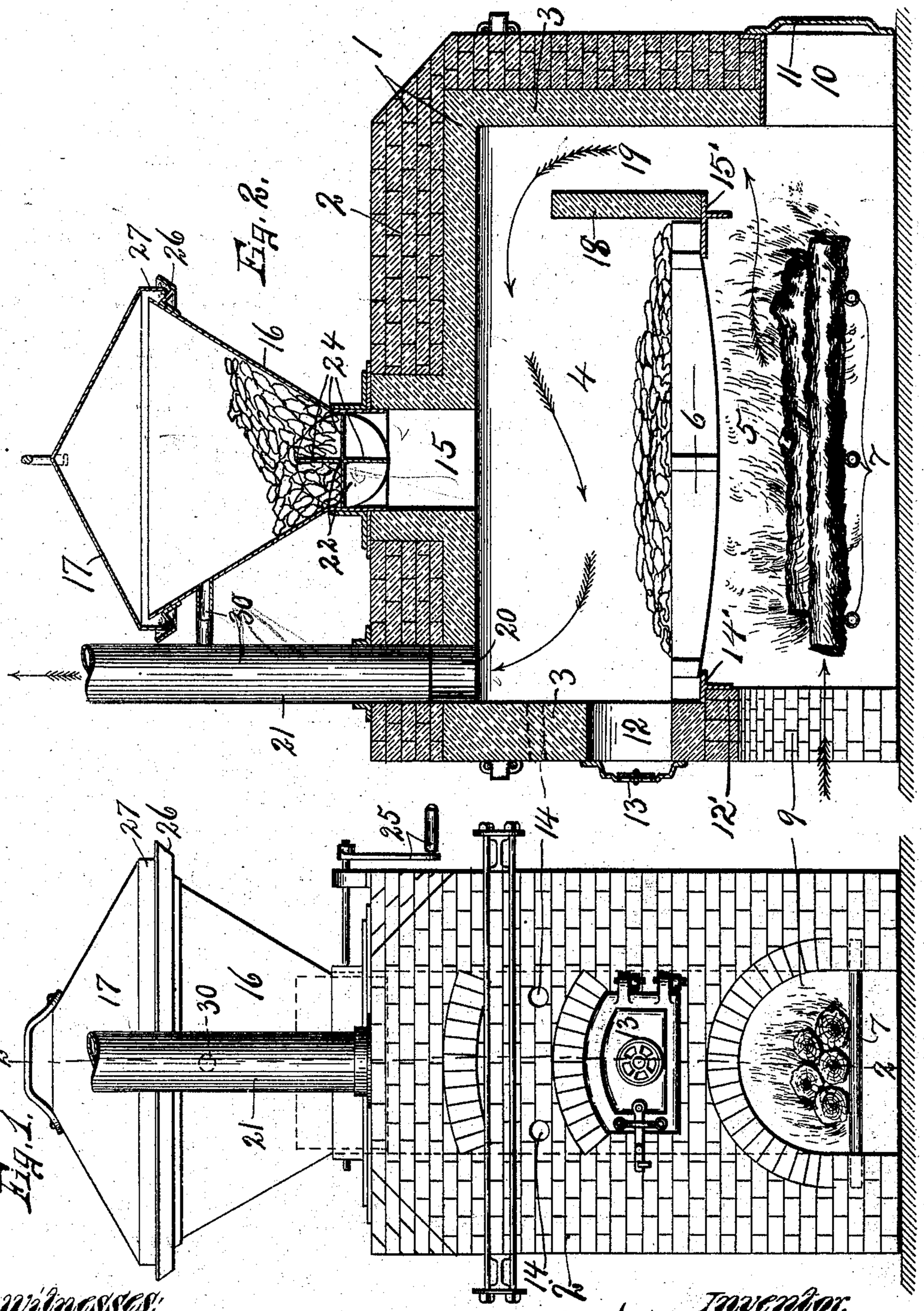
No. 806,127. PATENTED DEC. 5, 1905.

