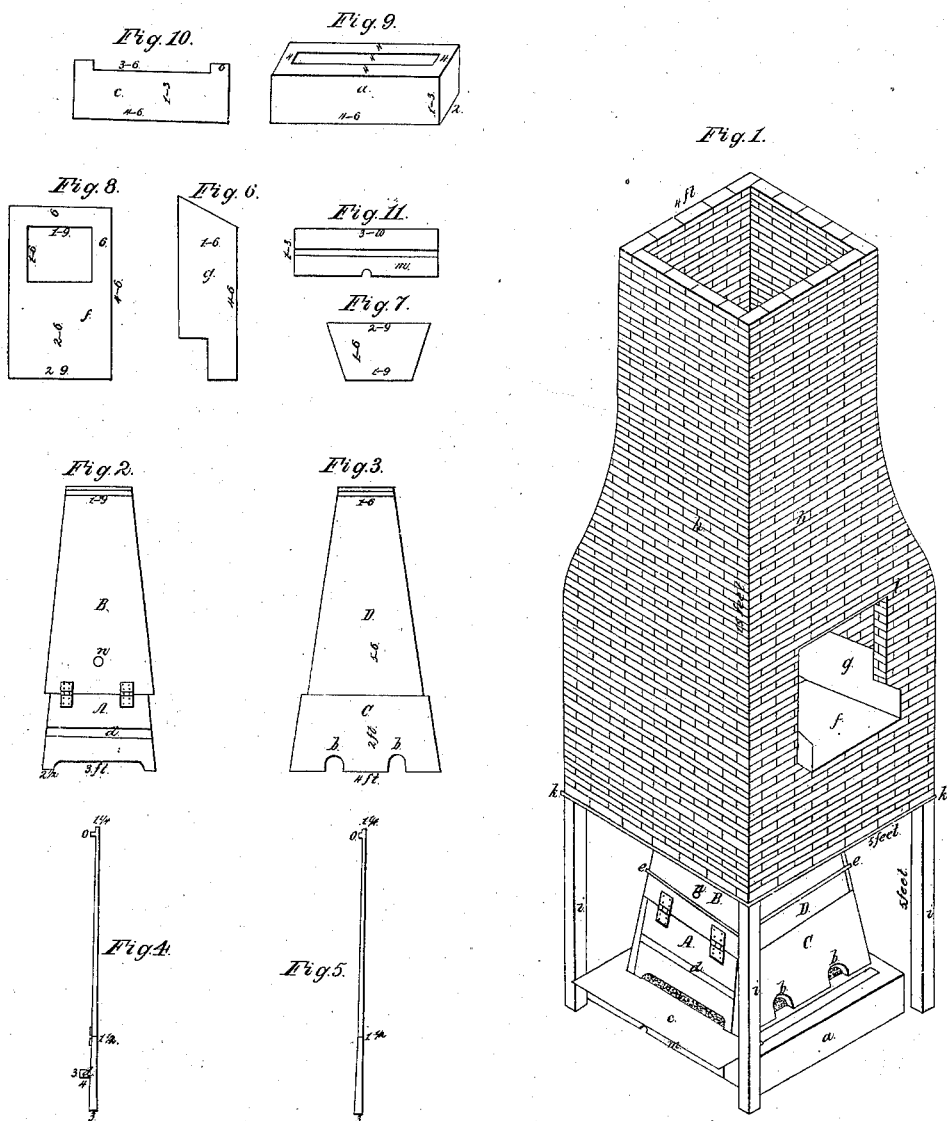


No. 2,688.

PATENTED JUNE 22, 1842.

J. C. McMANAWAY.  
IRON REFINING FURNACE.



0 1 2 3 4 5 6 7 8 9 10  
Scale feet to an inch.

Witnesses

*Wm. Kendall*  
*George Burr*

Inventor

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# UNITED STATES PATENT OFFICE.

JOHN C. McMANAWAY, OF PORTSMOUTH, OHIO.

## IMPROVEMENT IN IRON-REFINING FURNACES.

Specification forming part of Letters Patent No. 2,688, dated June 22, 1842.

### *To all whom it may concern:*

Be it known that I, JOHN C. McMANAWAY, of Portsmouth, in the county of Scioto and State of Ohio, have invented a new and Improved Close-Fire Run-Out or Refining-Furnace for Smelting Pig-Iron or Scrap-Iron; and I do hereby declare that the following is a full and exact description.

The nature of my invention consists in making a close fire-place, which requires no lining, so that the heat can only escape in a vertical direction through the material to be smelted, and in connecting therewith a door or doors, so that by opening the same a ready admission is had to the interior at any time for the purpose of renewing or repairing the bottom, for putting in heavy chunks of iron, or for any other purpose, without the necessity of removing or deranging any other part of the furnace.

To enable others skilled in the art to make and use my invention, I will proceed to describe its construction and operation.

