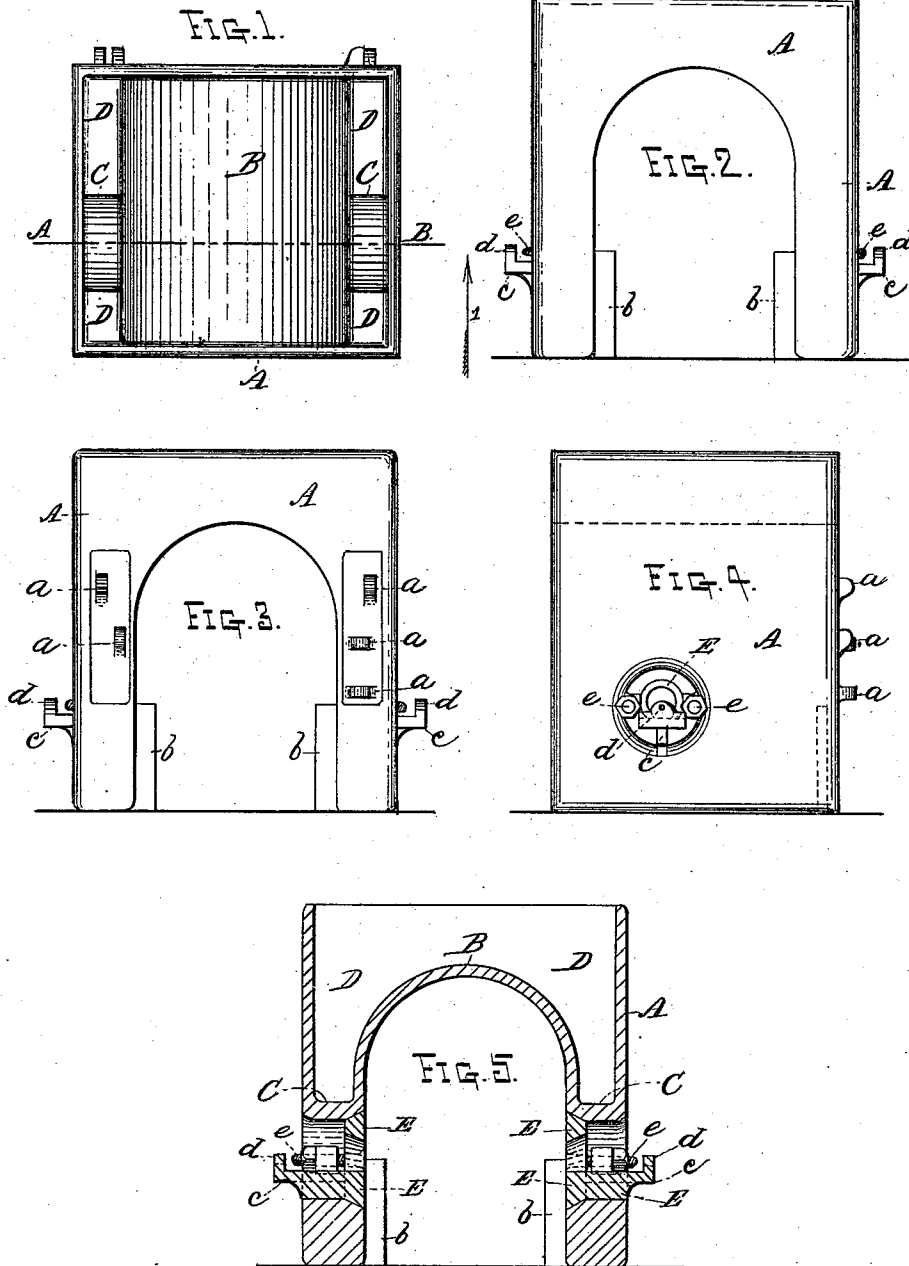


C. H. MORGAN.

CHARCOAL FINERY FURNACE.

No. 187,164.

Patented Feb. 6, 1877.



WITNESSES;

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CHARLES H. MORGAN, OF WORCESTER, MASSACHUSETTS.

IMPROVEMENT IN CHARCOAL-FINERY FURNACES.

Specification forming part of Letters Patent No. 187,164, dated February 6, 1877; application filed November 6, 1876.

To all whom it may concern:

Be it known that I, CHARLES H. MORGAN, of the city and county of Worcester and Commonwealth of Massachusetts, have invented certain new and useful Improvements in Charcoal-Finery Furnaces; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming a part of this specification, and in which—

Figure 1 represents a top or plan view of so much of a charcoal-iron furnace as is necessary to illustrate my present improvements. Fig. 2 represents an end view of the parts shown in Fig. 1, looking in the direction of arrow 1, Fig. 1. Fig. 3 represents an opposite end or front view of the parts shown in Fig. 1. Fig. 4 represents a side view of my improved furnace; and Fig. 5 represents a vertical section on line A B, Fig. 1.

