W. MANN.

Reverberating Furnace.

No. 207,972. Patented Sept. 10, 1878.

FIG. I.

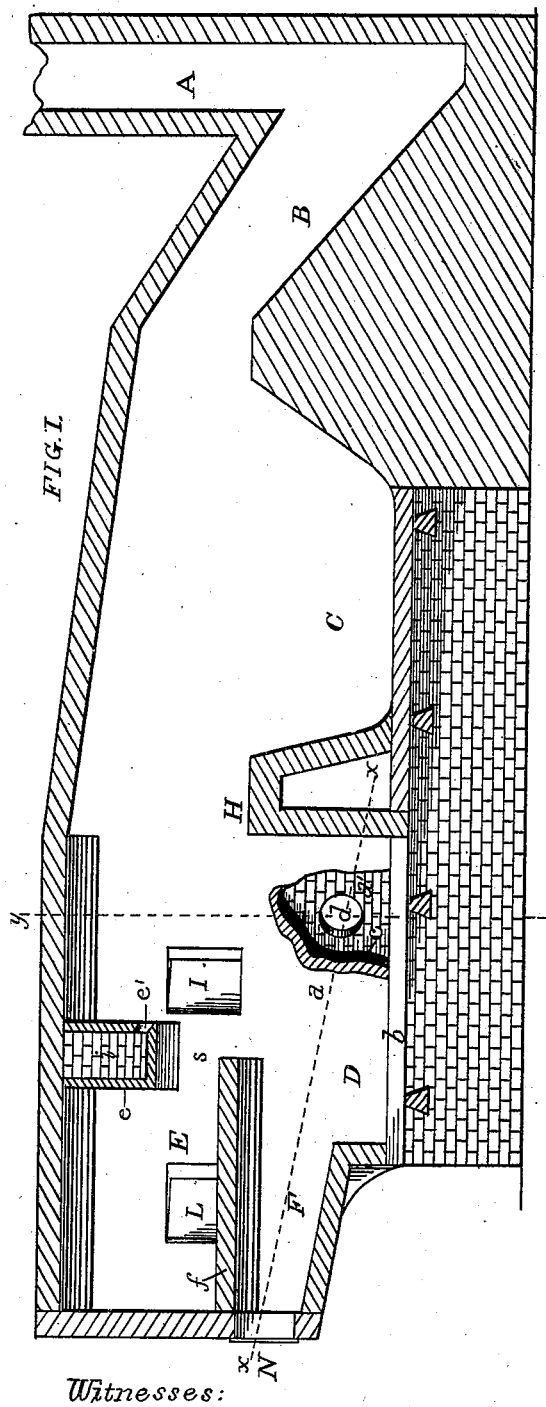


FIG. III.

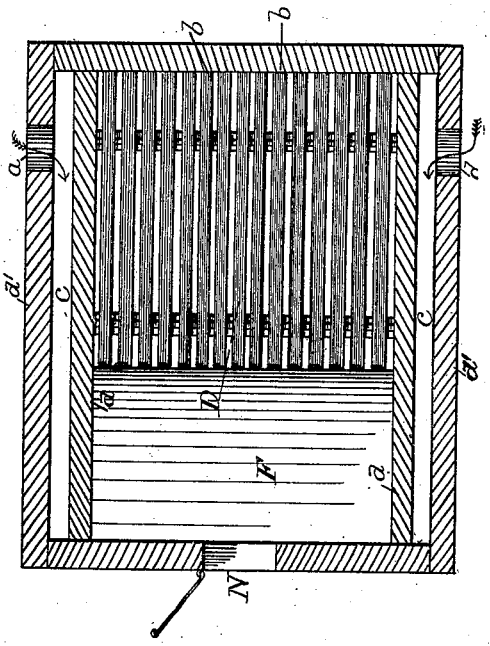
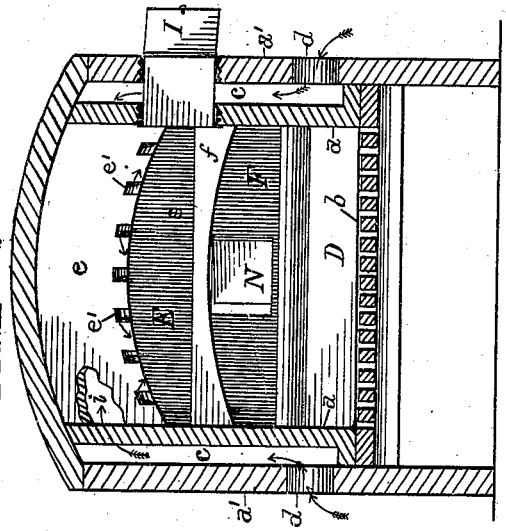


FIG. II.



