

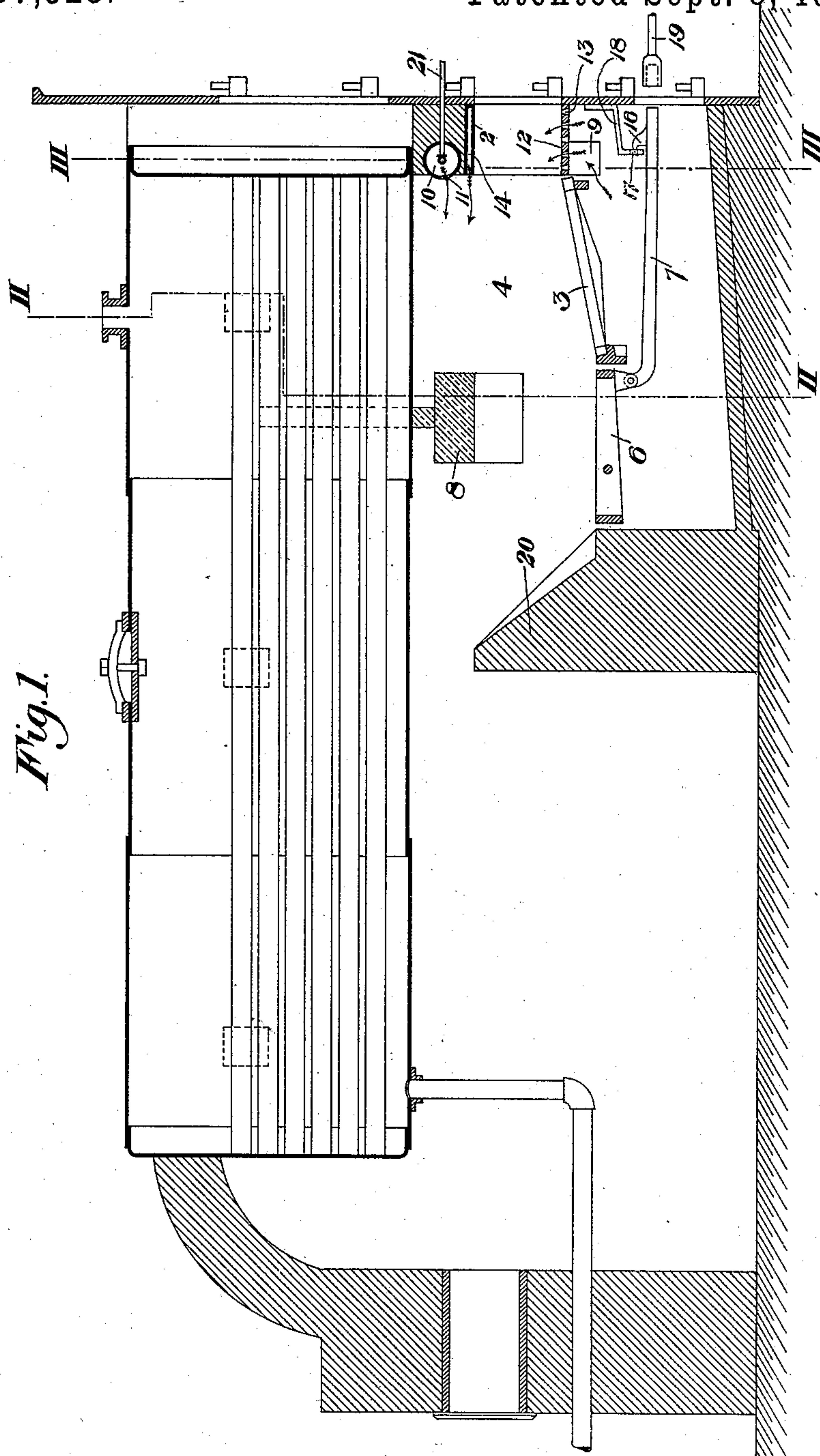
(No Model.)

2 Sheets—Sheet 1.

R. L. WALKER.
FURNACE.

No. 567,525.

Patented Sept. 8, 1896.



WITNESSES

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INVENTOR

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Fig. 3.

