(No Model.)

J. B. BOULICAULT.

FURNACE.

No. 246,452. Patented Aug. 30, 1881.

Fig. 1.

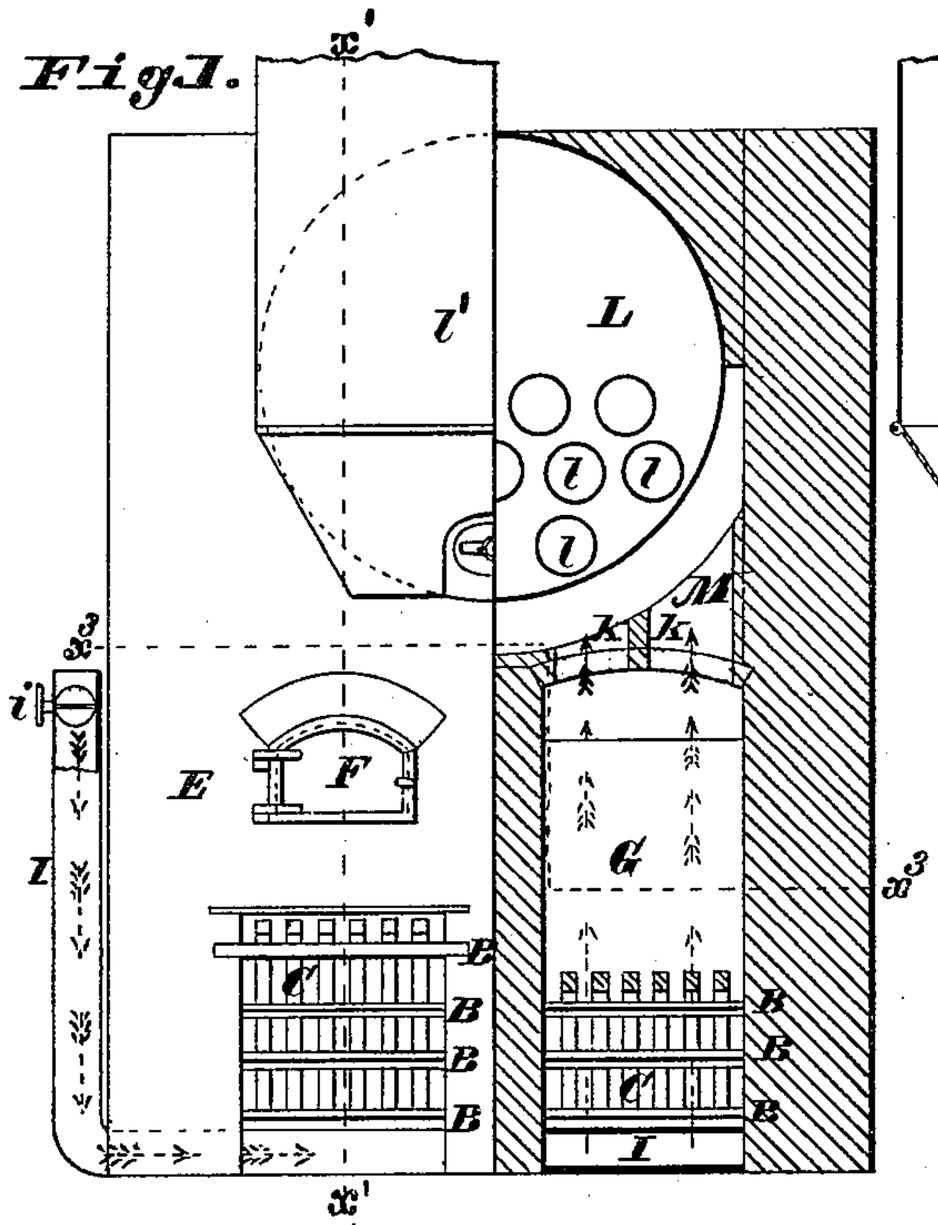


Fig. 2.

