(No Model.)

2 Sheets—Sheet 1.

W. HORSFALL.

FURNACE.

No. 435,837. Patented Sept. 2, 1890.

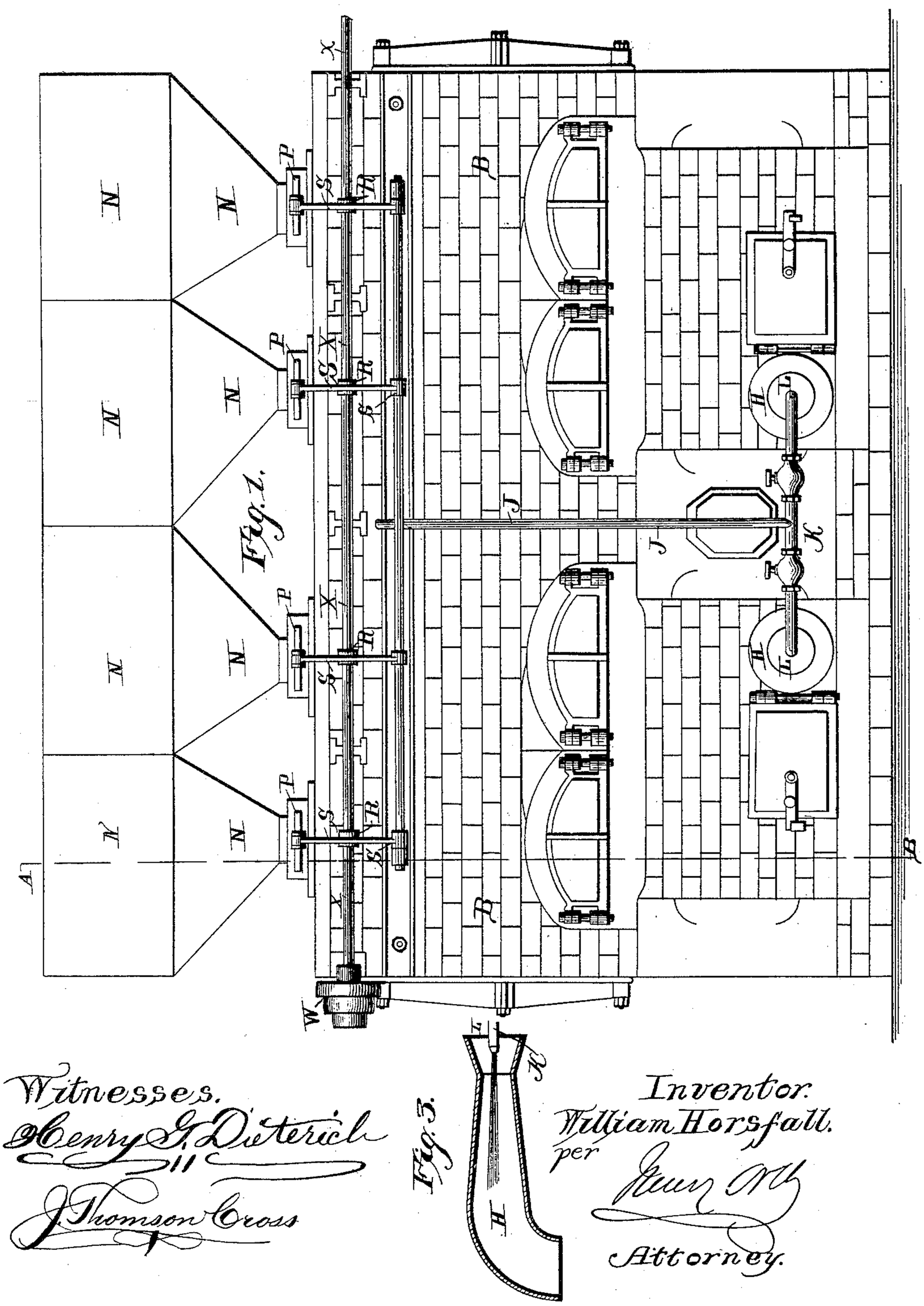

Fig. 1.

Fig. 3.

Witnesses.
Henry G. Dieterich
J. Thomson Cross

Inventor.
William Horsfall.
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Munn & Co
Attorney.

(No Model.) 2 Sheets—Sheet 2.