F. W. FIELD.

REDUCTION FURNACE.

APPLICATION FILED JULY 8, 1903.

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# UNITED STATES PATENT OFFICE.

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## REDUCTION-FURNACE.

No. 806,127. Specification of Letters Patent. Patented Dec. 5, 1905.

Application filed July 8, 1903. Serial No. 164,673.

*To all whom it may concern:*

Be it known that I, FREDERICK WILLIAM FIELD, a citizen of the United States, residing at Syracuse, in the county of Onondaga, in the State of New York, have invented new and useful Improvements in Reduction-Furnaces, of which the following, taken in connection with the accompanying drawings, is a full, clear, and exact description.

This invention relates to improvements in reduction-furnaces, and is particularly applicable for use in the reduction or cremation of garbage in which the fumes and gases are confined or consumed within the combustion-chamber and finally pass off through a suitable flue or smoke-conduit provided therefor.

One of the objects of this construction of furnace is to entirely envelop the garbage in the heated products of combustion without coming in direct contact with the fuel.

Another object is to provide means whereby the garbage may be fed or deposited in the furnace while in operation without liability of the escape of the fumes or gases.

Other objects will be made manifest in the subsequent description.

In the drawings, Figure 1 is a front elevation of my improved furnace. Fig. 2 is a sectional view taken on line 2 2, Fig. 1.

Similar reference characters indicate corresponding parts in both the views.

This furnace is adapted to be built or installed in any size or capacity; but in carrying out the objects previously stated I have given attention and study to the simplification and reduced cost of installation of the complete furnace, which is specially adapted for the incineration of general refuse as collected in cities without any attempt to recover any by-products. This is successfully accomplished by constructing a rectangular shell 1, which consists of an outer wall 2, of common brick, and an inner lining or wall 3, of fire-brick, to inclose an elongated rectangular combustion-chamber 4 and a subchamber 5, in which the fuel is placed. These chambers 4 and 5 are disposed one directly over the other and are separated by an intermediate grate 6, upon which the garbage or refuse is deposited in a manner hereinafter described preparatory to being incinerated.

The furnace is specially constructed to burn logs or wood, and I therefore provide the lower chamber 5 with a coarse subgrate 7, which is slightly above the bottom of the furnace and upon which the logs are placed and ignited, so that the burning fuel is directly beneath the grate 6. The fuel is inserted into the chamber 5 and onto the grates 7 through a suitable inlet-opening 9 in the front end wall of the furnace and beneath the grate 6, and the accumulating ashes are removed through an opening 10 in the rear end wall, also beneath the grate 6, the front inlet-opening 9 being normally open for draft purposes, but may be provided with a door, if desired, while the rear end opening 10 is usually provided with a closed door 11, to be open only when cleaning out the ashes.

The front wall of the upper chamber 4 is provided with an opening 12, through which some of the material to be incinerated may be inserted, if desired, and is normally closed by a suitable door 13, while just above the opening 12 in the front wall are sight-openings 14, through which the condition of the material may be observed at any time without opening the door 13. The upper wall of the furnace is formed with a central opening 15, in which is mounted one end of a hopper 16, having a removable cap or cover 17. This hopper is funnel shape, but is elongated widthwise of the furnace, so that its lower or discharge end and also the opening 15 are of substantially the same length as the distance between the inner side walls of the furnace or combustion-chamber, so that the material precipitated through the opening 15 is deposited at once entirely across the grate 6 and may then be worked lengthwise of the grate by a suitable instrument inserted through the opening 12. At the rear end of the combustion-chamber 4, but in front of the rear wall of the furnace, is a transverse wall 18, which is joined at its opposite ends to the side walls of the furnace to form a fire-passage 19, connecting the rear ends of the chambers 4 and 5. This wall 18 preferably extends to a distance slightly below the top or upper wall of the furnace, thereby enabling the top or upper wall of the furnace to act as a deflector, which will to a slight degree have a tendency to deflect the heat downwardly upon the garbage on the grate 6. The lower and upper edges of the wall 18 are separated from the bottom and top of the furnace to permit the passage of the products from the chamber 5 upwardly at the rear end of the grate 6 and then over the top of the wall and forwardly over the material on said grate 6, so as to entirely envelop said material in the products of combustion, after which the said products of combustion pass upwardly

