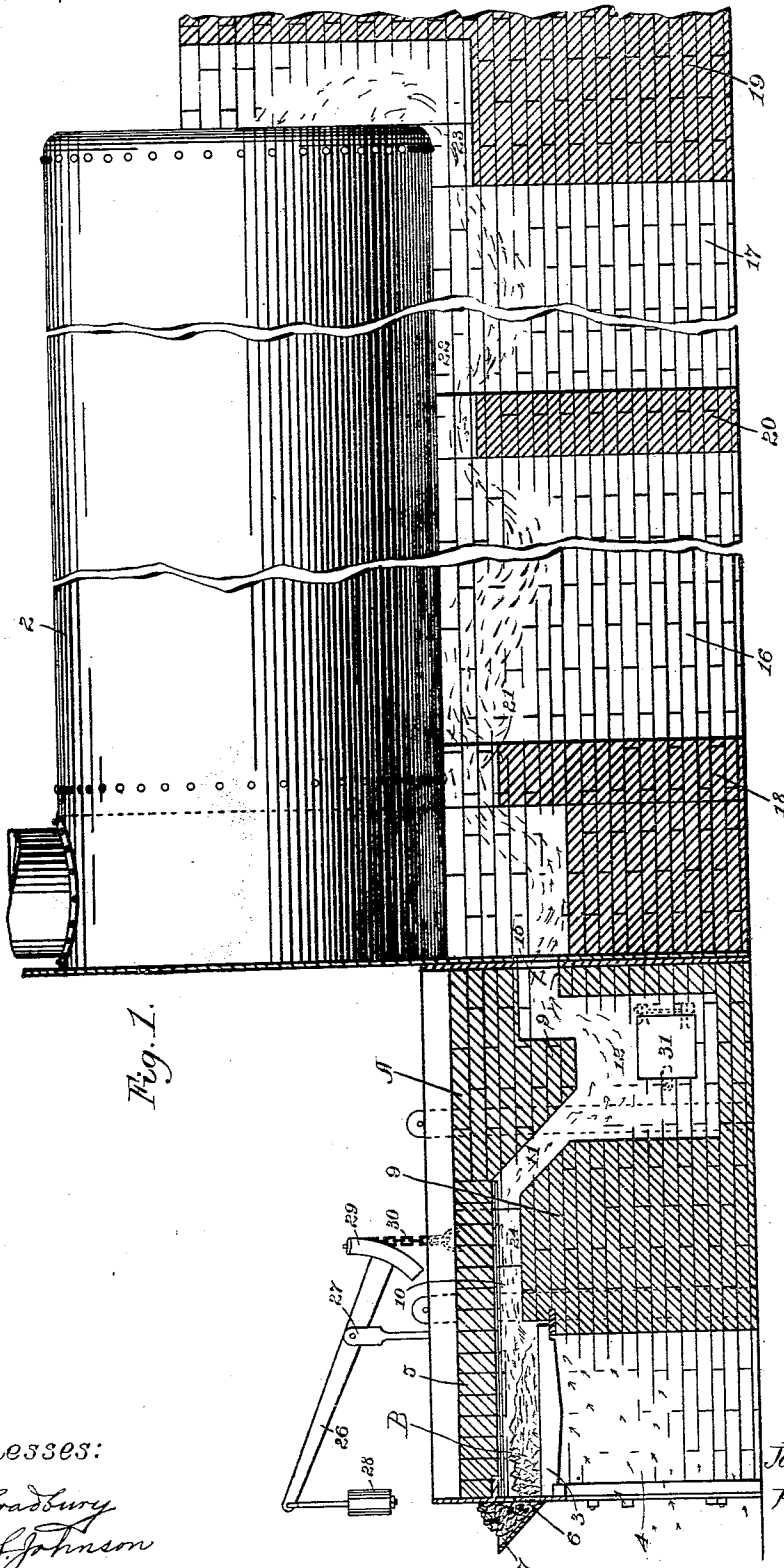


3 Sheets—Sheet 1.

No. 555,172.

Patented Feb. 25, 1896.



