N. L. NEWCOMB.

Furnace.

No. 168,174. Patented Sept. 28, 1875.

Fig. 1.

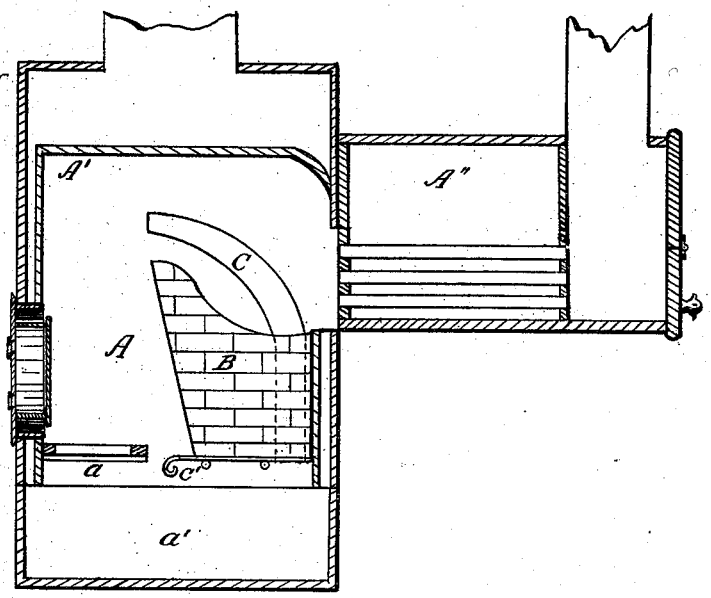


Fig. 2.

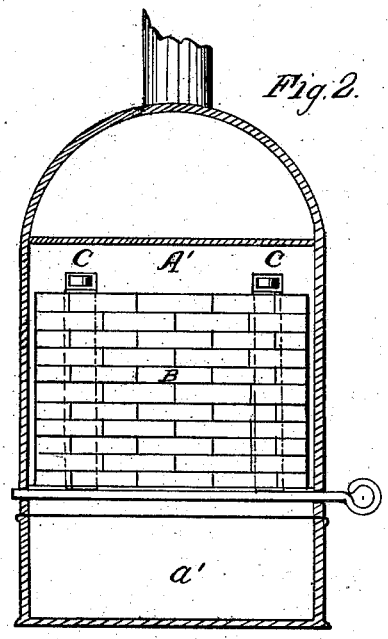
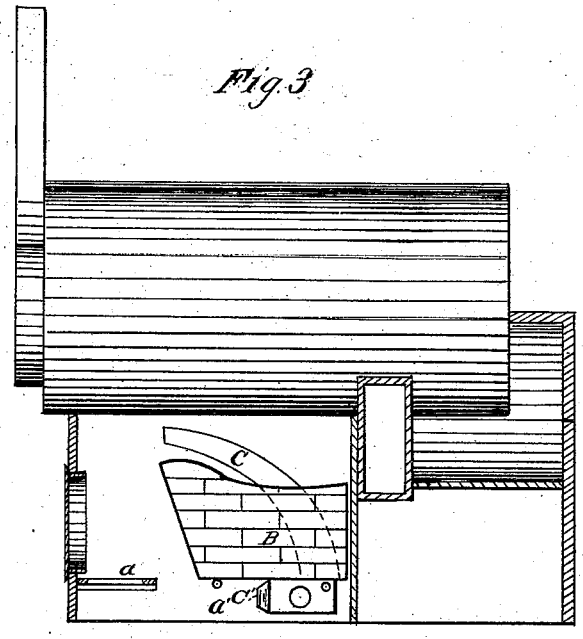


Fig. 3



WITNESSES
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NATHAN L. NEWCOMB, OF CLEVELAND, OHIO.

IMPROVEMENT IN FURNACES.

Specification forming part of Letters Patent No. **168,174**, dated September 28, 1875; application filed August 12, 1875.

To all whom it may concern:

Be it known that I, NATHAN L. NEWCOMB, of Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Furnaces for Steam-Boiler, &c.; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it pertains to make and use it, reference being had to the accompanying drawings which form part of this specification.

My invention relates to an improvement in furnaces for steam-boilers, &c., whereby more perfect and complete combustion is obtained.

In the drawings, Figure 1 is a longitudinal section of my invention as adapted to the ordinary tubular-flue boiler; Fig. 2, a cross-section of same; Fig. 3, a longitudinal section of my invention as adapted to the common return-flue boiler.

My invention consists in the following parts and combinations, as hereinafter specified and claimed, wherein—

A is the furnace or fire-box, for instance, of a locomotive, as shown in the drawings, with its crown-sheet A′ and tubular flues A″, grate-bars *a*, and ash-pit *a′*. B is a fire-wall, constructed, preferably, of masonry, or of any suitable material of sufficient strength, and capable of resisting the effect of heat. From the bottom or lower portion of the fire-wall B extend the flues C, of any suitable construction and material. These flues are provided with valves C′, to regulate the amount and force of air passing through them. These flues may be one or more in number, and are made to open in a forward direction above the fire-wall B, as shown in Figs. 1 and 3.

It is only necessary to change the fashion without substantially altering the construction, and without at all affecting or changing the principle of my invention, in order to adapt it to furnaces or boilers of different construction, my invention consisting, as it does, essentially in the fire-wall B, placed within the furnace, and provided with one or more flues, C, opening at or near the bottom of the fire-wall B, extending upward, and opening forward above said fire-wall.

The operation of my invention is as follows: The air passing to the lower mouth of the flue C becomes thoroughly heated before it is discharged at the upper exit thereof. This air, thus heated and discharged, affords a supply of oxygen sufficient to assist very materially in the combustion of such matter as has not already been burned upon the grate-bars or within the fire-box before reaching this point.

The advantages that I claim for my invention, besides all that can be claimed for any device affording a more or less perfect and complete combustion, are, first, extreme simplicity; second, durability; third, its easy adaptation to furnaces of almost any construction; fourth, its automatic operation; fifth, by my invention an exceedingly small grate-surface is required, and likewise a very moderate draft of air beneath or over the grate-bars, consequently an immense saving of fuel and a diminished liability of burning the grate-bars.

The door of the chamber is supplied with an upper and a lower series of draft-openings. When the fire is started all are opened; but afterward the upper series should be closed, and the lower series will not only sufficiently assist in the required supply of oxygen, but will also save materially in preventing the fender of the furnace-door from being burned.

In a furnace where no exhaust-draft is employed, as in the case of a locomotive-flue, connection may be made between the lower mouths of the flues C and any suitable vent or other contrivance whereby air may be artificially supplied, if necessary, without dependence upon the natural draft. When artificial draft is unnecessary, the supply of air may be regulated by suitable register or valves in the flues C, as heretofore mentioned.

What I claim is—

1. The combination, with a furnace, of one or more flues, C, adapted to receive air from under the grate, and to discharge it within the furnace above the grate-bars, substantially as and for the purpose shown.

2. The combination, with the furnace, of the fire-wall B, placed immediately behind the grate-bars, and extending well up into said furnace, and one or more flues, C, receiving air from below, and discharging it at the upper portion of said fire-wall and over the grate-bars, substantially as and for the purpose described.

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

NATHAN L. NEWCOMB.

Witnesses:
FRANCIS TOUMEY,
H. T. HOWER.