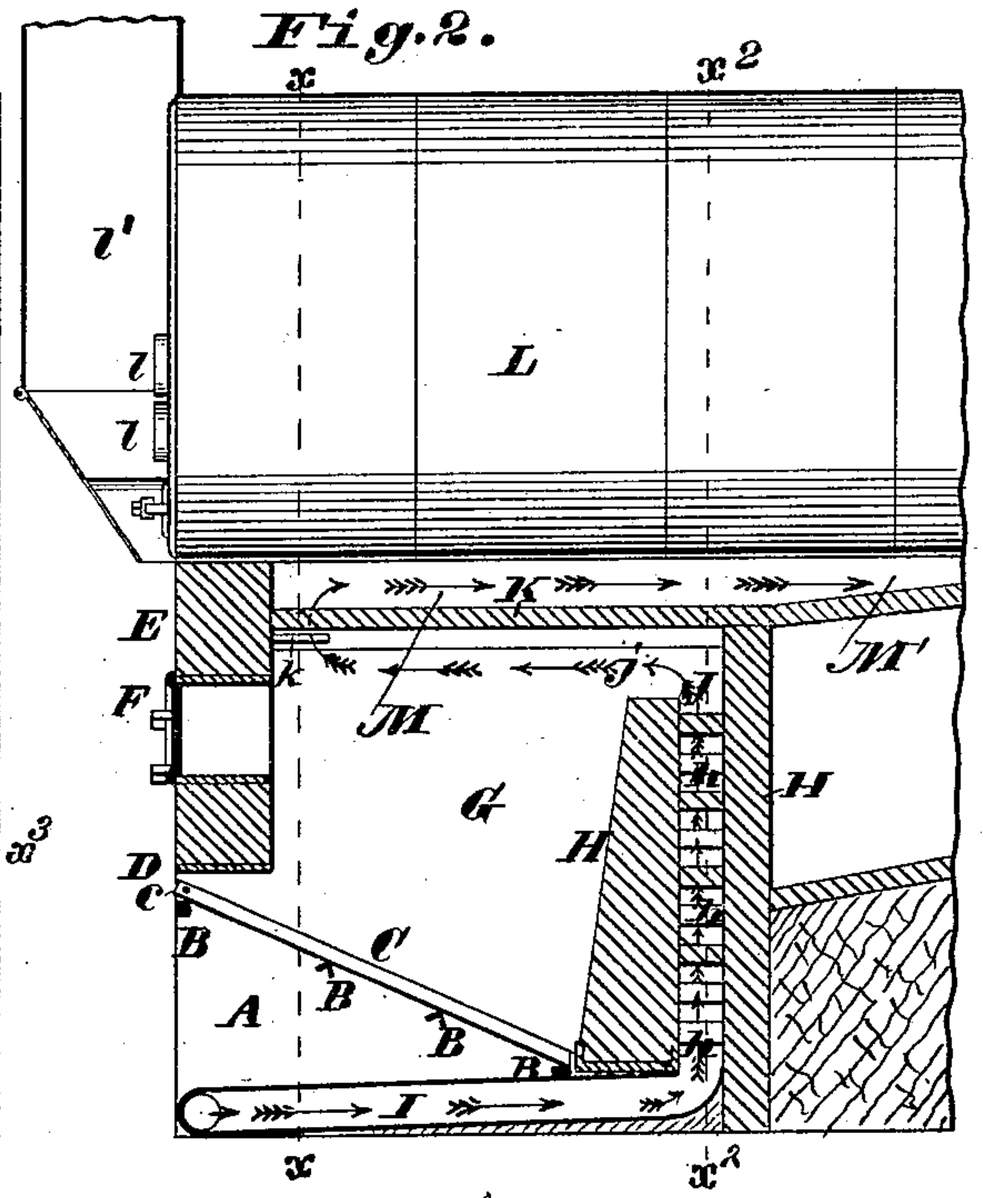


Fig. 3.