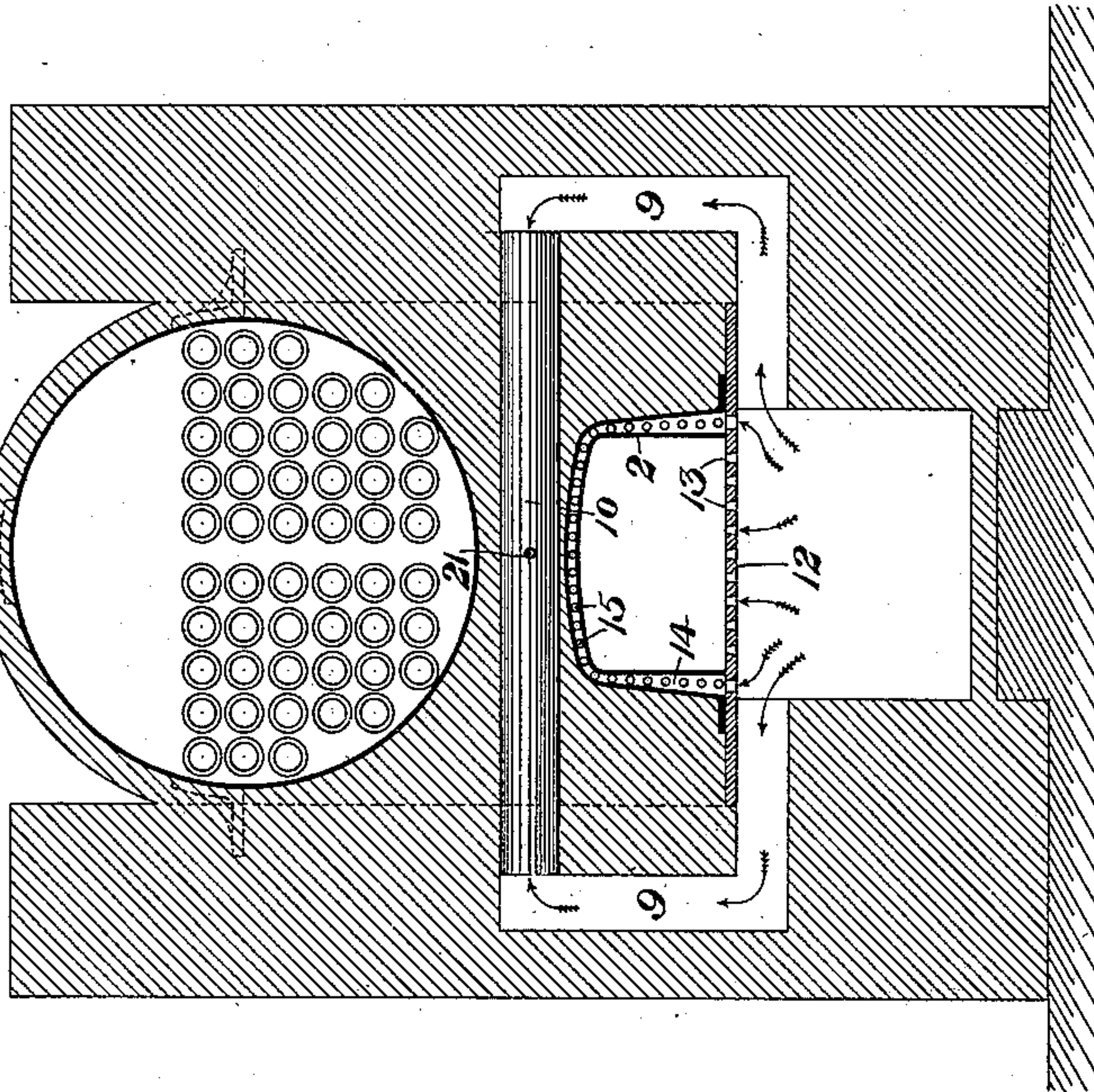
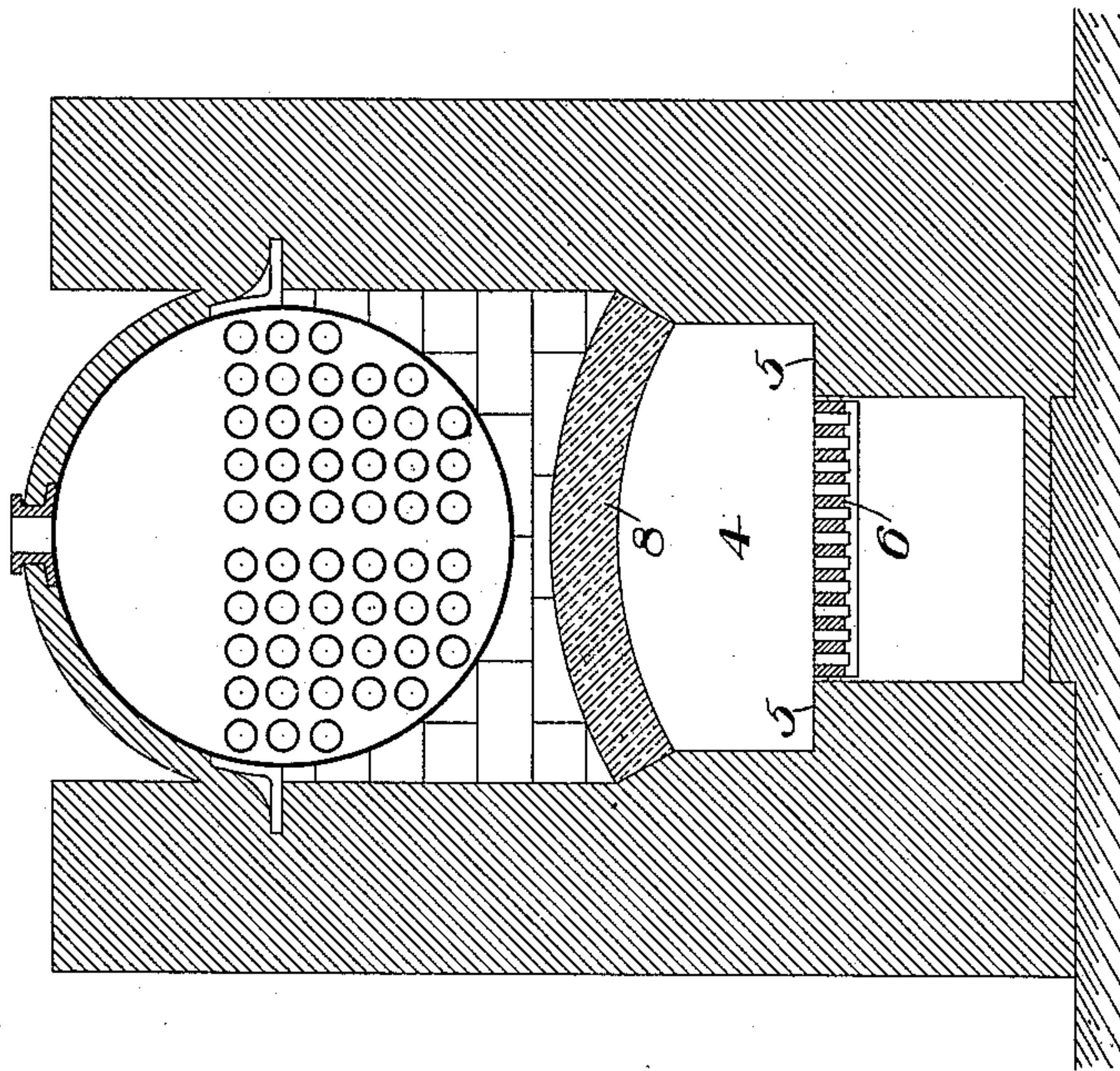


