W. MANN.

Reverberating Furnace.

No. 202,845. **Patented April 23, 1878.**

Fig. 1.

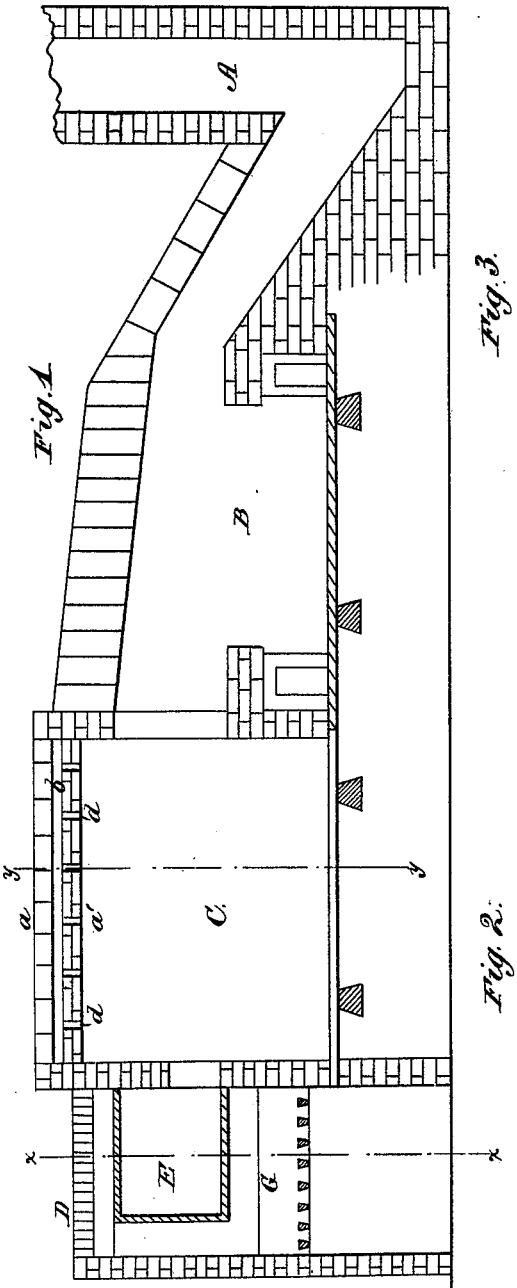


Fig. 3.

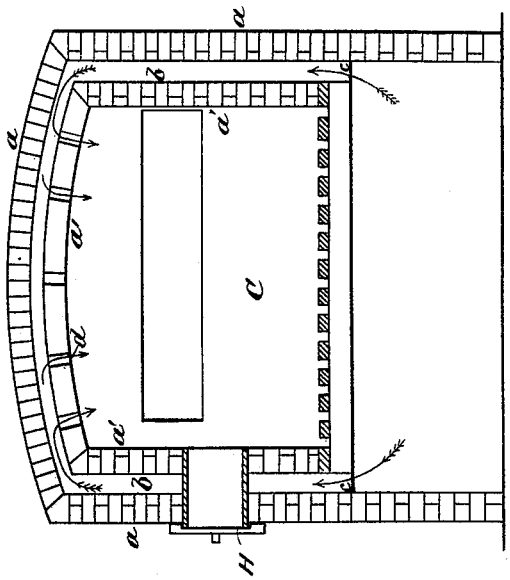
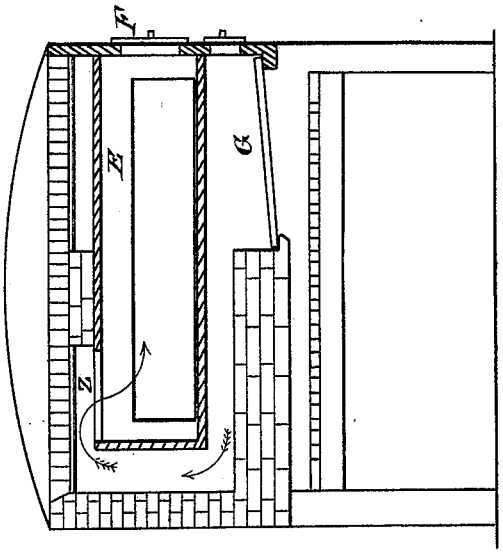


Fig. 2.



WITNESSES:

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UNITED STATES PATENT OFFICE.

WILLIAM MANN, OF NEWCASTLE, PA., ASSIGNOR OF ONE-HALF HIS RIGHT TO WILLIAM PLANT, ISAAC HILL, AND JAMES MATTHEWS.