V. A. Bradbury
H. C. Johnson

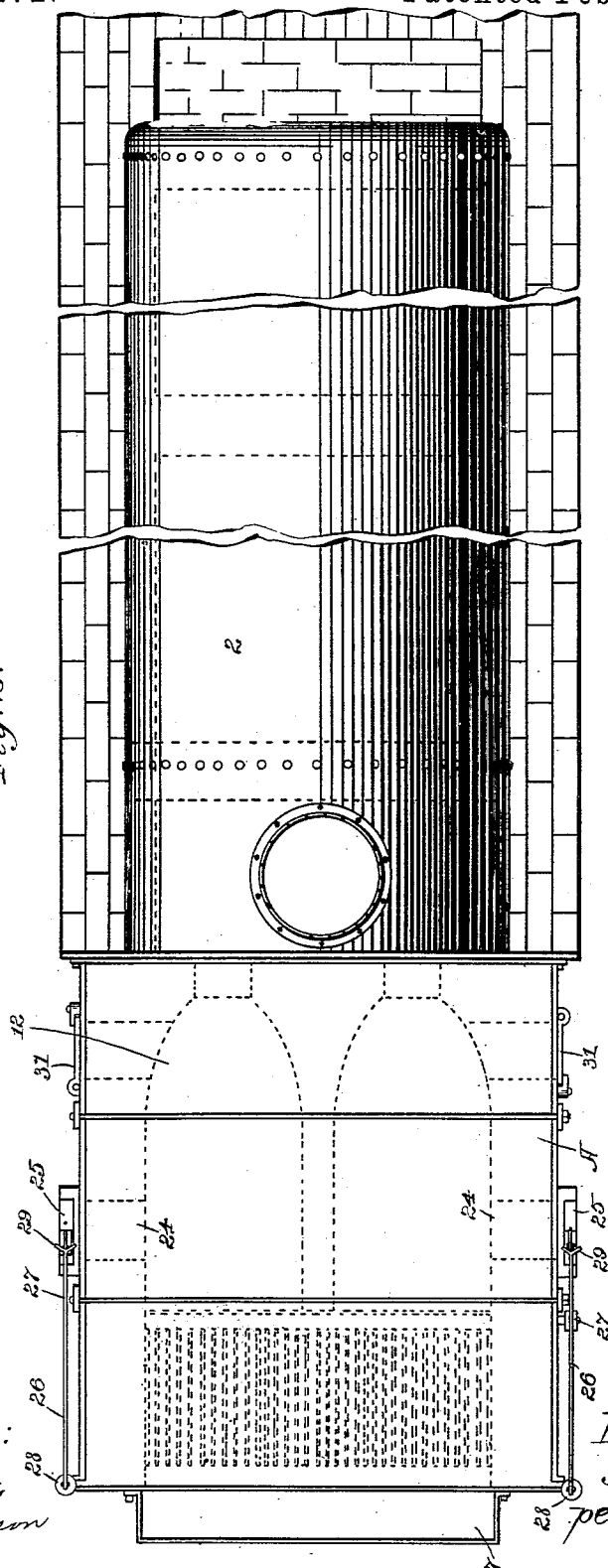
Inventor:
Jacob Kritzch.
per: Thomas W. Wain
Attorney.

J. KRITCH.
FURNACE.

No. 555,172.

Patented Feb. 25, 1896.

Fig. 2.



