

(No Model.)

I. W. BECKWITH.
SMOKE CONSUMING FURNACE.

No. 513,070.

Patented Jan. 23, 1894.

Fig. 1

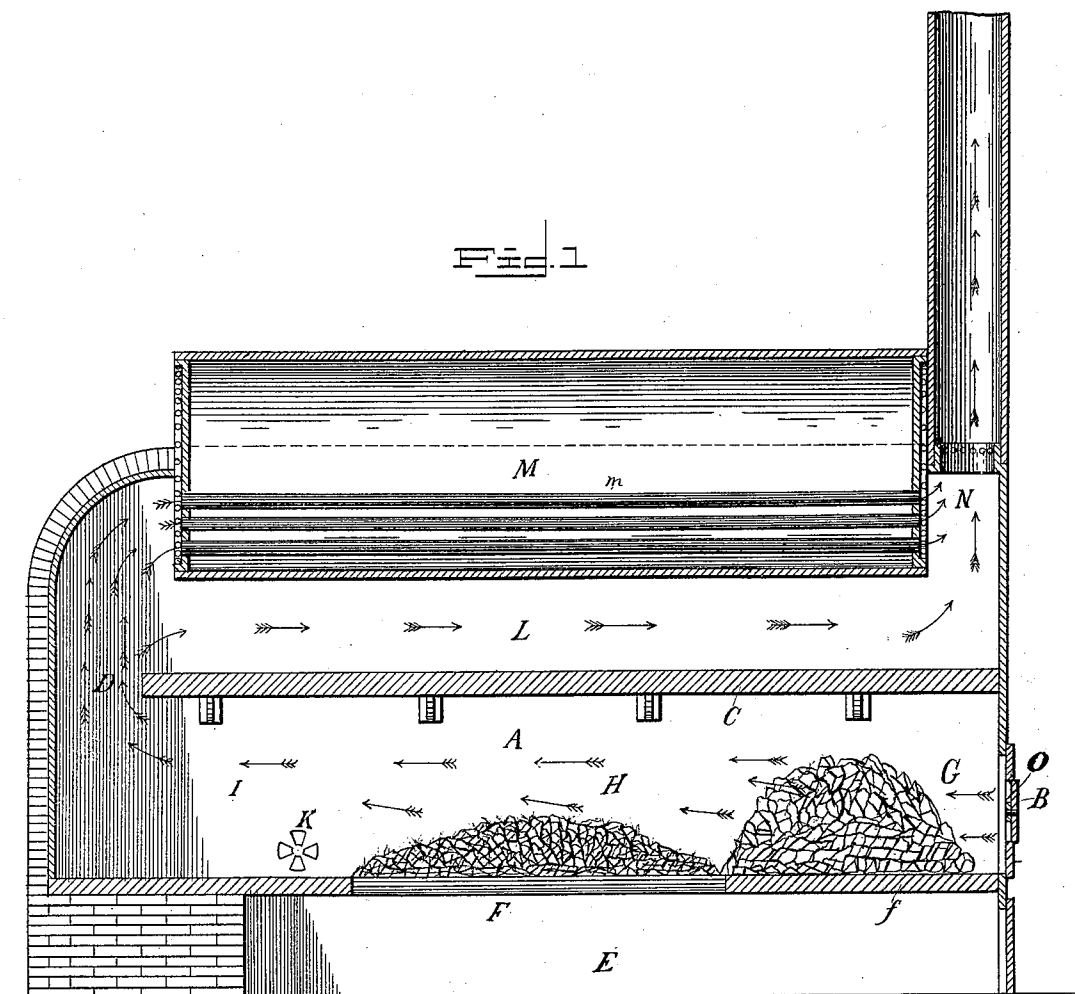
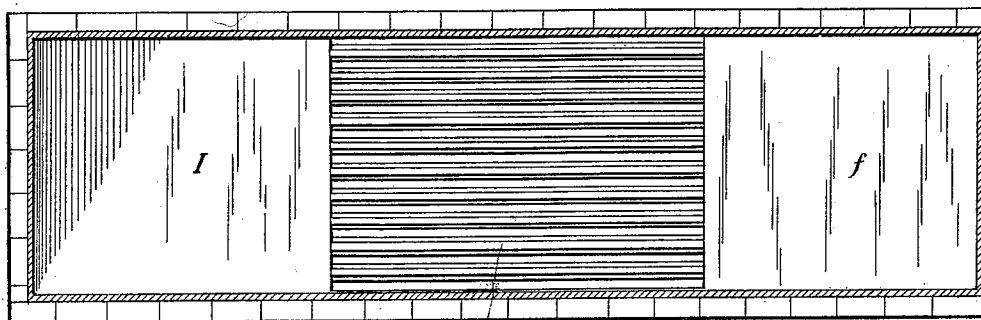


Fig. 2



Witnesses

Inventor

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UNITED STATES PATENT OFFICE.

IRA W. BECKWITH, OF HAYES CENTRE, NEBRASKA.

