

(No Model.)

R. M. WEIR.
FURNACE.

No. 459,892.

Patented Sept. 22, 1891.

Fig. 1



Fig. 2

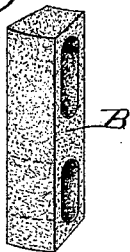


Fig. 3



Fig. 4

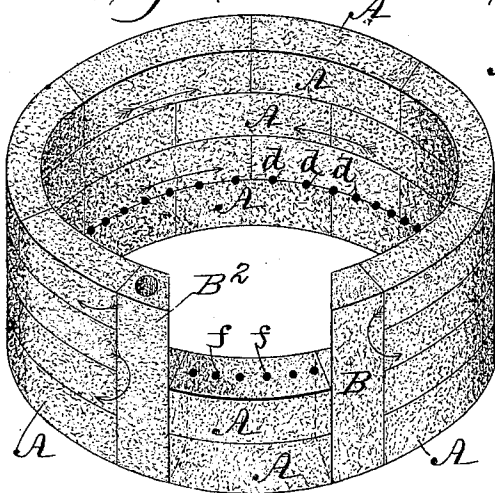


Fig. 5

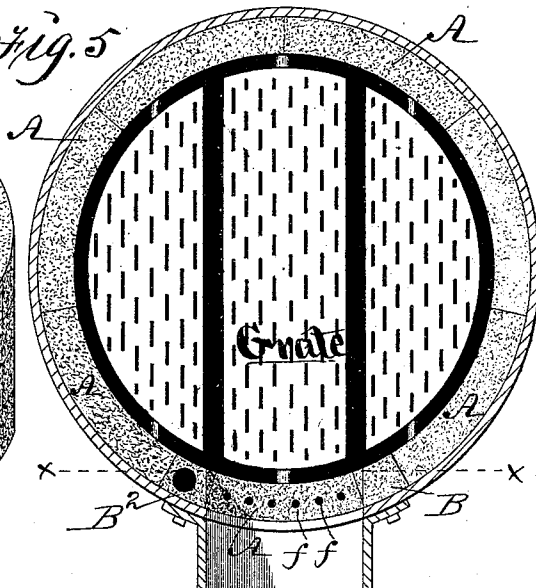
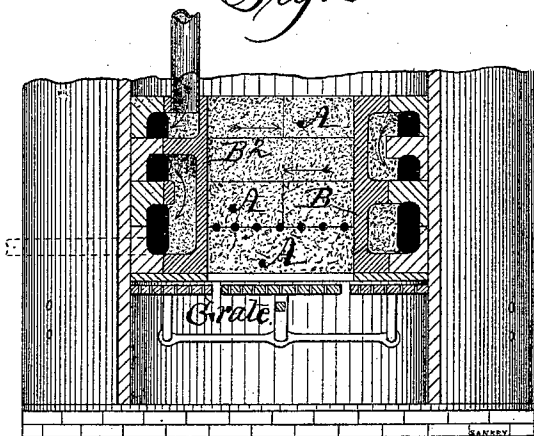


Fig. 6



Witnesses:

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UNITED STATES PATENT OFFICE.

ROBERT M. WEIR, OF BOONE, IOWA.

FURNACE.

SPECIFICATION forming part of Letters Patent No. 459,892, dated September 22, 1891.

Application filed April 28, 1891. Serial No. 390,873. (No model.)

To all whom it may concern:

Be it known that I, ROBERT M. WEIR, a citizen of the United States of America, and a resident of Boone, in the county of Boone and State of Iowa, have invented a new and useful Improvement in Furnaces, of which the following is a specification.

My invention relates to the furnace for which United States Letters Patent were issued to me April 14, 1885, No. 315,867; and it consists in the construction, arrangement, and combination of an air conveyer, superheater, and distributor, as hereinafter set forth, in such a manner that cold air will be admitted from outside of the furnace and circulated and heated and discharged to the fuel to aid combustion, to economize fuel, to facilitate the operation, to reduce the cost, and to promote the efficiency and durability of the furnace.