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per: J. D. Merwin
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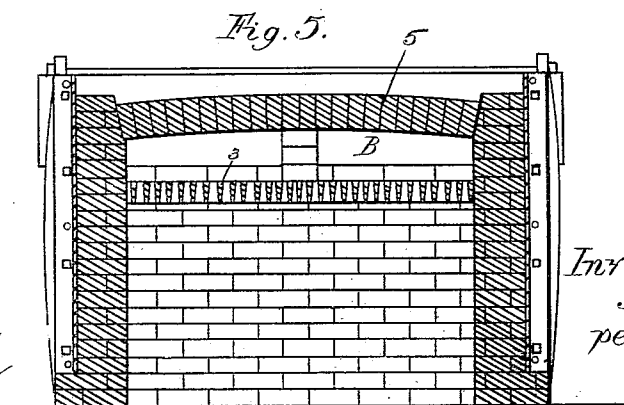
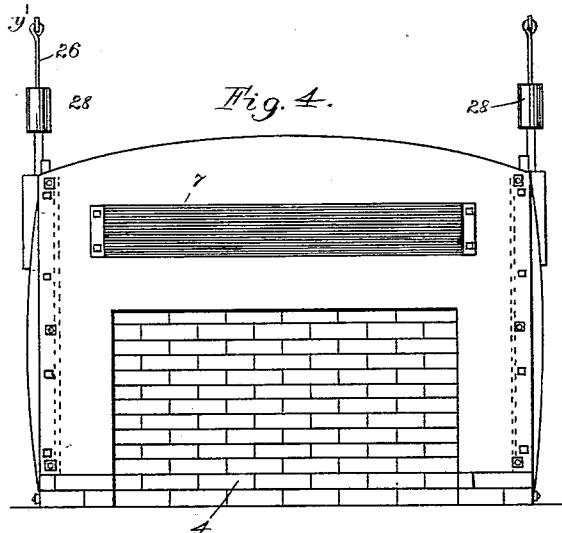
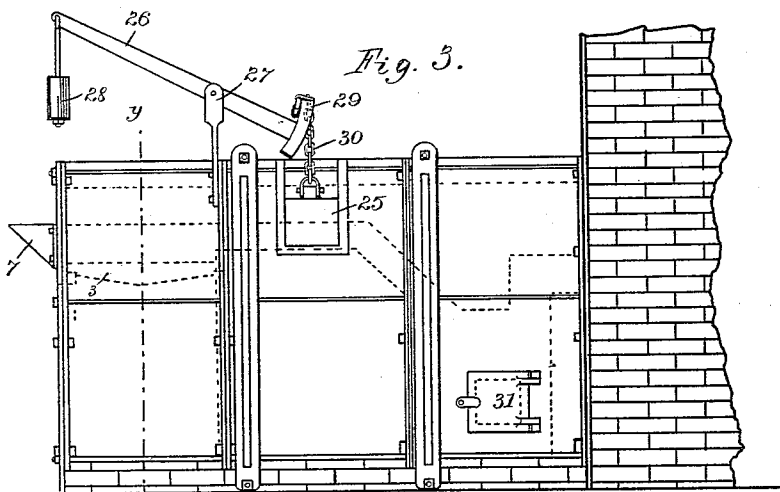
(No Model.)

3 Sheets—Sheet 3.

J. KRITCH.
FURNACE.

No. 555,172.

Patented Feb. 25, 1896.



Witnesses:
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UNITED STATES PATENT OFFICE.

JACOB KRITCH, OF ST. PAUL, MINNESOTA.

FURNACE.

SPECIFICATION forming part of Letters Patent No. 555,172, dated February 25, 1896.

Application filed May 28, 1895. Serial No. 550,938. (No model.)

To all whom it may concern:

Be it known that I, JACOB KRITCH, of St. Paul, Ramsey county, Minnesota, have invented certain Improvements in Furnaces, of which the following is a specification.

My invention relates to improvements in furnaces, its object being to provide such improved features of construction that I am enabled to produce a much more intense degree of heat than is produced in the ordinary furnaces.

To this end my invention consists essentially in arranging in a structure in front and outside of the boiler a fire-box, the slightly arched roof of which is only about six inches above the grate-bars, and the grate-bars themselves are arranged above a large space or ash-pit, which is open to the outer air. Located at the base of this structure and in front of the boiler is a relatively-large reverberatory chamber. Leading from the rear of the fire-box is a series of horizontal flues, said horizontal flues communicating with the reverberatory chamber by means of an equal number of gradually-constricted plunging-flues. The reverberatory chamber is connected with the space underneath the boiler by ascending constricted flues.

My invention further consists in the construction and combination hereinafter more particularly described and claimed.

In the accompanying drawings, forming part of this specification, Figure 1 is a longitudinal vertical section of my improved furnace. Fig. 2 is a plan view of the same. Fig. 3 is a partial side elevation. Fig. 4 is a front elevation of the fire-box, and Fig. 5 is a vertical cross-section of the same on line *y y* of Fig. 3.

