

No. 491,233.

Patented Feb. 7, 1893.

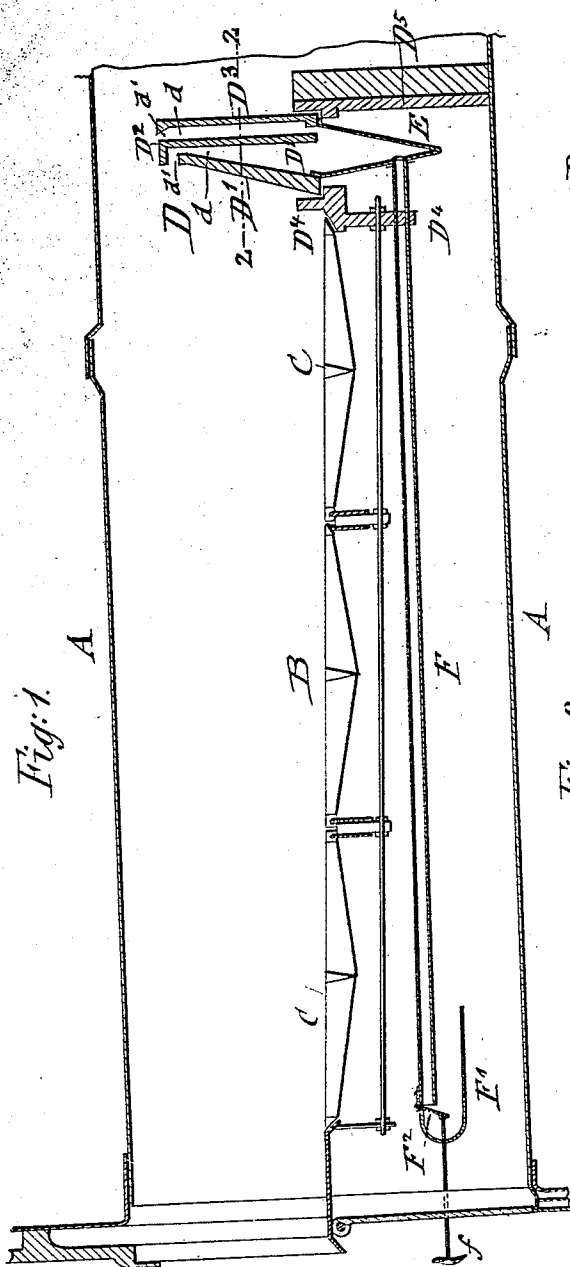


Fig:1.

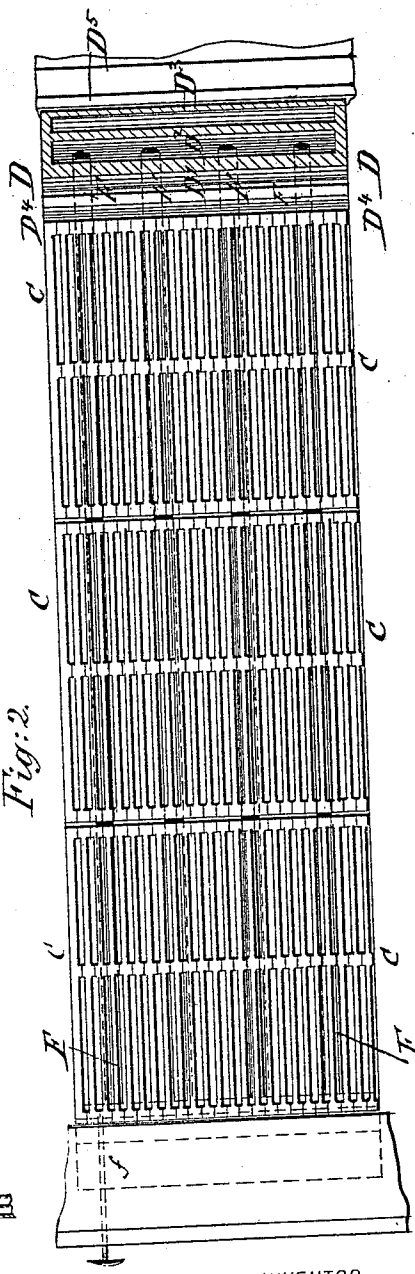


Fig:2.

WITNESSES:

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SMOKE-CONSUMING FURNACE.

SPECIFICATION forming part of Letters Patent No. 491,233, dated February 7, 1893.

Application filed November 28, 1892. Serial No. 453,327. (No model.)

To all whom it may concern:

Be it known that I, WILHELM ARNEMANN, a citizen of the United States, residing in the city of Hamburg, Germany, have invented certain new and useful Improvements in Smoke-Consuming Furnaces, of which the following is a specification.

