(No Model.)

A. BACKUS, Jr.

BOILER FURNACE.

No. 338,462. Patented Mar. 23, 1886.

Fig. 1.

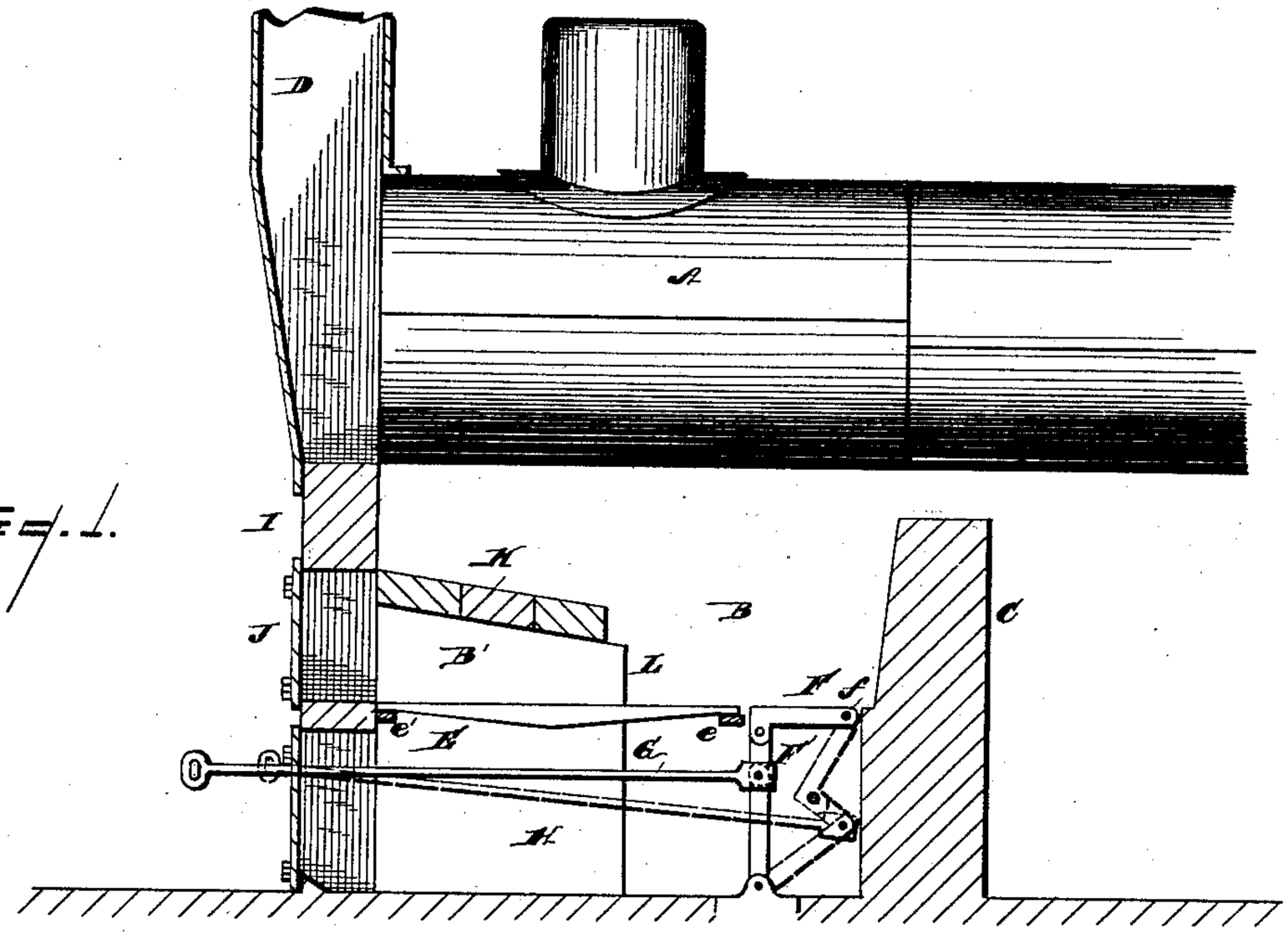
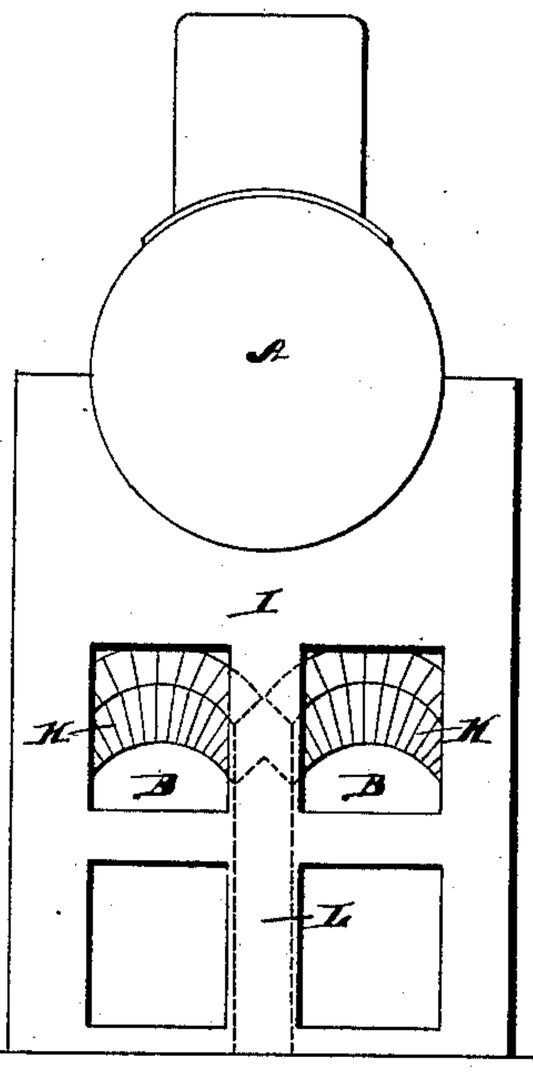