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UNITED STATES PATENT OFFICE.

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

IMPROVEMENT IN REVERBERATING FURNACES.

Specification forming part of Letters Patent No. **207,972**, dated September 10, 1878; application filed July 5, 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 useful Improvement in Reverberatory Furnaces, of which the following is a specification:

Figure 1 is a vertical longitudinal section of a reverberatory furnace, broken at one place to show double walls, air-space, and opening. Fig. 2 is a vertical transverse section through *y z*, Fig. 1, as seen from the working chamber. Fig. 3 is a sectional plan view taken through *x x*, Fig. 1.

My present invention relates to improvements in the ordinary reverberatory furnace used for puddling, boiling, heating, or smelting metal; and the improvement is upon that form of furnace in which the fuel is charged first to one compartment, where the gases are partially driven off, after which the remaining coke is pushed onto the grate of the main furnace; and the invention consists in combining, with a furnace having hot-air spaces in the double side walls, a heating-chamber placed forward of and somewhat elevated above the fire-grate, and a coking-oven above said heating-chamber, and a transverse hot-air flue having suitable openings, as hereinafter more fully described.

In the drawing, (see Fig. 1,) A represents the stack; B, the neck or flue; C, the hearth or working chamber; D, the fire-chamber, which is provided through the side walls with a door, I, and has a grate, *b*, of any desired construction. The side walls of all that part in front of the fire-bridge H and above the grate are double, *a* and *a'*, forming between them air-spaces *c*, same as in my former patent. These parts just named, being well-known, do not require further description.

E is an elevated fuel-coking oven, which is charged through the door L. The bed *f* of this oven is arched on the lower side, and extends across from the side walls.

F is a heating-chamber, immediately below the oven, and is provided through the end wall with a small door, N.

A hollow arch, *e*, is placed across the roof, within the furnace and above the outer edge of the bed *f*. Thus the space constituting the coking-oven is almost inclosed, the opening shown in Fig. 1, at *s*, left between the bed and the arch being sufficient for the purposes hereinafter named.

The arch just described constitutes a hot-air flue, *i*, connecting on each side with the air-spaces *c*, and is provided with openings *e'* in its lower rear edge, through which hot air is delivered into the fire-chamber. The cold air enters the air-spaces through the side openings *d*, placed as low down as possible.

After the fire is started in the grate, the heat goes both under the arched bed *f* of coking-oven and over it into said oven, which also gets heat from the grate by reflection. The slack is charged into the chamber E, and the developed gases and smoke pass therefrom by the opening or space *s* into the fire-chamber, where they are ignited over the center of the fire-grate by the supply of hot air delivered from the openings *e'* in the arched flue, producing heat of great intensity.

When the slack in the oven or coking-chamber has been exhausted of gas, it is pushed by means of a suitable fire-hook off into the grate below, and the oven is charged with a fresh supply of slack. Thus a live fire is maintained in the chamber D constantly, no fuel being supplied except the coke after the first start. The result of this particular construction—namely, the arched bed *f*, forming below a heating-chamber and above a coking-oven, and the transverse flue *i*, so placed as to partly inclose the oven-space and deliver hot air from its openings over the center of fire-chamber to cause the ignition of the gases and smoke as they pass from the oven under the flue—is, that the operation of puddling iron is simplified and rendered easier, and consequently somewhat cheaper, than is possible by the con-

struction shown in my former patent dated April 23, 1878.

Having described my invention, I claim—

The combination, with a furnace having hot-air spaces in the double side walls, of the heating-chamber F, placed forward of and somewhat elevated above the fire-grate, having the arched top *f*, projecting partly over the fire-chamber and forming the bed of the coking-oven E, and the transverse flue *i*, placed just above the outer edge of the bed, as herein shown and described.

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Witnesses:
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