IMPROVEMENT IN REVERBERATING FURNACES.

Specification forming part of Letters Patent No. **202,845**, dated April 23, 1878; application filed January 9, 1878.

To all whom it may concern:

Be it known that I, WILLIAM MANN, of Newcastle, in the county of Lawrence and State of Pennsylvania, have invented a new and Improved Reverberatory Furnace; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawing, forming part of this specification, in which—

Figure 1 is a vertical longitudinal section of a reverberatory furnace provided with my improvement. Fig. 2 is a vertical transverse section through the supplemental furnace at *x x;* Fig. 3, a vertical transverse section through the line *y y*.

My invention relates to an improvement in reverberatory furnaces such as are employed in metallurgy for puddling, boiling, heating, &c. The improvement is upon that form of reverberatory furnace in which the fuel is charged first to one compartment of the furnace, where the gases are partially driven off, and the remaining coke afterward pushed into the main fire-chamber.

The improvement consists in combining, with a furnace having hot-air spaces about the fire-chamber, a supplemental furnace and retort arranged in front of the fire-chamber, which retort is located above the grate of and opens laterally into the fire-chamber, and which supplemental furnace opens also into the fire-chamber through the retort, and has maintained in the same, beneath the retort, a slow fire with little draft.

In the drawing, A represents the stack or chimney, B the hearth, and C the fire-chamber, of an ordinary reverberatory or puddling furnace. Said fire-chamber C is, however, built with double walls *a a'* upon the sides and top, forming an intermediate air-chamber, *b*, which communicates with the space below the grate through openings *c*, and communicates also through the inner wall of the roof (or sides, if desired) through openings *d*. This chamber *b* forms a passage-way for the air to the fire-chamber, which, as it passes up beside the hot bricks of the inner wall, becomes heated to the high temperature required to produce the best effect in combining with the gas developed from the coal in the retort. Just in front of the fire-chamber is arranged the supplemental furnace D, in which is fixed the retort E, having its side opening full into the fire-chamber, and its front end opening outside of the supplemental furnace through a door, F. The fire-chamber G of this supplemental furnace is arranged beneath the retort, so that the hot currents shall thoroughly circulate around the retort, and then pass with unconsumed gases down through an opening, Z in the top of the retort into the latter, and thence with the developed gases into the fire-chamber C.

In the operation of the furnace, as thus described, the retort E is charged, through door F, with slack or pulverized coal, and the fires started in the fire-chamber G of the supplemental furnace, and also the fire-chamber C. The action of the supplemental furnace, it will be seen, is to develop the gases from the contents of the retort, which gases pass into the fire-chamber C, where they become thoroughly mixed with the highly-heated supply of air from the chamber between the walls, and ignite to produce a flame of much greater intensity than can be obtained from the combustion of the material in the fire-chamber, the smoke and unconsumed products of combustion from the fire-chamber of the supplemental furnace passing also through the retort into the fire-chamber C, to be consumed and further intensify the heat. After the contents of the retort E have become thoroughly coked, they are pushed laterally into the fire-chamber C, to keep up the supply of live coals in said chamber, a new supply of fuel being then charged to the retort. This arrangement obviates the necessity of firing the fire-chamber after starting, by feeding it with the supply of coke from the retort. Said fire-chamber C is, however, to be charged with fuel at the start, and for this purpose, and for stirring the fire from time to time, a door, H, is provided.

I am aware of the fact that it is not new to charge the fuel first to one compartment of a furnace for the distillation of the gases, and

then to transfer and burn the coke thus formed in an another compartment without removing it from the furnace, and that a sluggish fire has been maintained in an independent coking-chamber, whose gases pass into a separate chamber containing incandescent coke upon a higher grate. With my construction and arrangement of the retort placed above the level of the grate of the main fire-chamber, opening into the same, and provided with a supplemental furnace, as described, I am enabled both to control definitely the distillation of the gases by rendering it independent of the main fire, and at the same time to effect the discharge of the contents of the retort to the main chamber, to maintain the fire in the latter.

Having thus described my invention, what I claim as new is—

In a reverberatory furnace, the fire-chamber C, surrounded by air-spaces opening below the grate and into said fire-chamber, in combination with the retort E, arranged above the level of the grate, and opening laterally into the fire-chamber, and the supplemental furnace D, arranged to discharge its gases into the retort, substantially as and for the purpose described.

WILLIAM MANN.

Witnesses:
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