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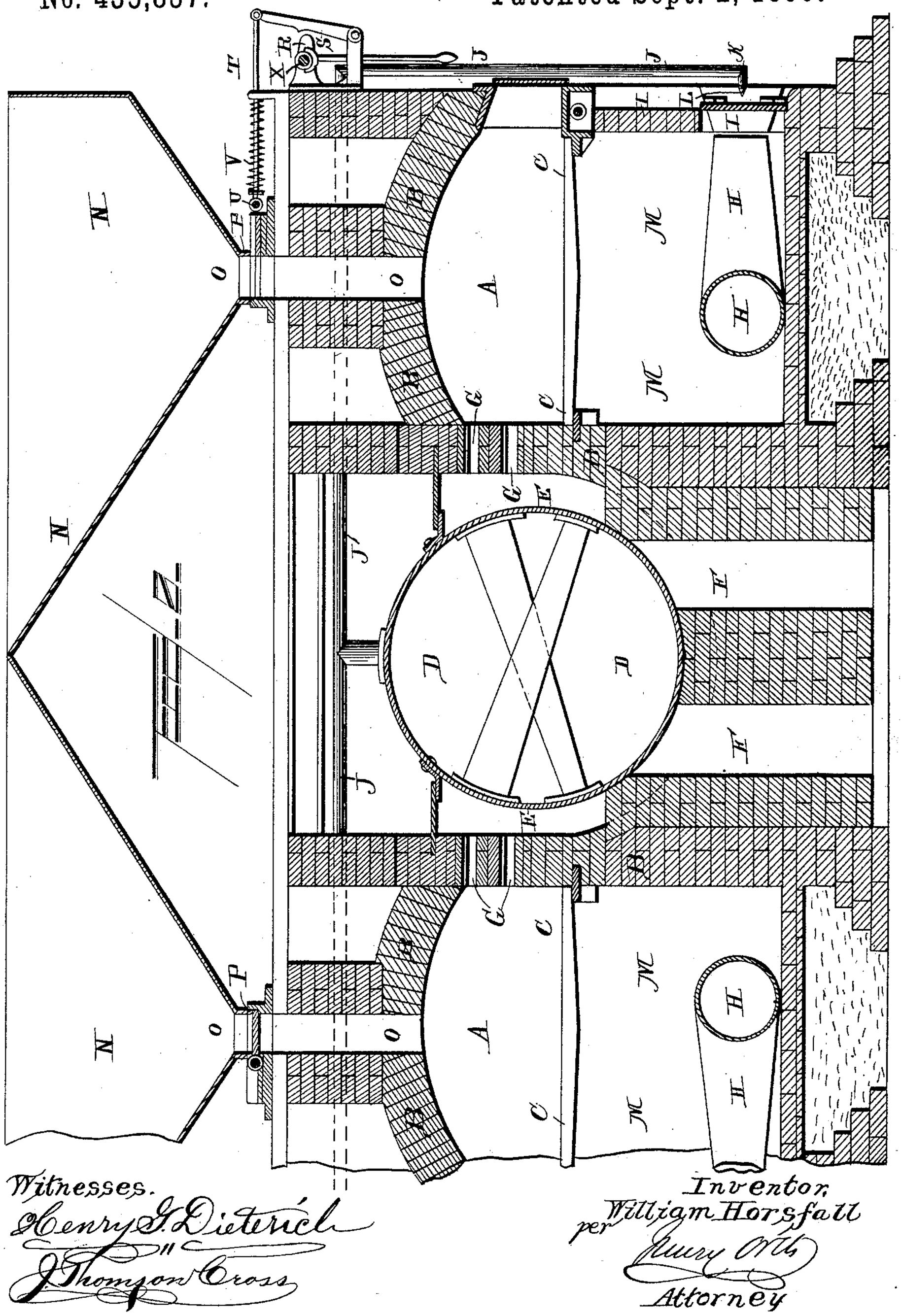

Witnesses.
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J. Thomson Cross

Inventor.
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UNITED STATES PATENT OFFICE.

WILLIAM HORSFALL, OF CAMP ROAD MILLS, COUNTY OF YORK, ENGLAND, ASSIGNOR TO WILLIAM GARLICK, JR., AND WILLIAM BROWNE COLVILLE, BOTH OF CALCUTTA, INDIA.

FURNACE.

SPECIFICATION forming part of Letters Patent No. 435,837, dated September 2, 1890.

Application filed October 16, 1889. Serial No. 327,175. (No model.) Patented in England June 24, 1887, No. 8,999.