I construct my furnace of cast-iron plates, setting on water-boxes, and surrounded by a chimney resting on upright posts. There may be three water-boxes—one on each side and one at the back. Those on the sides (marked *a*, Figs. 1 and 9) are four feet six inches long, twelve inches wide, and fifteen inches high, with a hollow in the middle for containing water, which will leave the bottom, sides, and ends four inches thick. That on the back is three feet long, and otherwise of the same dimensions as those on the sides. In front, and occupying the relative situation of the back water-box, is the tapping-plate *m*, Figs. 1 and 11, with a flange near its center horizontally, and an aperture two inches wide and four inches high in the center of the bottom edge, to run out the metal. On these are placed the plates forming the furnace in such manner as that the inside of the plates are flush with the inside of the water-boxes, leaving the greater portion of the water-boxes, which are covered with a lid or plate of cast-iron, projecting beyond and in front of the furnace-plates. The front and back plates of the furnace, which are in all respects alike, are cast in two pieces, the lower one of which, *A*, Figs. 1 and 2, is the door. These doors are two feet high, three feet wide, and three inches thick at bottom, and about two feet nine inches wide, and one

and one-half inch thick at top. To prevent them from warping, a flange, *d*, Figs. 1, 2, and 4, is cast in the center horizontally, which is three inches wide, and projects four inches in the center, diminishing to nothing at the sides. The bottom side of the door is cut out, leaving an aperture three inches wide and two feet six inches long, through which to stir the materials in the furnace. These doors are hung to the upper plates by strong hinges or hooks, and shut between the lower parts of the side plates, to which they may be fastened, when shut, by hooks or by pins, or rod passing through ears in the side plates and in front of the doors. The upper part of the back and front *B*, Figs. 1 and 2, is five feet six inches high, three feet wide, and one and one-half inch thick at bottom, and one foot nine inches wide and one and one-quarter inch thick at top. Within about two inches of the top is cast a flange, *o*, Figs. 2 and 4, to support the trundle-head plates, and at twelve inches from the bottom is a hole, *n*, Figs. 1 and 2, two inches diameter, to throw light on the molds at night and to examine and stir the materials. The side plates are cast in one or two pieces, as most convenient. If in two, (which is most advisable,) the lower one, *c*, Figs. 1 and 3, corresponding to the doors in front and back, is two feet high, four feet wide, and three inches thick at bottom, and three feet two inches wide and one and one-half inch thick at top. On the lower side of these plates is left one, two, or three holes for the tuyere-pipes *b b*, Figs. 1 and 3, six inches wide and high and semicircular on top. The upper side plates, *D*, Figs. 1 and 3, are five feet six inches high, two feet eleven inches wide, and one and one-half inch thick at bottom, and one foot six inches wide and one and one-quarter inch thick at top. Near the top is a flange, *o*, Fig. 5, similar to those on the front and back plates, and for the same purpose. If cast in one piece, the same dimensions are preserved. These plates are then put together in such a manner that the upper front and back plates rest against the edges of the upper and upon the top edge of the lower side plates. The upper and lower side plates, if cast in two pieces, are fastened together by projecting flanges with bolts or by strong hooks, and all the four plates are then connected together by bands, hoops, or clamps *ee*, Fig. 1, one near the bottom and top and one

at the center. Thus secured together, they form the frustum of a four-sided pyramid, resting, as before described, on the water-boxes. Below the door, resting on the water-boxes and projecting horizontally in front, is a cast-iron fore plate, *c*, Figs. 1 and 10, for the purpose of holding braze or coal-dust to keep in the blaze. Around the furnace thus set up are four upright posts of cast-iron, *iii*, Fig. 1, four or five inches square and five feet high, and placed five feet apart. On these are placed cast-iron plates or lintels, *k k*, Fig. 1, upon which is built the chimney *h h*, Fig. 1. The chimney is fifteen feet high, tapering suddenly above the opening to four feet square at top. In one side of the chimney is an opening or doorway two feet nine inches wide, three feet six inches high, the bottom of which is level with the top of the furnace-plates. Through this opening and into the top of the furnace is put the charge of metal and coal, and should be kept nearly or quite full while working. At the top of the furnace, resting on the flanges of the upper plates and on the bottom of the opening in the chimney, is placed a plate, Fig. 8, four feet six inches long and two feet nine inches wide, with a hole the size of the top of

the furnace. On each side of this and resting against the sides of the doorway are set two other plates, Fig. 6, and at the back another, Fig. 7. These three trundle-head plates are eighteen inches wide, and are set obliquely, forming a funnel-shaped guard to prevent the coals, &c., from falling down the sides of the furnace in putting in. They may be made of cast or sheet iron, and fastened together in any convenient manner. In front of the doorway is a platform with steps to ascend with the metal and coals.

What I claim as my invention, and desire to secure by Letters Patent, is—

The addition of a door or doors to a close-fire run-out or refinery, whereby access can at any time be had to the interior, and the bottom renewed or repaired, or large chunks of iron put in, or for any other purpose, without the necessity of removing or deranging any other part of the furnace.

JOHN CLARK McMANAWAY.

Witnesses:

WILLIAM JONES,  
his  
DAVID X PRICE.  
mark.