In the drawings the structure A, containing the fire-box B, is arranged in front of and outside the boiler 2. The fire-box is provided with an ordinary grate 3 and the large open front air-chamber or ash-pit 4 underneath the same, thus furnishing free admission of air to the fire-box, the space between the grate and the slightly-arched roof 5 of the fire-box being only about six inches, forming a comparatively shallow fire-box. Upon the front of the furnace and covering the opening 6 into the fire-box is the hopper 7. In the rear of the fire-box is the bridge-wall 9, the top of

which rises about one-third the height of the roof of the fire-box. Over this wall and in line with the fire-box roof extend horizontal flues 10, with which connect the plunging-flues 11 leading to the reverberatory chamber 12. The chamber 12 converges, as shown in Fig. 2 by dotted lines, toward the rear, connecting with the constricted flues 15, leading to and underneath the boiler.

The space underneath the boiler is divided into the heating-chambers 16 and 17 by means of the front and rear bridge-walls, 18 and 19, and the center bridge-wall, 20. The products of combustion pass into the heating-chamber 16 through the flue 21 next the boiler, this flue being preferably about eight inches in depth. Thence they pass through the flue 22, over the bridge-wall 20, through the heating-chamber 17 and the flue 23, over the rear boiler-supporting wall 19, around the rear end of the boiler and thence through its flues. The flues 22 and 23 are each preferably about two inches smaller than the flue 21 in the wall 18.

In order to regulate the draft and to provide means for cleaning the flues and chamber, I provide the side openings 24, having sliding doors or valves 25, which are held in adjusted positions by means of the counter-weighted arms 26, having fulcrum connection 27 upon the top of the structure, and provided with suitable weights 28. The end of each arm connected to the valve is formed with a grooved quadrant 29, over which the chain 30 connecting it to the valve lies, thus being held from displacement and in a vertical line, so as to prevent binding of the valve as it opens and closes. The chamber 12 is also provided with side doors 31, adapted to be opened to check the draft or for the purpose of cleaning out the slag which collects therein.

Operation: In use the fire being ignited in the fire-box and the hopper supplied with fuel the heat of the fire transmitted through the intervening partition heats the coal lying against the same. This is carried into the fire-box by means of a poker or other suitable tool thrust through the slots in the front wall of the fire-box of the furnace, the air rushing freely upward through the grate-bars and serving to assist in the operation and to

carry back and distribute the fine particles of fuel over the grate-surface. The low roof of the fire-box standing closely above the mass of burning fuel confines the air entering through the grate and the other gases in the fuel and forces them after ignition through the constricted flues into the reverberatory chamber, where combustion is practically completed.

10 The successively-constricted passages for the products of combustion serve to increase the force of the current or draft. By this means while the combustion is incomplete in the fire-box it is thoroughly completed in the connected flues and reverberatory chamber, 15 wherein the most intense heat is produced. Consequently the boiler for its entire length of under surface and flues receives the full benefit from the results of perfect combustion, and as another and beneficial result 20 there is practically no unconsumed carbon or smoke thrown off.

I claim—

1. In a furnace of the class described, having a boiler arranged in the rear thereof, the combination with the fire-box, and its rear

bridge-wall, of the series of horizontal flues leading from the rear of the fire-box over said bridge-wall, the reverberatory chamber arranged at the base of the furnace, the gradually-constricted plunging-flues leading from said horizontal flues to said chamber, and the constricted ascending flues from said chamber leading underneath said boiler. 30

2. In a furnace of the class described, having a boiler located in the rear thereof, the combination with the fire-box, of the pair of similar horizontal flues leading from the rear of the fire-box, the valve-controlled opening for each of said flues adapted to admit air thereto, the reverberatory chamber, the gradually-constricted plunging-flues leading from said horizontal flues to said chamber, and the constricted ascending flues from said chamber leading underneath said boiler. 40 45

In testimony whereof I affix my signature in presence of two witnesses.

JACOB KRITCH.

Witnesses:

T. D. MERWIN,
MINNIE L. THAUWALD.