chambers, stoke-openings at both said chambers, chute extending to the chamber F, door for said chute and elevated platform K, all constructed to operate substantially as and for the purpose set
15 forth.

BERNARD C. HEAVEY.

In presence of—

J. W. DYRENFORTH,
W. N. WILLIAMS.