and outwardly through an outlet-opening 20 in the front end of the top wall of the furnace to a smoke-pipe 21. The front wall on its inner side adjacent openings 12 is provided with a transverse ledge 12′, on which seats one side of the head of a T-iron 14′, the web of which abuts the inner side of the front wall. Upon the head of this T-iron and the head of T-iron 15′ seats the grate 6. T-iron 15′ also extends transverse of the front wall and is secured to the side walls, the transverse wall 18 also seating on T-iron 15′ to the rear of grate 6.

It is now seen that the products of combustion in passing over the surface of the material from rear to front of the combustion-chamber 4 pass across the inner end of the opening 15, and therefore tends to draw the fumes from said opening into the combustion-chamber, where they are deodorized by heat, and then pass on through the smoke-flue 21.

In the base or small end of the hopper 16 is a revoluble valve or feeder 22, which is provided with radial wings 24 and is rotated by a suitable hand-crank 25, said wings being arranged at right angles to each other and form a series of pockets, so that when rotated a quarter-turn the material in one of the pockets will be discharged and the diametrically opposite wings form a closure for the discharge end of the hopper to prevent the feed of the material, except when the valve is rotated, and also prevent the heat from passing into the hopper.

The upper enlarged end of the hopper is provided with an annular trough 26, into which sand or similar material is placed, and receives the flange 27 of the cover 17 to form a seal to prevent the escape of gases or fumes.

The cover 17 may be removed at any time and additional garbage introduced therein without liability of the heat passing into the hopper by reason of the closure of valve 22, and when the cover is in place and it is desired to feed more garbage into the grate 6 it is simply necessary to rotate the valve 22 by means of the handpiece.

Leading from the hopper from a point between the valve and cover is a vent-pipe 30, which discharges into the smoke-conduit to permit the free escape of any gas which may accumulate in the hopper as a result of the heat, and thereby to prevent any possible explosion of gases in said hopper.

It will be observed that the fuel-inlet for the lower chamber is of considerable size and is purposely made to receive barrels, boxes, and other combustible matter which may be collected with the garbage and used as fuel on the lower grate, and it is also apparent that by conducting the products of combustion over the surface of the garbage on the upper grate the gases escaping from said garbage are brought into contact with the excessive heat in the upper chamber and are not only consumed, but supply additional fuel for incinerating the material on the upper grate.

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

1. A furnace comprising a front wall, a rear wall, side walls, a top and a bottom, said front wall having a transverse ledge on the inner side thereof, a T-iron having the portion of its head on one side of its web seating on said ledge and having its web engaging said front wall, a second T-iron secured to the side walls and spaced from the rear wall, a grate seating on the head of the first-named iron and on a portion of the head of the second-named iron, and a transverse wall seating on the remainder of the head of said second iron and extending considerably above said grate.

2. A reduction-furnace having two combustion-chambers of substantially equal length disposed one above the other, each chamber having an open grate-bottom of substantially the same length from front to rear, a bridge-wall rising from the rear end of and considerable distance above the upper surface of the upper grate, said chambers communicating at the rear of the bridge-wall, a smoke-conduit leading from the upper front end of the upper chamber, and a sealed hopper having its lower end discharging into the upper chamber, a revolving damper in the discharging end of the hopper and a conduit connecting the hopper with the smoke-conduit.

In witness whereof I have hereunto set my hand this 23d day of June, 1903.

FREDERICK WILLIAM FIELD.

Witnesses:
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