H. C. E. EGGERS & H. C. KIRCHMANN.

Furnace for Steam-Boilers.

No. 198,587. Patented Dec. 25, 1877.

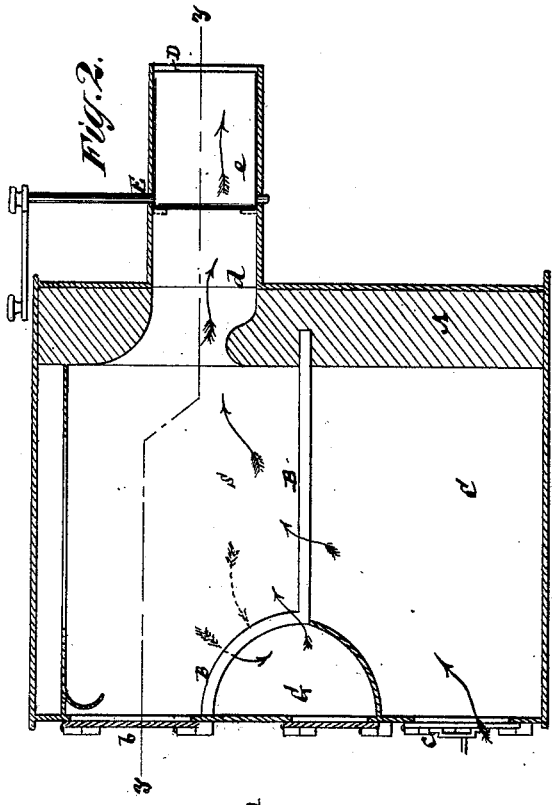

Fig. 2.

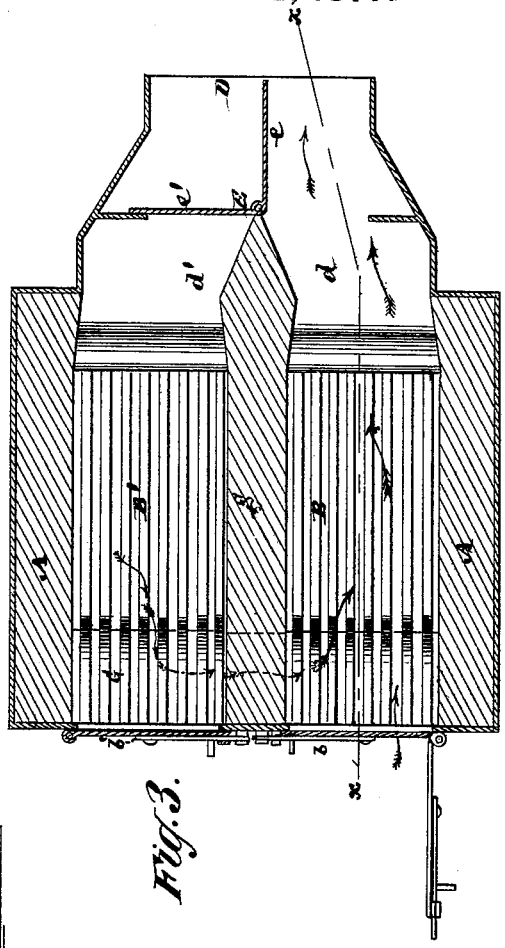

Fig. 3.

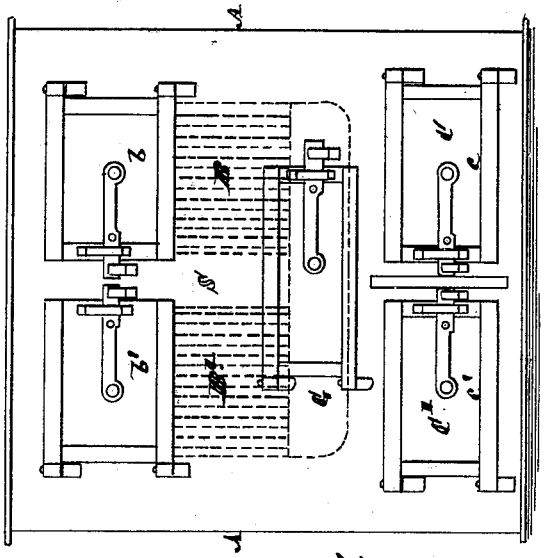

Fig. 1.

Witnesses
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UNITED STATES PATENT OFFICE.

HEINRICH C. E. EGGERS AND HEINRICH C. KIRCHMANN, OF HAMBURG, GERMANY.

