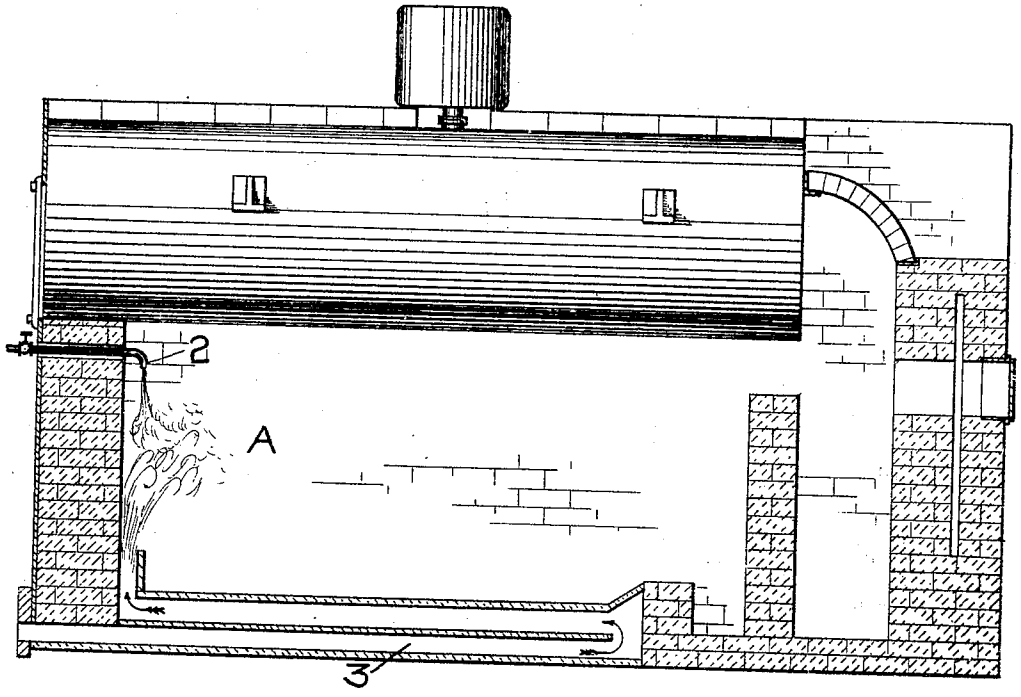
No. 805,671. PATENTED NOV. 28, 1905.

A. H. SAFFELL.

HOT AIR APPLIANCE FOR HYDROCARBON BURNERS AND FURNACES.

APPLICATION FILED MAY 9, 1904.

Fig 1



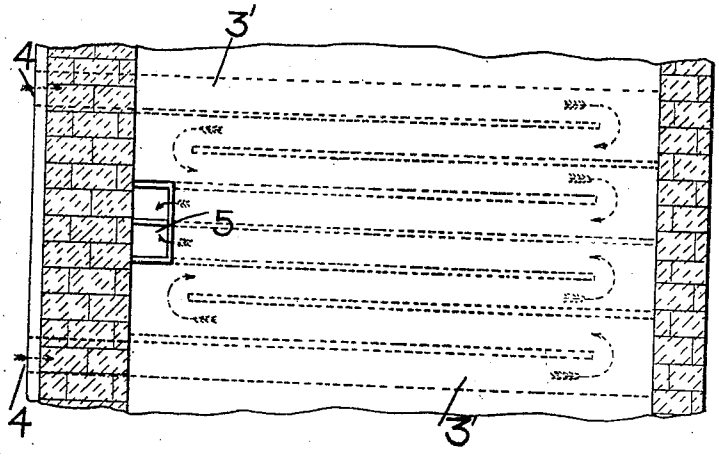


Fig 2

Witnesses

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ARTHUR H. SAFFELL, OF BAKERSFIELD, CALIFORNIA, ASSIGNOR OF ONE-HALF TO RICHARD J. POWERS, OF SAN LEANDRO, CALIFORNIA.

HOT-AIR APPLIANCE FOR HYDROCARBON BURNERS AND FURNACES.

No. 805,671. Specification of Letters Patent. Patented Nov. 28, 1905.

Application filed May 9, 1904. Serial No. 207,002.

To all whom it may concern:

Be it known that I, ARTHUR H. SAFFELL, a citizen of the United States, residing at Bakersfield, in the county of Kern and State of California, have invented new and useful Improvements in Hot-Air Appliances for Hydrocarbon Burners and Furnaces, of which the following is a specification.

My invention relates to improvements in draft appliances for hydrocarbon burners and furnaces, and pertains particularly to means for delivering the air and for heating it prior to its commingling with the discharged inflammable vapor to effect combustion.