Fig. 2.



WITNESSES

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ABSALOM BACKUS, JR., OF DETROIT, MICHIGAN.

BOILER-FURNACE.

SPECIFICATION forming part of Letters Patent No. 338,462, dated March 23, 1886.

Application filed August 7, 1885. Serial No. 173,852. (No model.)

To all whom it may concern:

Be it known that I, ABSALOM BACKUS, Jr., of Detroit, county of Wayne, State of Michigan, have invented a new and useful Improvement in Boiler-Furnaces; and I do hereby declare the following to be a full, clear, and exact description of the same, 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 a part of this specification.

The object of my invention is to provide an improved furnace designed to secure a more thorough combustion of the coal, thereby economizing the fuel, preventing smoke, and securing the most thorough utilization of the heat.

My invention consists in the combination of devices and appliances hereinafter specified, and more particularly pointed out in the claims.

In the drawings, Figure 1 is a longitudinal section of a device embodying my invention. Fig. 2 is a front section.

I carry out my invention as follows: A represents a boiler; B, the combustion-chamber; C, a rear bridge-wall; D, a smoke-flue; E, the stationary grate supported upon cross-bars *e e'*, or otherwise.

F is a dumping-grate in the rear of the stationary grate, said grate being pivoted at its rear end, as shown at *f*.

F' is a knee-joint lever having a pivotal connection with the front end of said dumping-grate, and provided with an operating-bar, G, the construction being such that when said lever is forced inward the grate will assume the position shown in dotted lines, Fig. 1. It is obvious that by the use of this dumping-grate in the rear of the grate E the clinkers may be readily removed without disturbing the operation of the furnace, or impairing the combustion of the fuel, the clinkers being crowded to the rear end of the stationary grate, where they readily fall into the ash-pit H when the rear grate is dumped.

I is the front wall of the combustion-chamber; J, a door through which fuel may be fed to the grate.