This invention relates to certain improvements in smoke consuming furnaces of that class in which highly heated air is supplied to and mingled with the products of combustion at or near the fire-bridge so that a more perfect combustion of the unburned carbon-particles contained in the fire gases is obtained; and the invention consists of a furnace, the fire-bridge of which is formed of several passages or channels which are arranged side-wise of and one back of the other, the discharge-orifices of said channels being inclined in a direction opposite to the course of the products of combustion so as to mingle with the same in front of and above the fire-bridge. The lower ends of the passages or channels are closed by a collecting box or casing, which is connected by one or more longitudinal pipes or flues, that are located below the grate-bars of the furnace, said pipes or flues being provided at their front-ends with dependent hoods or deflectors that extend from the upper parts of said pipes to some distance below said pipes and with valves by which the ingress of air into the supply-pipes is regulated.

In the accompanying drawings, Figure 1 represents a vertical longitudinal section of a smoke-consuming furnace with my improved fire bridge, shown as arranged in the fire-space of a Cornwall-boiler. Fig. 2 is a plan-view of the same, partly in horizontal section, line 2 2, Fig. 1.

Similar letters of reference indicate corresponding parts.

Referring to the drawings A represents a steam-boiler of the so-called Cornwall type, or of any other suitable construction, B a furnace which is arranged either in the fire-space of the same or below the boiler as desired, C the grate-bars and D the fire-bridge, which is arranged with two or more air passages or channels, that are constructed of a number of cast iron plates D' D² D³ as shown clearly in Fig. 1. The upper ends of the air passages or channels *d* are provided with discharge

orifices *d'* that emit the air supplied to the same in a direction opposite to the direction of the products of combustion, so as to produce a perfect and successive intermingling of the hot air with said products of combustion. The plates D' D² D³, by which the air passages or channels *d* are formed, are supported in suitable manner at the rear end of the furnace, the front plate D' being supported on the rear-bar D⁴ of the grate, while the rear plate D³ is supported on a shoulder of an upright breast plate D⁵ which is backed by a layer of fire-bricks. The intermediate plate D² is attached at the ends to the front and rear plates D' D³ and supported by the same. The lower ends of the front and rear plates D' and D³ are connected by a casing E, which is preferably made of a V-shaped cross-section and which is formed of two converging wrought iron plates, that are closed at their lower ends, said plates forming a collecting box for the air supplied from the front-end of the furnace to the fire-bridge D. One or more longitudinal air-pipes or flues F are connected with the lower part of the collecting box or casing E, said pipes are extended in longitudinal direction below the grate-bars to the front-end of the furnace where they are provided with curved hoods or deflectors F' that are attached to the upper parts of said conducting pipes or flues, their lower parts being extended parallel thereto in backward direction, as shown clearly in Fig. 1. Hinged valves F² that are operated by suitable rods *f* from the outside of the furnace are applied to the ingoing ends of the air-supply pipes F so as to regulate the quantity of air that is conducted through the same to the fire-bridge. The hoods or deflectors F' take up the air from the space below the grate, where the air is already heated up to some extent by the heat radiated by the fire on the grate-bars and conduct the same to the ingoing ends of the air-supply pipes and through the same into the collecting box or casing E from which the air which is heated up to a high degree in its passage through the pipes or flues F is conducted to the passages or channels and emitted through the orifices of the same so as to mingle with the products of combustion, before and during their passage over the fire-bridge. The air drawn in at the ingoing ends of the pipes or

flues F is subjected throughout its course through the air-pipes and collecting-box to the heat radiated by the fire and grate-bars, so that the same is gradually heated to a high temperature, until it is mingled with the products of combustion, which are thereby burned in a more perfect manner above the fire-bridge, and the result being a superior combustion of the products of combustion and the unconsumed carbon-particles contained in the same, so that the formation of smoke is to a great extent prevented and a higher degree of heat obtained with a considerable saving of fuel.

Having thus described my invention, I claim as new and desire to secure by Letters Patent:

1. In a smoke consuming furnace, the combination of a hollow fire bridge composed of outer plates D¹ and D² supported respectively on the rear bar D⁴ of the grate and an upright breast plate D⁵, and an inner plate D² connected to said outer plates at the ends, a col-

lecting box connecting the lower ends of the outer plates, and conducting pipes extending from the collecting box below the grate bars toward the front of the furnace.

2. In a smoke-consuming furnace, the combination, of a hollow fire-bridge, composed of a number of plates forming passages or channels, a collecting box at the lower parts of said channels, conducting pipes extending from the collecting box or casing below the grate-bars toward the front of the furnace, deflectors or hoods attached to the ingoing ends of said pipes and regulating valve or valves arranged at the front-end of said pipes, substantially as set forth.

In testimony that I claim the foregoing as my invention I have signed my name in presence of two subscribing witnesses.

WM. ARNEMANN.

Witnesses:

PAUL GOEPEL,
CHARLES SCHROEDER.