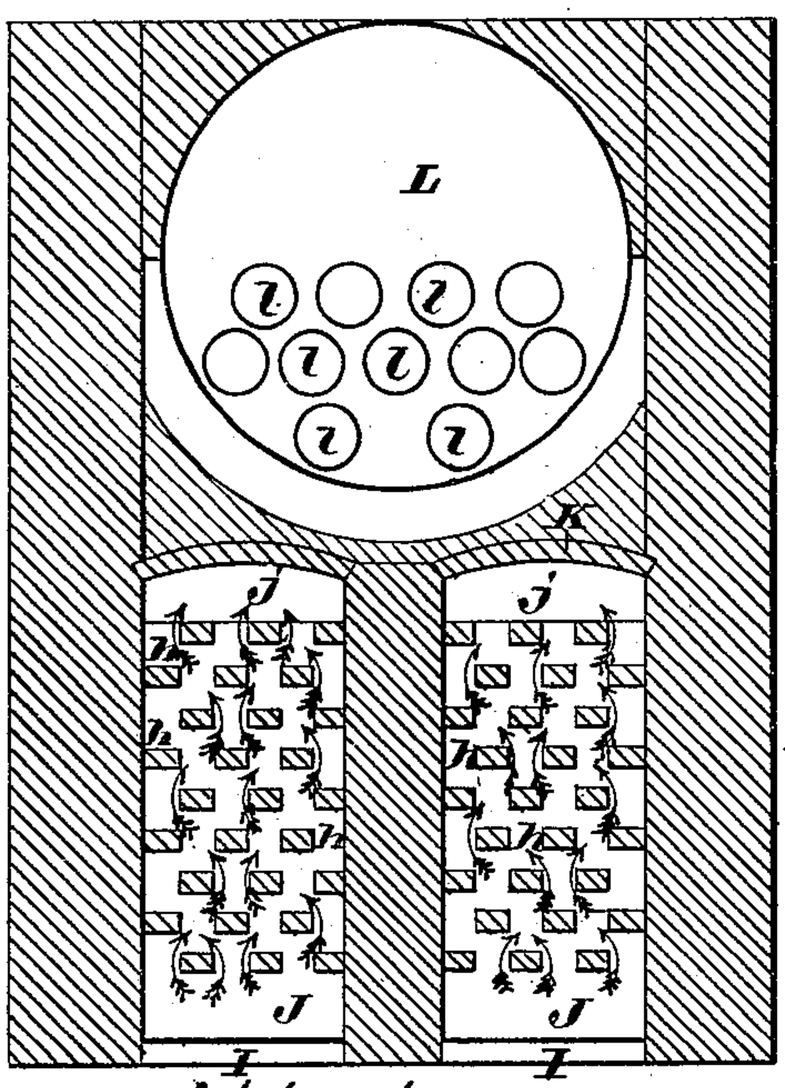
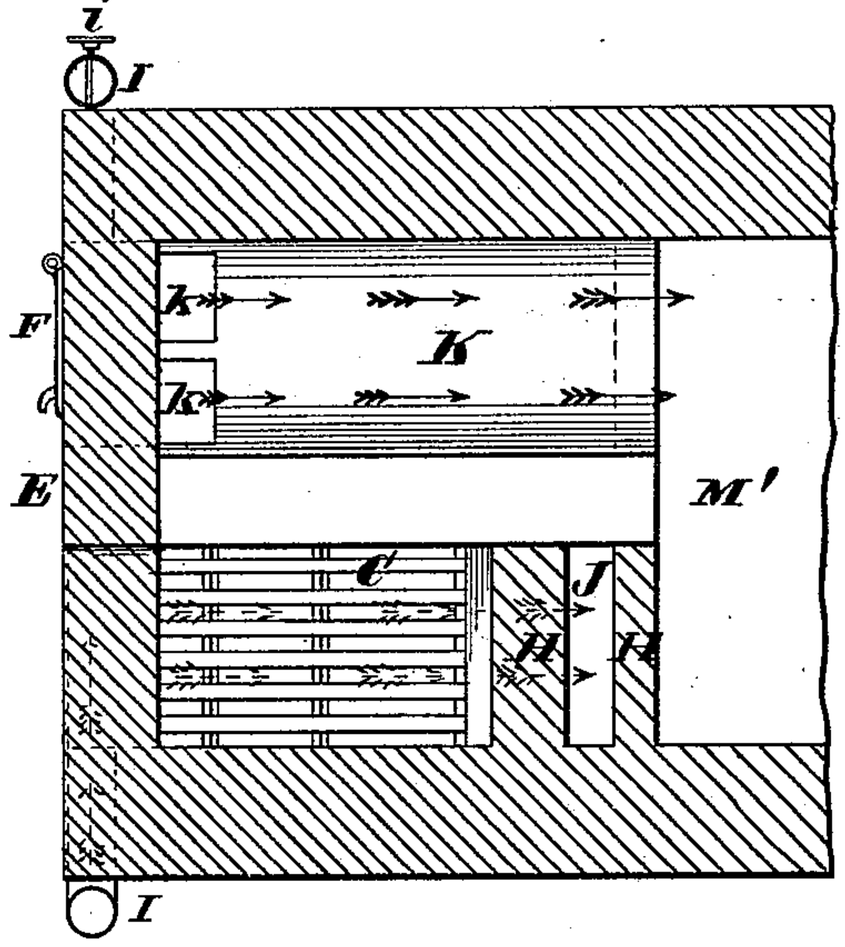


Fig. 4.



Attest:
Charles Pickles
Geo. H. Knight

Inventor:
Jean B. Boulicault
By Knight Bro's.
Attys.

UNITED STATES PATENT OFFICE.

