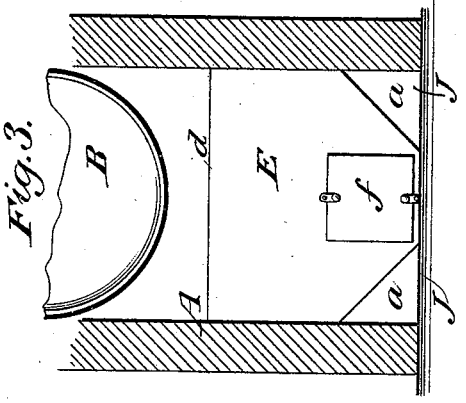
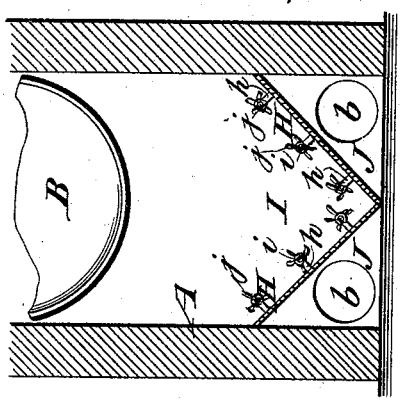
(No Model.)

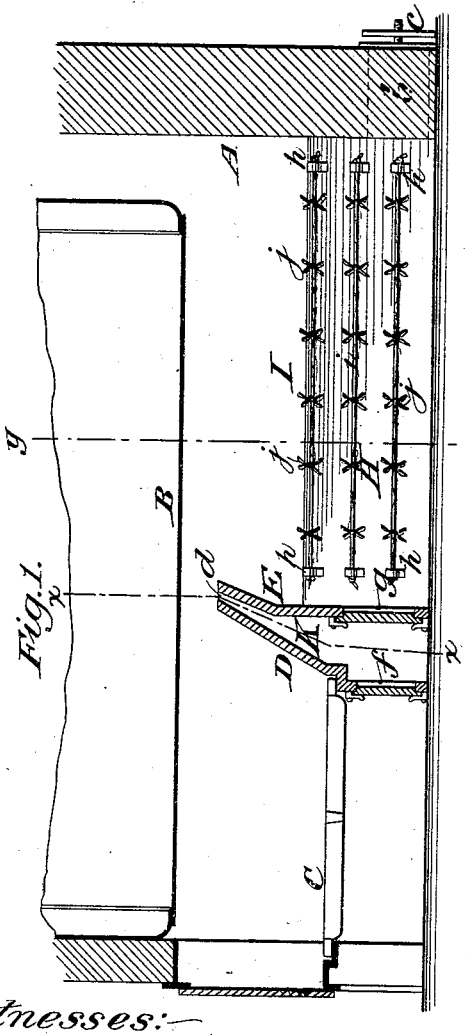
M. FRICKE.

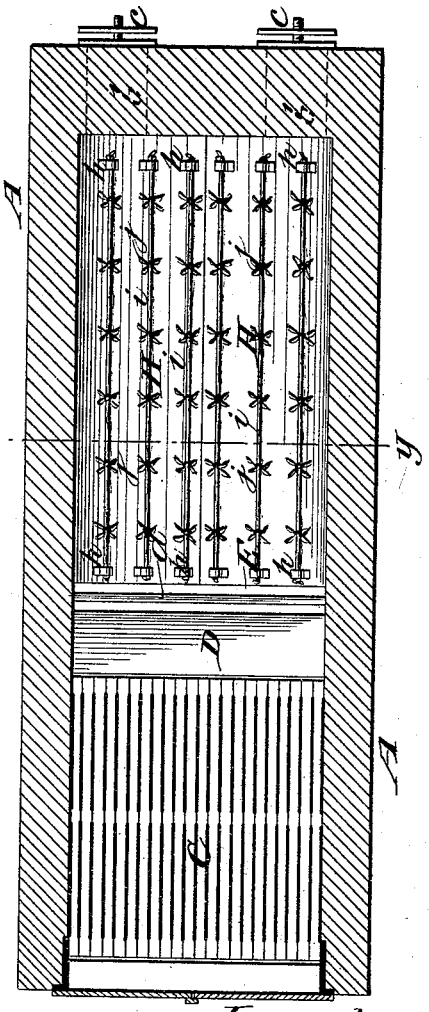
SMOKE CONSUMING FURNACE.

No. 494,272. Patented Mar. 28, 1893.









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SMOKE-CONSUMING FURNACE.

SPECIFICATION forming part of Letters Patent No. 494,272, dated March 28, 1893.

Application filed November 28, 1892. Serial No. 453,316. (No model.)

To all whom it may concern:

Be it known that I, MAX FRICKE, a subject of the Duke of Brunswick, Germany, at present residing in the city of New York, in the State of New York, have invented a new and useful Improvement in Smoke-Consuming Furnaces, of which the following is a specification, reference being had to the accompanying drawings.