SMOKE-CONSUMING FURNACE.

SPECIFICATION forming part of Letters Patent No. 513,070, dated January 23, 1894.

Application filed March 23, 1893. Serial No. 467,338. (No model.)

To all whom it may concern:

Be it known that I, IRA W. BECKWITH, a citizen of the United States, residing at Hayes Centre, in the county of Hayes and State of Nebraska, have invented a new and useful Smoke-Consuming Furnace, of which the following is a specification.

My invention relates to improvements in furnaces, and operation of fire, the objects in view being to provide means and methods whereby perfect combustion of the fuel is attained; whereby the smoke is mixed thoroughly with air and consumed before leaving the furnace; and whereby the heat is presented to the boiler in such a manner as to avoid burning the latter, and in such a manner as to heat the same evenly throughout.

Further objects and advantages of my invention will appear hereinafter, and the novel features thereof will be particularly pointed out in the claims.

In the drawings:—Figure 1 illustrates in vertical section a furnace constructed in accordance with my invention. Fig. 2 is a horizontal section, showing grate in plan view.

Like letters of reference indicate like parts in both figures of the drawings.

A represents the fire-box, having the fuel-door B.

C represents a horizontal partition forming the roof of the fire-box, and terminating at its rear end short of the rear wall of the furnace, to form a passage D, and E represents the ash-pit beneath the fire-box.

The grate F of the fire-box is solid at the front, or partially so as shown at *f*, thus forming what will be termed the coking chamber G, and is open (or barred) in rear thereof, as shown at *f'*, to form the floor of the combustion-chamber H.

In rear of the combustion-chamber is a tempering-chamber I in the side-walls of which are formed tempering inlets K K.

Above the horizontal partition C and removed therefrom sufficiently to form a horizontal flue L is the boiler M, through which pass the heating tubes *m m*, which communicate at their rear ends with the upper end of the tempering-chamber I. The horizontal

heat-flue L, and the heat-tubes communicate at their front ends with the exit flue N.

The operation is as follows: The burning fuel being upon the open grate, or in the combustion-chamber, the fresh fuel is introduced to the coking chamber, where it is coked by the heat from the burning fuel, and is caused to give off its gases, which following the direction indicated by the arrows in Fig. 1, pass over the burning fuel, are ignited and burn in conjunction therewith. After the fuel has been coked it is removed back into the combustion chamber to be finally burned, and fresh fuel is introduced to be coked. As the products of combustion leave the combustion-chamber they pass into the tempering chamber, are mixed with air, and thence pass upward, then horizontally through the flue L and heat tubes and escape through the exit flue. Air is admitted through inlets O at the front end of the coking chamber, such openings being preferably formed by a damper in the fuel-door, as shown. The air admitted through these inlet openings, mingles with the gases as they are liberated from the coking fuel, whereby when the mixture of gases and air come in contact with the glowing coals in the combustion-chamber, ignition and complete combustion are the immediate results. The air inlets K consist of dampers through which the air may be admitted in any desired quantities.

It is common to arrange a boiler, kiln, or article to be heated at a distance from the combustion chamber, but in the improved furnace the said boiler, kiln, or device to be heated, is placed directly over the combustion chamber, and is separated therefrom by an interposed horizontal partition between which and the adjacent side of the boiler there is a heat flue.

The space in the rear end of the combustion chamber which I have termed a tempering chamber is essential to my invention from the fact that in this chamber the heat may be tempered to prevent burning or fusing the boiler or other device. The heat produced is sometimes too intense to bring in contact with the boiler without tempering. By the

use of the interposed partition or wall the heat is evenly distributed over the surface of the boiler or other device.

My improvements may be applied effectively to many furnaces now in use.

Having described my invention, what I claim is—

1. In a coking furnace, the combination with a fire-box having a coking chamber arranged at the front thereof and provided with an imperforate grate or floor, and a combustion chamber located in rear of said coking chamber and provided with a perforate grate or floor, a tempering chamber arranged in rear of the combustion chamber and provided with damper-controlled side inlets, a horizontal heat flue arranged above the fire-box and separated from the coking, combustion and tempering chambers by a horizontally-disposed partition, and an exit flue communicating with said horizontal flue, substantially as specified.

2. A coking furnace having a fire-box comprising a front coking chamber having an imperforate floor, an adjacent communicating

combustion chamber provided with a grated floor, and a tempering chamber located in rear of and communicating with the combustion chamber with its imperforate floor in the plane of the grated floor of the combustion chamber, side air-inlets communicating with the tempering chamber adjacent to its front end and provided with controlling dampers, a horizontally-disposed partition C arranged above and covering the coking, combustion and tempering chambers, a boiler or kiln disposed horizontally above the partition and separated therefrom to form an intervening heat flue which communicates by means of a rear vertical passage D with the rear end of the tempering chamber, and an exit flue communicating with the front end of said heat flue, substantially as specified.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

IRA W. BECKWITH.

Witnesses:

A. A. HATCH,
R. C. ORR.