To enable those skilled in the art to which my invention belongs to make and use the same, I will proceed to describe it more in detail.

In the drawings, the part marked A is the furnace shell or frame, and which shell I cast in one piece, thereby obviating the objections to this class of furnaces, which had been made previous to my invention from separate pieces, riveted together. The interior part B is cast in circular form, thereby forming a secure and tight bottom for the water-receptacle D, and also an arched and bracing top for the fire and iron chamber below. At right angles to the part B are cast two projections, C C. The upper parts of these projections are also made in circular form, and the ends of the projections, being cast with the parts A and B, are not liable to be broken, warped, or sprung by use. The projections have circular openings formed in them to receive tuyere-supporting frames E E, the latter frames being beveled off to fit the bevels on the sides of the furnace-frame A, as fully indicated in Fig. 5. The construction and arrangement of the parts are such that the tuyere-frames E can be fitted in very accurately and conveniently, since the openings in the projections C C can first be rimmed out circular and afterward a conical or tapering head can be placed upon the end of a spindle, and the inner concave surfaces

rimmed or formed perfectly true to receive the convex surfaces of the tuyere-iron frames or supports, said tuyere-iron frames or supports being held in place by nuts and bolts *e*, as indicated in Figs. 4 and 5, the ends of the bolts passing through projections cast upon the part A, while the heads of the bolts fit into concavities formed in the inner sides of the parts E, thus enabling said tuyere-iron frames or supports E to be easily removed in case they become injured by fire or otherwise. The tuyere-iron or pipes pass through the openings in the frames E, and, as they are liable to be hit by the bars of iron, it is necessary that their frames should be well supported; and for this purpose I form the frames E with downward projections *c*, which take a bearing on their lower edges on frame A. (See Figs. 4 and 5.) Upward projections *d* are cast upon the parts *c* for the purpose of forming center supports in turning frames E. *a a* are projections cast upon the front of the furnace-frame for supporting the doors and cross-bars, while inward projections *b b* are cast upon the inside of the front of the furnace for supporting pry-stands and closing plates or doors, when desired. The fire and iron chamber may be lined with any suitable material.

The attendant or foreman, in manipulating the iron during the process of manufacture, places his lifting-bar over the pry or fore plate attached to the projections *b b*, and as he raises the pasty mass or loop of iron it comes in contact with the tuyere-pipes, and, as they were supported prior to my present invention, they were liable to be disturbed and thrown out of proper adjustment, thereby injuring the quality of iron, all of which difficulties and objections are overcome and obviated by my improvements, since the parts E E, by reason of their peculiar construction and arrangement, hold the tuyere-pipes securely in position, thereby rendering the iron of a uniform quality.

In the use of the furnace, the space D is filled with water, and any suitable devices may be employed in introducing and conveying it away.

By my invention the furnace can be made comparatively very cheap, while the forms of the parts A, B, and C are so made as to brace

each other, thereby preventing warping and breaking of the furnace-frame to a great extent; besides there being no joints in the main furnace-frame, particularly that portion forming the water-receptacle, there is no liability and danger of the water leaking from the receptacle, as is the case when such receptacle is made from plates of wrought-iron and riveted together, the joints of which are constantly liable to be injuriously affected by corrosion, and also by the springing and warping of the parts when in use.

I am aware that charcoal-iron furnace-frames have heretofore been made of cast pieces, and also of pieces of wrought metal, and I disclaim both of such modes of construction. When the frame is made from pieces of cast metal the frame is liable to crack, in consequence of the strain of the fastening bolts or rivets, and when made of pieces of wrought metal the parts are liable to twist more or less out of shape. Then, again, when the frame is made of separate pieces, the joints prevent the ready and quick transmission of heat from one part or piece to the next or adjoining piece or pieces; consequently, one part is liable to become overheated, whereas, by my invention,

the heat of one part is conducted to the other parts, whereby the frame can be retained at a more uniform and even heat than in the other two forms of frame above alluded to. Then, again, the concave openings render the frame very strong, while at the same time forming strong supports for tuyere-frames. My invention cheapens the construction, also.

Having described my improvements in charcoal-iron furnaces, what I claim therein as new and of my invention, and desire to secure by Letters Patent, is—

1. A frame or shell for a charcoal-iron furnace, cast in a single piece, and having the inner ends of the tuyere-frame openings made with bevel or concave faces, substantially as shown and described.

2. The combination, with the inner concave surfaces of the frame A and bolt-supporting projections upon the outside, of the convex tuyere-frames E E, provided with projections *c* and *d*, substantially as and for the purposes set forth.

CHAS. H. MORGAN.

Witnesses:

EDWIN E. MOORE,
THOS. H. DODGE.