In the accompanying drawings, Figure 1 is a perspective view of a curved section or segment of a ring, and Figs. 2 and 3 of straight parts of the air conveyer and superheater. Fig. 4 is a perspective view showing all the parts of the air conveyer and superheater combined and ready to be applied to a furnace. Fig. 5 is a transverse sectional view of the circular metal wall of a furnace and a top view of the air conveyer and superheater in concentric position therein, as required in practical use. Fig. 6 is a vertical sectional view through the line X X of Fig. 5, showing the serpentine passage-ways for air within the conveyer and superheater.

A is one of the curved sections or segments of a ring, made of fire-clay, and a segment of one of a series of circular layers in the complete air conveyer and superheater. It has a channel extending from one end to the other adapted to serve as an air-passage in the complete device.

B is a straight piece of the same material adapted to be placed in a vertical position at the right side of a furnace-door and against the ends of curved sections, as shown in Figs. 4 and 5. It has elongated cavities in one of its sides adapted to establish communication with the channels of two overlying curved sections, as shown in Fig. 6.

B² is a corresponding straight piece of corresponding shape, adapted to be placed on

the left side of a door, as shown in Figs. 4, 5, and 6. It has a bore in its top to admit a tube C, which can extend vertically or horizontally to the outside of the furnace to convey air into the serpentine passage-way produced by the combination of overlying curved sections A and the straight pieces B and B². The air that enters through the tube C passes downward in the straight tube B², and from thence through the horizontal passage in the upper tier of sections A into the elongated opening in the straight piece B, which allows it to enter the horizontal passage-way in the second tier of the curved sections A. A serpentine or back-and-forth course is thus produced that can be continued through any number of tiers of sections A. The lower tier of sections A is inverted, so that the channels in the two lower tiers are brought together to produce an enlarged channel or superheating-chamber that has communication with the interior of the furnace through a series of perforations *d*, through which the superheated air will be ejected to envelop the fuel on the grate and to ascend up through the fuel to promote combustion and to prevent the formation of soot and the escape of valuable products of combustion through the smoke-flue.

In place of admitting air from the outside of the furnace to pass downward, it may be admitted through a horizontal opening, as indicated by dotted lines in Fig. 6, and the top of the piece B closed to retain and confine the air in the serpentine passage until it is superheated and ejected through the series of perforations *d* and a second series of perforations *f* in the section A, that serves as the under part of the open doorway.

A simple, cheap, and non-combustible lining for a metal furnace is thus produced and readily applied, as required for practical use, for the purpose of conveying, superheating, and distributing air to promote combustion, to economize fuel, and to reduce the labor and cost of operating a furnace.

The air passage and chamber being separated from the fuel by the thin wall of the fire-brick, that readily absorbs and conveys heat, will become heated quickly, and the circulation will be rapid, so that the superheated air ejected and distributed through

the perforations *d* and *f* will create a draft as well as envelop and heat the fuel to aid in promoting combustion and generating heat for warming a building with hot air.

5 I claim as my invention—

1. A fire-proof block in the form of a straight piece having cavities in one of its faces adapting it to be combined with overlying segments of a ring having channels in their under faces to produce a serpentine passage-way in a furnace-lining, in the manner set forth, for the purposes stated.

2. A fire-proof air conveyer, superheater, and distributor for a furnace, comprising a series of overlying tiers of segments of rings, each having a continuous channel in one of its faces, and straight blocks having open-

ings in their side faces to establish communication with the horizontal passages in said tiers, arranged and combined to operate in the manner set forth.

3. In a furnace, a lining extending from one side of an open space or doorway around to the other side thereof, to the under side, and across below, and also to the top of the same doorway, composed of pieces placed in abutting and overlying positions and having a serpentine air-passage for conveying, superheating, and distributing air, for the purposes stated.

ROBERT M. WEIR.

Witnesses:

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