To all whom it may concern:

Be it known that I, WILLIAM HORSFALL, engineer, a subject of the Queen of Great Britain, residing at Camp Road Mills, Leeds, in the county of York, in England, have invented a certain new and useful Improved Construction of Furnace for Burning Town or other Refuse, (for which I have obtained Letters Patent in Great Britain, dated June 24, 1887, No. 8,999;) and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters of reference marked thereon, which form a part of this specification.

The object of my invention is to construct furnaces for burning town or other refuse, and to supply means for assisting in the burning of such refuse and products of combustion thereof, so that the operation may be performed without any danger to the health or inconvenience to the district in which the furnaces are placed.

In the accompanying drawings, Figure 1 is a front elevation; Fig. 2, a transverse section through A B, Fig. 1, showing my improvements; and Fig. 3 is a longitudinal horizontal section of one of the conical steam-injector tubes H.

To accomplish the above objects I employ the arched or dome-shaped reverberating furnaces A A. These are formed of brick-work B B and provided with grate-bars C C in the usual way. Longitudinally and between these furnaces I provide a boiler D, being provided with the side flues E E and bottom flues F F. I also provide the openings or passages G G, through which the products of combustion pass from the furnaces A A into the side flues E E of the boiler D.

Below the grate-bars C C are provided the conical tubes H H or other passages, which pass through the outer walls I I and are open to the outer air by preference in front of the furnace. The steam-jets J J are coupled to the boiler D at the top, these terminating at their other ends K with taper mouths or nozzles L L, through which the steam is injected from the boiler D into the conical tubes H H, and by so doing sucks or forces air from the outside through the conical tubes into the chambers M M below the grate bars C C, thence through the grate-bars and into the fires, causing thereby a very rapid combustion of the material forming such fire without natural draft. The products of combustion have to pass from the furnaces A A through the passages or openings G G. The brick-work of the said passages or openings becoming intensely hot will ignite or destroy the noxious gases or products of combustion as they pass through. These heated products travel along the flues E E and F F of the boiler, heating the water therein in so doing, thence to the chimney, passing therefrom in a perfectly harmless condition, so that no inconvenience arises in the neighborhood where the furnaces are placed. The boiler is by preference placed lengthwise of the furnaces, so that any required number of steam-jets may be more conveniently applied.

The materials are fed to the furnaces A A through hoppers N N and openings O O, such materials being tipped into them from an elevated stage or platform or thrown in by any convenient means, and in order to regulate the feed I provide the sliding dampers or shutters P P. These sliding shutters are withdrawn or opened by revolving cams R, from which the motion is conveyed through levers S and rods T, to which the sliding shutters P P are coupled at U. As the cams R revolve, they open the sliding shutters P P by pressing outward the levers S, and as they continue to revolve they are released from the levers S and allow the shutters to be suddenly or quickly closed by the action of the helical springs V, thus stopping the supply to the furnaces A A.

Motion is imparted to the cams R through cone W and shaft X from any suitable motor, and it is intended by this means to supply the material to the furnaces A A in the same ratio as the consumption or combustion of the material takes place in the furnaces.

I provide a suitable clutch or other convenient arrangement for arresting the movement

of the cams R, so that the sliding shutters or dampers P P can be closed and caused to remain so for the purpose of removing clinkers and other like obstructions in the furnaces A A.

By the above arrangements the chimney used for conveying away the products of combustion may be of a much less height than those now in use in consequence of the harmless nature of the products of combustion transmitted therefrom.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is—

1. The combination, with a plurality of juxtaposited furnaces, a feed-hopper for each of said furnaces, and a slide-valve for each of said hoppers, arranged at the lower end thereof, of a connecting-rod, radial arms secured thereto and connected with the stems of the valves, a cam-shaft, and cams secured thereto adapted to operate on the radial arms to simultaneously move all the valves in one direction, substantially as and for the purpose specified.

2. The combination, with a plurality of juxtaposited furnaces, a feed-hopper for each of said furnaces, and a slide-valve for each of said hoppers, arranged at the lower end thereof, of a connecting-rod, radial arms secured thereto and connected with the stems of the valves, a cam-shaft, and cams secured thereto adapted to operate on the radial arms to simultaneously move all the valves in one direction, and springs V, adapted to automatically move the valves in a reverse direction, substantially as and for the purposes specified.

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

WILLIAM HORSFALL.

Witnesses:

ALFRED ATKINSON,
Engineer, 75 Church St., Hunslet, Leeds.

GEORGE MOUNTIER,
Accountant, Devonshire Road, Merton, Surrey.