JEAN B. BOULICAULT, OF ST. LOUIS, MISSOURI, ASSIGNOR OF ONE-HALF TO JOSEPH LEHNBEUTER, OF SAME PLACE.

FURNACE.

SPECIFICATION forming part of Letters Patent No. 246,452, dated August 30, 1881.

Application filed March 8, 1881. (No model.)

To all whom it may concern:

Be it known that I, JEAN B. BOULICAULT, of the city of St. Louis, in the State of Missouri, have invented certain new and useful Improvements in Furnaces, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, making part of this specification.

My improvement relates to a furnace which is applicable to both manufacturing and domestic purposes; and it consists in the described construction for the saving of fuel and consumption of smoke.

In the drawings, Figures 1, 2, 3, and 4 illustrate the invention as applied to a steam-boiler. Fig. 1 is part in front view and part in vertical transverse section at $x\ x$, Fig. 2. Fig. 2 is a vertical longitudinal section at $x'\ x'$, Fig. 1. Fig. 3 is a vertical transverse section at x^2 x^2, Fig. 2. Fig. 4 is a horizontal section at jagged line $x^3\ x^3$, Fig. 1.

A is the ash-pit.

B are bearing-bars for the grate-bars, of which the central ones are shown as made of angle-iron, although the sectional shape is not an essential feature.

C are the grate-bars, which I prefer to make disconnected and removable by drawing out endwise by means of a hook inserted in the hole *c* at the outer end of each bar.

D is an elongated aperture between the top of the bars and the furnace-front E, through which a poker or scraper may be introduced to stir the fire or remove clinkers from the bars.

F is the furnace-door.

G is the fire-chamber.

H is the bridge-wall, forming the back wall of the fire-chamber.

A portion of the air to feed the fire enters by way of the ash-pit through the spaces between the grate-bars; but the air which is relied upon to consume the smoke enters the upper part of the fire-space through a duct, I J *j*, which passes beneath the ash-pit upwardly through the bridge-wall and then into the fire-space beneath an arch, K, of fire-brick, tile, or other refractory material.

The air-duct I may be in communication with the outer air at each side of the furnace, as shown in Figs. 1, 4, or on one side thereof, or the said duct may receive air from any suitable location. The ducts I are provided with dampers or valves *i*, to check or stop the entrance of air, as may be required.

The arch or crown K extends over the whole of the fire-chamber from the top of the bridge-wall H to the front wall, E, and from side to side, except that at or near the front wall, E, are apertures or an aperture, *k*, extending through the arch K, through which the products of combustion ascend from the fire-chamber and pass over the crown to the back of the bridge-wall at M′, thus heating the bottom of the boiler in the application of the invention. As the carbonaceous gases arise from the burning fuel they mingle with the heated air flowing through opening *j*, and the smoke is perfectly consumed.

To insure the heating of the whole of the air in its passage through the flue J, I fix in the said flue fire-bricks or other bricks, *h*, which may extend entirely across the flue in the manner shown in Figs. 2, 3, so as to give devious courses to the air and insure that all portions shall become heated by the hot sides of the duct and the heated deflectors *h*.

I will now describe the application of my invention to a steam-boiler furnace, and in another subsequent application to a reverberatory furnace.

L is a portion of a steam-boiler, which should rest at the front end upon the front wall or front plate, E, a proper distance above the arch K.

Deflectors may be used above the ventages *k*, to interfere with the direct impact of the heated flame against the boiler.

In their way to the chimney the heated gases pass in contact with the rear side of the bridge-wall, having passed through flues M M′ and boiler-flues *l* to the breeching and chimney *l′*.

I claim for this furnace that it needs replenishment only at long intervals, and that the smoke is thoroughly consumed, and consequently there is a considerable saving in fuel; also, that the poorer articles of fuel may be used, such as coal-slack, sawdust, and other cheap fuels, either wet or dry.

The improvement is applicable to furnaces

in general for manufacturing or domestic purposes, for locomotives, &c., and in general where a high degree of heat is required, where fuel is scarce or poor, and wherever it is desired to consume the smoke.

I claim as my invention—

1. The combination of fire-chamber or furnace G, bridge-wall H, arch or crown K, with ventage *k* and flue J within the bridge-wall.

2. The combination of the fire-chamber or furnace G, arch or crown K, having ventage *k*, wall H, and flue J, within the same, with the flue I, in connection with flue J, and passing beneath the ash-pit.

JEAN B. BOULICAULT.

Witnesses:

SAML. KNIGHT,

GEO. H. KNIGHT.