IMPROVEMENT IN FURNACES FOR STEAM-BOILERS.

Specification forming part of Letters Patent No. **198,587**, dated December 25, 1877; application filed September 14, 1877.

To all whom it may concern:

Be it known that we, HEINRICH CONRAD ERNST EGGERS and HEINRICH CHRISTIAN KIRCHMANN, both of the city of Hamburg, Germany, have invented a new and useful Improvement in Apparatus or Means for Consuming Smoke, of which the following is a description, reference being had to the accompanying drawing, which forms part of this specification.

Our invention, which is applicable to fire-places or furnaces of various kinds, including those relating to stoves, steam-boilers, kilns, and other heating structures or apparatus, subject only to such modifications of construction as are essential to its particular application, relates to twin fire-places or furnaces in communication with each other at their front, and alternately put in direct communication at their rear with the chimney or outlet, in order that as each fire-place or furnace is charged with fresh fuel the smoke and resulting gases therefrom, in their escape to the chimney, will be made to pass over the incandescent fuel in the adjacent fire-place or furnace, thus producing a perfect combustion of said smoke and gases. This mode of firing is more particularly advantageous when coal or other like smoke-producing fuel is used, and the invention will here be described accordingly.

The invention, which is an improvement upon this description of twin furnaces, consists in a novel construction of the duct used to establish communication between the two fire-places or furnaces at their fronts, said duct being composed of an arched channel, arranged to extend throughout the width, or thereabout, of both fire-places, and the upper portion of which is formed by an arched or raised continuation or extension of the grate-bars of said fire-places, whereby the unconsumed smoke and gases passing from the grate-section which receives the fresh charge of fuel not only have a free escape to the adjacent grate-section, but are more uniformly distributed to and over the incandescent fuel in said adjacent grate-section throughout its width, and a free current of air is or may be admitted over the fire, to mingle in a divided or widely-distributed manner with the unconsumed gases to assist in their combustion.

Figure 1 represents a front view of a furnace having our invention applied; Fig. 2, an irregular vertical section of the same on the line *x x;* and Fig. 3, an irregular horizontal section thereof on the line *y y*.

A A are the outer walls of the furnace, the grate of which is divided into duplicate parallel sections B B′ by a vertical partition-wall, S, which wall may be extended throughout the whole depth or height and length of the furnace, including its ash pit or pits. Each grate-section B B′ is provided with a separate fire-door, *b* or *b′*, and each ash-pit section C or C′ may also be similarly provided with a separate door, *c c′*.

The grate-sections B B′ are connected in their rear by separate draft channels or ducts *d d′* with a common outlet or chimney, D. These ducts are controlled by a single valve, E, having duplicate flaps or leaves *e e′*, arranged at right angles with each other or otherwise, so as to control both ducts *d d′* in such manner that when one of said ducts is open the other duct is closed. The fire-bars of each grate-section B or B′ are bent upward at their front ends, and said grate-sections are connected above their beds or bottoms through such bent-up portions of the bars by a front channel or duct, G.

In the operation of the furnace, after the coal has been properly lit in both sections B B′, and fresh coal is supplied to either one of said sections, while the other of said sections presents a clear fire of live coal or coke, then the valve E is turned to close the outlet *d* or *d′* from the grate-section which has had the green coal last supplied to it. This causes the smoke and unconsumed gases from said last-named section to pass along the front channel or duct G to the other grate-section, containing the live coal or coke, and in free communication by the valve E with the main outlet or chimney. This causes a perfect combustion of the escaping smoke or unconsumed gases by their passage over the live coal or coke, atmospheric air being freely supplied to keep up the combustion by or through the ash-pits below. Such action is repeated al-

ternately for either grate-section B or B′, as fresh or green coal is supplied first to one section and then to the other by reversing the position of the valve E to divert the draft from the grate-section containing the fresh coal through the front duct G to the grate-section having the clear fire, where the smoke and escaping gases from the section containing the green coal are consumed in their way or passage to the chimney. Each rear outlet from either fire-place, however, may, if desired, be controlled by a separate valve.

What we claim as our invention, and desire to secure by Letters Patent, is—

In a twin furnace, in which the duplicate fire-places are in communication with each other at their front, and controlled by valves in their rear, to put either fire-place alternately in direct communication with the chimney, the combination, with the twin fire-places or grate-sections B B′, of the front duct G, arranged to extend throughout the width, or thereabout, of both fire-places, and the upper portion of which is formed of an arched or raised continuation or extension of the grate-bars of said fire-places, substantially as and for the purposes specified.

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