This invention consists in the novel combination in a furnace, as hereinafter described and claimed, of a plate and partitions in the space behind the fire bridge for the purpose of heating air by the gaseous products of combustion during the exit of the latter from the furnace and of introducing the so heated air in properly regulated quantity, to mix immediately behind the fire chamber with the gaseous and fuliginous products of the imperfect combustion in the said chamber and thereby to complete the combustion of such products.

It also consists in the means hereinafter described for the purpose of absorbing heat from the outgoing gaseous products of combustion and transmitting it to the incoming air.

Figure 1 represents a central longitudinal vertical section of a boiler furnace embodying my invention. Fig. 2 represents a horizontal section of the same immediately below the boiler. Fig. 3 represents a transverse vertical section taken in the line *x x* of Fig. 1 and viewed from the left. Fig. 4 represents a transverse vertical section taken in the line *y y* of Figs. 1 and 2 and viewed from the left.

A designates the walls of the furnace, B the boiler and C the grate.

D is a fire bridge in rear of the grate. This may be such a fire bridge as is common in boiler furnaces built of masonry or may be an iron plate. In the example represented it is a plate.

E is a plate erected on the base of the furnace behind the bridge D. This plate extends transversely between the side walls of the furnace. Its base is some distance in rear of the bridge D but its upper edge is very near the bridge and about on a level with that of the top of the bridge. In the space between the back of this plate E and the rear wall of the furnace there are arranged two longitudinal partitions which are represented (see Fig. 4) as consisting simply of two loose iron plates H H which rest upon the base of the furnace and abut against each other at their lower edges and lean against the side walls of the furnace, the said partitions dividing said space lengthwise and diagonally to the base and side walls of the furnace into a middle flue or passage I, and two side flues or passages J J. The middle flue or passage I is in direct communication at its front above the fire bridge D and plate E with the fire chamber K of the furnace and communicates at its rear end with the outlet passage L leading to the chimney. The two side flues or passages J J communicate in front through openings *a a* (see Fig. 3) in the lower corners of the plate E with the space K between the said plate E and the bridge; and at the rear of said flues or passages there are openings *b b* in the rear wall of the furnace for the admission of air into said flues, the said openings *b b* being fitted with doors, gates or valves *c c* for the purpose of regulating such admission.

h h are iron eye-bolts or studs secured in the partition plates H H and projecting from the upper side thereof within the central flue or passage I. To these bolts or studs are secured cords *i i* of asbestus fiber which extend lengthwise of the said flue or passage I at a distance from the plates H H, and on these cords, knots or knobs *j j* of asbestus fiber are affixed at intervals in any suitable manner as by tying them on. These asbestus cords and knots and eye-bolts are surrounded by the outgoing gaseous products of combustion in the passage I and absorb from said products heat which they transmit to the partition plates H which are further heated by the direct contact of said products for the purpose of heating incoming air in the flues or passages J J.

In the operation of the furnace the gaseous products of combustion from the furnace passing through the flue or passage I around the asbestus cords *i i* and knots *j j*, and the studs *h h* and over the plates H heat the said plates, and the air admitted to the flues or passages J by the openings *b b* is heated through the said plates and is, by the draft of the furnace, drawn through said flues or passages and through the openings *a a* in the plate E into the space K between the said plate and the fire bridge D, through which space it passes

upward and in which it is further heated. Thus heated the said air issues from the opening *d* between the upper edges of the fire bridge and plate E where it meets the hot gaseous and fuliginous products of the imperfect combustion in the fire chamber and passing with said products into the flue or passage I is therein mixed and combined with the said products to complete their combustion.

To provide for the removal from the bottoms of the space K and the flue or passage I of any dust or cinders that may collect therein, I provide an opening *f* in the fire bridge D below the grate and an opening *g* in the lower part of the plate E, the said openings being fitted with doors by which they are closed during the operation of the furnace.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. The combination in a furnace, of a fire bridge in rear of the fire chamber, a plate arranged across the furnace in rear of the fire bridge, two longitudinal partitions dividing the space in rear of said plate into a middle flue or passage and two side flues or passages, the said middle flue or passage being in communication above the said plate and the fire bridge with the fire chamber and also in communication with the outlet passage to the chimney and the two side flues or passages communicating through openings in the said plate with the space between the said plate and the fire bridge and having air inlets at their rear ends, substantially as and for the purpose herein set forth.

2. In a boiler furnace, the combination with the fire grate and the fire bridge in rear thereof, of the plate E transversely arranged behind the fire bridge and having openings *a a* in its lower corners, and the longitudinal diagonal partitions H H behind the said transversely arranged plate, said partitions consisting of separate plates resting upon the base of the furnace and leaning against the side walls thereof and forming with the walls and base of the furnace air-passages in communication with the space between the fire bridge and said transversely arranged plate, all substantially as herein set forth.

3. The combination with the fire bridge, the transverse plate E in rear thereof, and the longitudinal diagonal partition plates H H in rear of said transverse plate E dividing the space in rear of said plate E into a central passage I for the gaseous products of combustion and side passages J J for incoming air, of the cords *i i* of asbestus fiber attached to the said partition plates H H within said passage I, substantially as and for the purpose herein set forth.

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