

C. REES & T. JOHNS.
Heating-Furnace.

No. 162,688.

Patented April 27, 1875.

Fig. 1

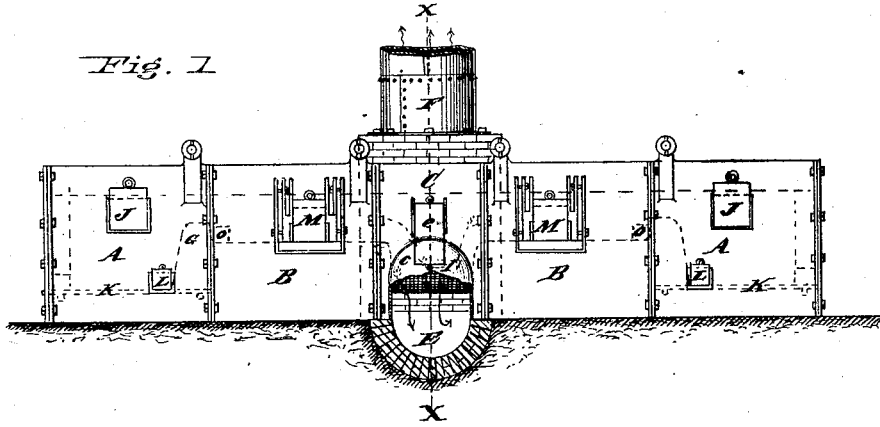


Fig. 2

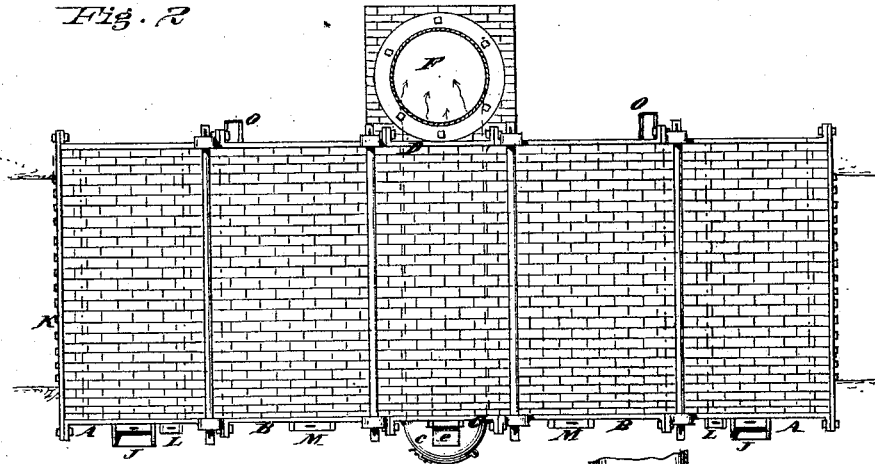


Fig. 3

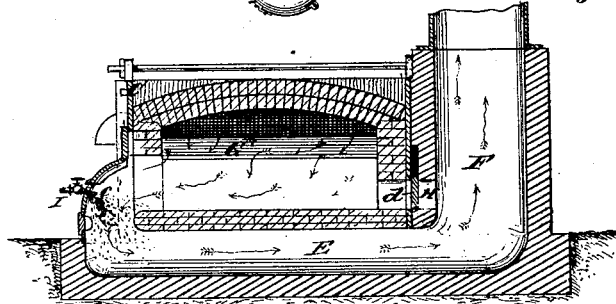
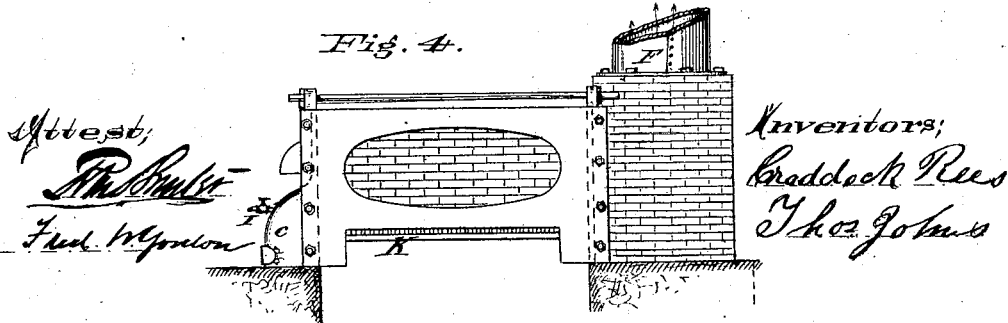


Fig. 4.



UNITED STATES PATENT OFFICE.

CRADDOCK REES AND THOMAS JOHNS, OF IRONTON, OHIO.

IMPROVEMENT IN HEATING-FURNACES.

Specification forming part of Letters Patent No. **162,688**, dated April 27, 1875; application filed February 19, 1875.