Fig. 2.



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UNITED STATES PATENT OFFICE.

ROBERT L. WALKER, OF PITTSBURG, PENNSYLVANIA.

FURNACE.

SPECIFICATION forming part of Letters Patent No. 567,525, dated September 8, 1896.

Application filed December 21, 1894. Serial No. 532,534. (No model.)

To all whom it may concern:

Be it known that I, ROBERT LOUDON WALKER, of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Furnaces, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a longitudinal sectional view of my improved furnace. Fig. 2 is a cross-section on the line II II of Fig. 1, and Fig. 3 is a like view on the line III III of Fig. 1.

Like symbols of reference indicate like parts in each of the figures.

My invention relates to furnaces for steam-boilers; and it has for its object the thorough combustion of the fuel and products of combustion and the production of an even and intense heat.

I will now describe my invention so that others skilled in the art to which it appertains may employ the same.

In the drawings, 2 represents the fire-door of the furnace, and 3 stationary grate-bars adjacent to the doorway, preferably sloping downwardly therefrom. These grate-bars 3 are less in extent than the width of the fire-chamber 4, the bars being flanked with the flat benches 5, the purpose of which is to permit the collection of fine ashes and dust, which will prevent injury by clinkers adhering to the walls. In rear of the stationary bars 3 are the dumping-bars 6, provided with a dumping or shaker bar 7. This bar 7 is curved at its rear end and is pivoted to the forward end of the dumping-grate 6, so as to permit of the longitudinal movement of the bar. At the forward part of the bar 7 is a hook 16, which is adapted to engage in a slot 17 in the bracket 18. The forward end of the bar is square for the reception of a removable handle 19. When it is desired to renew the supply of incandescent coals on the grate 6, the bar 7 is drawn forward to disengage the hook 16, and the clinkers and ashes are dumped from the grate, making room for a fresh supply of coke to be pushed back from the grate 3.