K is my improved arch, located in the front of the combustion-chamber, between the grate and the boiler-dividing the combustion-chamber, so as to form a coking-oven, B', in the front thereof, into which the fuel first enters, and after being coked therein is forced back upon the rear of the stationary grate, where the process of combustion is completed. The location of this arch above the front portion of the grate in the combustion-chamber obviously confines the volatile products of combustion upon the fuel-bed, and thereby secures thorough combustion, preventing the escape of smoke, the waste of fuel thereby, and the annoyance arising therefrom. The arch K is inclined from the front toward the rear, so as to narrow the throat at its rear end between the coking-oven and the rest of the combustion-chamber and secure the thorough combustion of the fuel gases. At the same time the inclined arch K prevents cold air from coming in contact with the boiler when the door is opened for the admission of fuel, or otherwise, and the heated air is permitted to circulate in the combustion-chamber above said arch and under the boiler.

The combustion-chamber is preferably provided with a longitudinal division-wall, L, dividing the combustion-chamber into two compartments, each provided with an inclined arch, K, said arches being supported at their inner edges upon the wall L and upon their outer edges upon the side walls of the combustion-chamber.

The draft for the combustion-chamber may be secured in any desired way.

I have found that the fuel-doors may be left open or adjusted to permit the entrance of air first to the coking-chamber with good results.

This inclined arch K may be built in any suitable manner—as, for instance, of arch-brick, although I do not confine myself thereto, nor to any particular manner of supporting the same in the combustion-chamber. The front of said inclined arch K abuts against the front wall, I, although it may be extended downward in the rear of the door. The front wall, I, supports the forward end of the boiler, the combustion-chamber being located entirely underneath the boiler, coking-oven, and all. The

front door to the combustion-chamber may be left ajar to furnish draft.

By the construction of the grates above described no cooling of the combustion-chamber takes place in clearing the grates.

I am aware that heretofore a deflector and spark-arrester have been used, consisting of a curved or arched roof to the combustion-chamber, having longitudinal and transverse communicating passages, and covering the entire chamber, excepting a limited passage for the products of combustion at the upper forward end of the chamber. This is not my invention and could not serve the purpose I attain. By thus locating the arch well down and inclining it downward from the door to its extremity it does not obstruct the direct radiation from the bed of fuel up against the forward end of the boiler, whereas if it were located high up it would be interposed, and therefore cut off a considerable surface from such direct radiation. At the same time the low situation and incline of the arch presents its bricks or material to a strong heat on top and its under surface into close contact with the fuel so that the arch thus highly heated radiates its heat directly against the contained fuel and greatly facilitates the coking process. This highly-heated arch also radiates its heat up against the surface of the boiler and serves to maintain a strong and substantially uniform heat during the period of charging. The construction also operates to highly heat the incoming air before it emerges into the combustion-chamber, and as it is obliged to traverse the whole length of the arch immediately on the surface or through the body of the fuel it is thoroughly commingled with the products of combustion that are given off from the fuel.

I am aware of the patent to J. T. Rich, November 1, 1870, No. 108,935, and J. J. Hall, February 21, 1882, No. 254,007, and lay no claim to anything therein shown.

What I claim is—

1. In a furnace, a wall having a flue with which the flues of the boiler communicate at their forward ends, a combustion-chamber located under the forward end of the boiler, an arch, K, abutting against the front wall of said chamber, midway thereof, and extending over the front half, or thereabout, of the stationary grate, and a bridge-wall, substantially as described.

2. In a furnace, the combination, with a stationary grate, of a dumping-grate consisting of an L-shaped grate-section pivoted by the ends of its longer arms to a support, and by the ends of the shorter arms to a supporting bar or plate pivoted beneath said dumping-grate, substantially as described.

3. In a furnace, the combination, with a stationary grate, of a dumping-grate consisting of an L-shaped grate-section pivoted by its longer arms or bars to a rigid support, and by its shorter arms to a bar or plate having pivotal support beneath said grate, and a connecting-bar pivotally attached to the supporting-bar, substantially as described.

4. In a furnace having a free combustion-chamber adapted to permit direct radiation of heat from the fuel-bed against the under surface of the boiler, and an inclined arch, K, located in the front portion of the combustion-chamber and about midway between the top thereof and the grate, the front of said arch abutting against the front wall of the combustion-chamber to form a coking-oven, substantially as described.

In testimony whereof I sign this specification in the presence of two witnesses.

ABSALOM BACKUS, JR.

Witnesses:
N. S. WRIGHT,
M. B. O'DOGHERTY.