To all whom it may concern:

Be it known that we, CRADDOCK REES and THOMAS JOHNS, both of Ironton, county of Lawrence and State of Ohio, have invented a Heating-Furnace, of which the following is a specification:

Our invention consists mainly of a smoke-passage whose opening for the exit of smoke is on the same side of the furnace as the doors through which the iron to be heated is placed in or drawn out of the furnace, and exactly between them, then opening downward and passing under the furnace and connecting with the smoke-stack, which is on the opposite side.

It has for its objects, first, the increase in production of heated iron in the same time; secondly, a great saving in coal; thirdly, one of these furnaces can be built to do double the amount of work of the ordinary furnace now in use, and will yield, at least, five (5) per cent. more iron on each side; fourthly, it is either suited to sand or cinder bottom, as desired; fifthly, it uses less brick by one-half; is easily erected, and saves time and expense in running the same. It is also adapted to make bar, rail, hoop, and guide-mill iron.

Figure 1 is a side elevation (with a portion of the smoke-passage broken away) of the furnace embodying our invention. Fig. 2 is a plan of same. Fig. 3 is a section of same through the line *xx*. Fig. 4 is an end elevation of one end of the furnace.

Plates A, B, and C are, respectively, the stock-hole plate, door-plate, and smoke-flue plate. These are bolted together as in the ordinary furnace, and as shown. Plates A and B are made the same on the opposite or stack side, with the exception that the door and stock-hole are left off on that side, as shown, Fig. 2. The flue-plate C is made different from the plate D in this respect, viz., plate C has a bulge, *c*, in which the smoke-flue is made, while plate D has no other changes from a smooth plate than a small doorway, *d*, whose object will be hereafter explained.

The smoke-flue passage *B* leaves the furnace at the bulge *c* upon the plate C, and passes downward until far enough below the furnace, then passes horizontally under until it has passed the side of the furnace, and enters the base of the smoke-stack *F*. It has its outlet

from the furnace on the opposite side to the smoke-stack, and on the same side with the doors, for the purpose of drawing the heat and flame, as it comes over the bridge *G*, to that side of the furnace, thus heating the iron last placed in the furnace first, and leaving that which is to remain in longest from heating as quickly, and thus making it have the same temperature as that which was drawn out first. The door *d* is placed in the flue *H* exactly opposite to the main outlet for the smoke from the furnace. Its object is to draw, by opening the same, a portion of the heat and flame from the main outlet to the opposite side, when desired to give more heating capacity to this side of the heating-furnace. By this means the operator can regulate the heating capacity in all quarters of the furnace, without the least trouble. A water-pipe, *I*, projects into the bulge *c* on plate C. On its end is a sprinkler-nozzle constructed so as to throw water in every direction, thus keeping the fire-brick at and around the elbow cool, in this way preventing fast wear. The water that is not absorbed falls to the bottom or bed of the smoke-flue passage *E*, where it becomes so heated as to form steam, which of course rushes up the chimney as the only opening, creating a considerable draft to the furnace. The flow of water is regulated by a small globe-valve, as shown in accompanying drawing. In the flue-plate C is a man-hole door, *e*.

The operation is as follows: The coal is thrown in stock-hole *J* upon the grate *K*, where it is ignited, the gaseous products of combustion passing over the bridge *G*, and among the iron to be heated, which is placed in the furnace through door *M*. The door *M* being open nearly all the time the flame is driven to the far side in the ordinary built furnaces, but in this furnace it is kept in the middle by reason that the outlet for the smoke is on the same side as the door *M*, thus causing the flame to run to that side when the door is closed, but when the door *M* is open the current of air rushing in throws the flame to the middle, thus heating the iron on both sides alike. If it is wished to draw the flame along the far side, all the operator has to do is to open the door *d* slightly, and the desired effect will be accomplished. Of course, the opposite end of

the furnace is operated in the same manner as the end just described. When the flames from the two furnaces come in contact with each other in the middle of the furnace they create an eddy, thus making use of much heat that would otherwise have been lost. The heat then passes out through the smoke-flue E. The water is then turned on, and keeps the fire-brick from being burned, as before explained. After the heat and smoke have passed into the flue E they commence to form the waste water into steam, and create the aforesaid draft to the furnace by passing up the chimney F. Doors L L are placed in the corners of the fire-places for cleaning purposes. On the chimney side of the furnace are a pair of cinder-escape holes, O O. In the old built furnaces, the cinder runs down the neck, and the consequences are that in time the neck is completely choked up, thus causing the furnace to cease running until repaired. In this furnace the cinder runs out

without ever going into the neck or flue. In the operation of this kind of furnace one side is always refilling, while the other is heating, and vice versa.

We claim—

1. In a smelting-furnace, having a fire-place at both ends, the central flue E running transversely under the furnace, and opening into the same at the side in which the doors M are arranged, all substantially as and for the purpose specified.

2. The combination of the flue-door *d* with the main smoke-outlet E, substantially as and for the purpose specified.

In testimony of which invention we hereunto set our hands.

CRADDOCK REES.
THOMAS JOHNS.

Witnesses:

R. M. HUNTER,
JOS. P. SHAW.