Extending over the forward part of the bars 6 is a deflector 8, preferably in the form of an arch, the purpose of which is to deflect

the products of combustion from the green fire on the bars 3 down on the incandescent fuel on the shaking-bars 6.

In the front wall of the furnace are air-conduits 9 9, which extend from the ash-pit and lead to the pipe or flue 10, which is set in the front wall of the furnace over the door 2 and is provided with a series of orifices 11, opening into the combustion-chamber on a level with or, preferably, above the deflector 8, the purpose of which is to supply air to the products of combustion arising from the green fire prior to the deflection of the same down on the incandescent fuel. To provide a further supply of air, the dead-plate 12 of the furnace-doorway may be provided with perforations 13, leading from the ash-pit inside of the door, and a flue 14, having perforations 15 opening into the combustion-chamber, may be fitted in the front wall around the doorway. In rear of the shaking-grate is the bridge-wall 20, having preferably a sloping front wall.

In the operation of my improved furnace the fuel is fed on the stationary bars 3, and as it is partially consumed or becomes coked it is forced back on the shaking or dumping grate. This produces a slow fire in the forward part of the furnace in front of the deflector and a fire of incandescent coke on the shaking or dumping bars beneath and in rear of the deflector. The gas and products of combustion arising from the slow fire mingle with the air from the air-flues 9 and are deflected downward over the incandescent fuel and arise therefrom in a state of combustion, producing an intense even heat under the boilers.

In order to keep the air-flues from becoming choked, a steam or air pipe 21 may be fitted in the same for the purpose of clearing out any ashes or foreign material that may collect in the air-orifices.

The combination of a stationary grate, a deflector, and a shaking-grate have been employed by me prior to the date of my present invention and form the subject-matter of Letters Patent No. 439,706, granted to me on November 4, 1890, and while this combination was a decided improvement on furnaces existing at that time, yet it was defective in that there was not complete combustion of

the gases arising from the fire in the forward part of the furnace. I am also aware that it is not new to introduce air into furnaces through the front wall of the same, and I do not desire to claim the same broadly.

One of the great advantages of my improvement is the action of the deflector, which throws the mingled gases and air down upon the live fire, producing a much more intense heat than was the case where the gases alone were so deflected, or where, the deflector being absent, the gases and air, insufficiently heated, are allowed to pass often but partially consumed up against the boiler and thence to the stack.

Careful and accurate tests have been made with my improved furnace as herein described, and it has been found that the evaporation in the ordinary type of two-flue boilers provided with my improved furnace is increased fully thirty-five per cent. over the most approved furnaces now in general use.

While I have shown and described certain forms of air-flues, grate-bars, and deflector, I do not desire to limit my invention thereto, since

What I claim is—

1. In a furnace having a suitable combustion-chamber, a transverse air-flue arranged in the front wall of the furnace having a series of orifices opening into the combustion-chamber, a stationary grate, a dumping-grate and a deflector arranged on a level with or preferably below the orifices and adapted to

deflect the gases and products of combustion from the stationary-grate fire together with the air from the orifices upon the movable-grate fire; substantially as described.

2. In a furnace having a suitable ash-pit, conduits 9, leading therefrom, a transverse air-flue 10 arranged in the front wall of the furnace and having a series of orifices opening into the combustion-chamber, a stationary grate a dumping-grate and a deflector arranged on a level with or preferably below the orifices and adapted to deflect the gases and products of combustion from the stationary-grate fire together with the air from the orifices upon the movable-grate fire; substantially as described.

2. In a furnace the combination of a grate adapted to produce vivid combustion at the rear end and slow combustion at the front end, an intermediate deflector adapted to deflect the products of combustion from the slow fire onto the incandescent coals at the rear part of the grate-surface, an air-inlet in the front of the furnace for the admission of air to the gases arising from the slow fire, and a perforated dead-plate in the mouth of the furnace forming a second supply of air; substantially as described.

In testimony whereof I have hereunto set my hand.

ROBERT L. WALKER.

Witnesses:

W. B. CORWIN,
H. M. CORWIN.