W. ENNIS.

Fire-Box.

No. 164,280. Patented June 8, 1875.

FIG. 2.

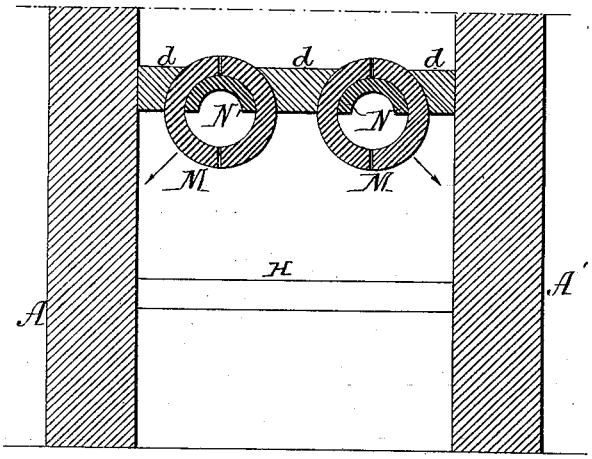


FIG. 1.

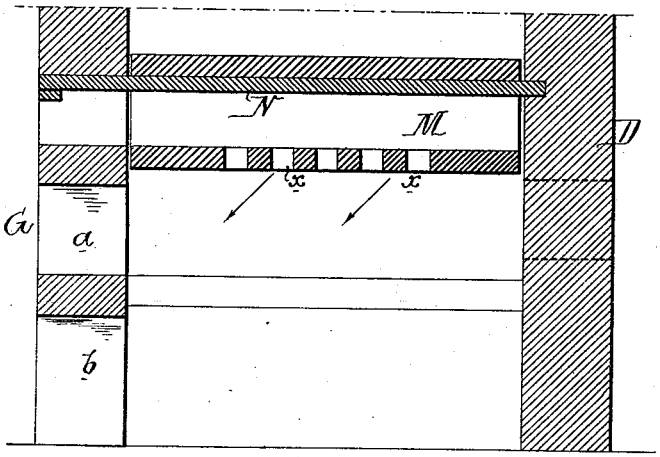
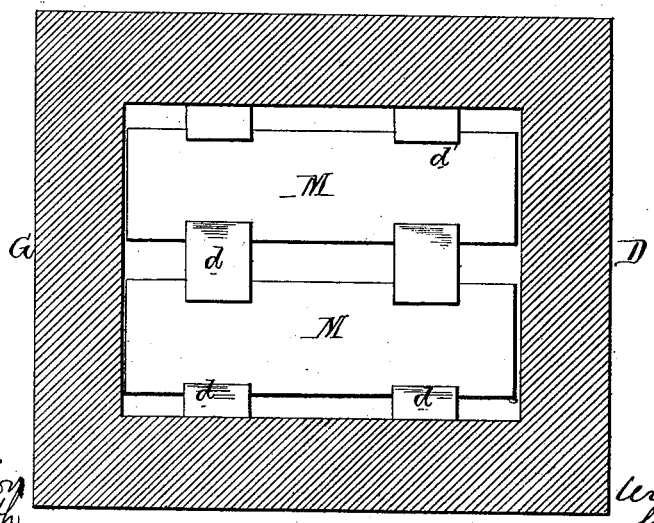


FIG. 3.



Witnesses,
Hubert Howson
Harry Smith

William Ennis
by his Attys
Howson and Sons

UNITED STATES PATENT OFFICE.

WILLIAM ENNIS, OF NEW YORK, N. Y.

IMPROVEMENT IN FIRE-BOXES.

Specification forming part of Letters Patent No. **164,280**, dated June 8, 1875; application filed October 22, 1874.

To all whom it may concern:

Be it known that I, WILLIAM ENNIS, of the city, county, and State of New York, have invented an Improvement in Fire-Boxes, of which the following is a specification:

The object of my invention is to introduce into furnaces or fire-places, for the combustion of fuel, jets of air, by the aid of appliances, which will effectually resist the destructive action of the fire, which I will now proceed to explain, reference being had to the accompanying drawing, in which—

Figure 1 is a longitudinal section of my improved fire-place for furnaces; Fig. 2, a transverse vertical section; and Fig. 3, a sectional plan.

A and A′ are the opposite side walls of the furnace; D, the rear wall, and G the front wall, in which is the usual feed-opening *a*, provided with suitable doors, and the opening *b* communicating with the ash-pit. From the front to the back of the furnace extend fire-clay pipes M, two being shown in the present instance, and each pipe is supported by an internal bar, N, of iron, which I prefer to make of the semi-tubular form shown in Fig. 2.

In order to afford facilities for the removing and replacing of the pipes M, without disturbing the supporting-bars, I make each pipe in two parts, which are retained in their proper position by fire-clay slabs *d*, introduced between the pipes and the side walls and between the pipes themselves, the slabs leaving apertures of sufficient area for the free upward passage of the products of combustion of the fuel on the grate H to the point where they are to be utilized. The pipes M communicate with openings in the front wall of the furnace, and these openings may be exposed to the air, or may communicate with any suitable blowing apparatus, as the use to which the furnace has to be applied, and the character of the fuel, may require. In the lower portion of the pipes M are a number of openings, through which jets of air can pass downward and commingle with the gaseous products of combustion, thereby converting them into flames of intense heat.

The position of the openings *x* in the pipes M may be varied. When no blower is used, for instance, the openings may so situated that air will pass into the fire-place in the inclined direction pointed out by the arrows, Fig. 2; but when blasts of air are introduced the openings may be such as to direct the air vertically onto the fuel.

In some cases the spaces between the pipes M may be entirely closed, and the products of combustion directed through an opening or openings in the rear wall of the furnace, as shown by dotted lines, in which case I prefer to make the air-openings *x* in the tubes inclined in the direction of the arrows, Fig. 1, so that jets of air will meet the products of combustion as they pass to the outlet.

It will be observed that the internal supporting-bars are protected from the direct and destructive action of the fire by the pipes, and that they are further protected by being exposed to the air passing through the said pipes; and hence, that this protection of the bars insures the permanency of the appliances, by which the air is introduced into the furnace from above.

I claim as my invention—

1. The combination, with a furnace of fire-clay pipes M, supported by internal bars of iron, and having openings, through which air admitted to the said pipes can pass downward therefrom into the fire-place, all substantially as set forth.

2. The combination of the pipes M, each made in two parts, the internal supporting-bars, and the retaining-slabs *d*, all as specified.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

WILLIAM ENNIS.

Witnesses:

WILLIAM HENRY WILLIS,

DAVID SEAMAN, Jr.