It is customary in boiler-furnaces to use a straight-shot burner which directs the commingled oil and steam more or less the length of the furnace and to admit the air directly through the furnace-front to mix as best it may with the inflammable vapor to cause combustion. The result is that the flame is often allowed to impinge directly upon the boiler-tubes or against the brickwork, causing a rapid deterioration of the same, while the admission of the cold air from the front produces a disagreeable if not an alarming roar in the furnace and acts to cool off the oven very quickly whenever the flow of the oil ceases.

The object of the present invention is to overcome the disadvantages above noted, to effect an economy in the amount of oil used, and to produce an intense and equable heat throughout the oven-space.

It consists of the parts and the construction and combination of parts, as hereinafter more fully described, having reference to the accompanying drawings, in which—

Figure 1 is a longitudinal section of a furnace equipped with my hot-air appliance. Fig. 2 is a plan view showing a modification of my invention.

A represents a combustion-chamber of any character, here shown as belonging to a furnace of well-known design or construction having the grate-bars removed to provide the necessary depth for the installation of my appliance and closed except for the usual exit provided for the waste gases.

2 is an oil-burner projecting into the combustion-chamber and having a laterally-disposed discharge-nozzle arranged to throw the vapor fan shape in a direction more or less parallel with the furnace-front instead of directing it at right angles to the front, as is now usual.

Suitably arranged in the furnace is a conduit 3 of suitable construction, into which the air for purposes of combustion and draft is delivered by forced or induced draft heated and thereafter discharged in juxtaposition with and preferably in opposition to the oil and steam issuing from the burner. This air conduit or "superheater," as it may be termed, may be variously arranged in a fire-box or in relation to a burner, so as to be subjected to the intense heat thereof. As shown in Fig. 1, I may form this superheater of hollow tiling, admitting the air through the usual grate-door openings in the furnace-front, conducting it well toward the back of the furnace, returning it again on top of the lower duct to the front of the furnace, and then discharging it upwardly in line or a little behind the vapor column issuing from burner 2, or, as in Fig. 2, I may form a series of staggered passages 3′ in the bottom of the chamber or oven with separate inlets 4 exterior to the combustion-chamber and at opposite sides of the furnace-front, with a common central upward discharge 5 in juxtaposition with and in opposition to the burner discharge. These air-superheaters become intensely hot, and offering as they do a large heating-surface to the air passing through them the result is that when the air is discharged in the manner described it approximates in temperature that of the burning gases themselves and assists in the ignition of the oil as well as furnishes the necessary supply of oxygen for combustion. By this method of oil-vapor discharge and draft regulation combustion takes place in the front of the furnace. No flame strikes against the boiler or the brickwork, since all the inflammable particles have time to be converted into heat molecules before meeting any obstruction. The action of the furnace is practically noiseless. Explosions are avoided in case the oil is shut off temporarily and then turned on again. The bricks, tiles, or other suitable material forming the walls of the superheater retain their heat for some time after the burner is shut off. In ordinary furnaces, where no particular attention is paid to the draft, the inrush of cold air rapidly cools down the combustion or oven chamber, and if it is desired to start the burner

up again in a short time it is necessary to throw in a lighted taper. By consuming practically all the combustible particles of the oil in the combustion-chamber I effect a proportionate saving of oil fuel. It is obvious that this principle of the combination with a burner of means for heating air and then discharging it proximate to the vapor discharge from the burner is capable of embodiment in a variety of forms, and I do not wish to be understood as limiting myself to the precise form or application here shown.

The invention is particularly advantageous in connection with bake-ovens.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

1. The combination with a combustion-chamber, of a burner having its nozzle provided with a downwardly-directed discharge-opening proximate to the inner front wall of the chamber and arranged to direct the fuel discharge downwardly and parallel with said wall, a superheating-chamber arranged in the furnace and forming a tortuous passage in which air is superheated before being delivered to the combustion-chamber, said superheating-chamber having one end connecting through the front wall of the furnace-casing and thence extending substantially the length of the combustion-chamber and returned upon itself to the front of the combustion-chamber and having its outlet arranged vertical and substantially in the plane of the oil-burner nozzle and adapted to deliver the heated air opposite to and against the oil-jet whereby direct impingement against the walls of the chamber is avoided and the combined vapors form a sheet of flame substantially across the whole of the chamber at the front end of the boiler.

2. The combination with a fire-box chamber, of a burner in the front end of said chamber and delivering substantially parallel with the front wall thereof, and an air-conduit in the bottom of the furnace and having a series of horizontal, parallel, staggered partitions forming a tortuous passage in which the air is superheated before it reaches the combustion-chamber, said conduit having its inlet exterior to the furnace and its outlet arranged vertical to deliver opposite to and substantially in line with the oil discharge and parallel with the front wall of the furnace whereby combustion of vapors occurs at the front end of the chamber and the direct impact of the flame-jet against the walls of the furnace is avoided.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

ARTHUR H. SAFFELL.

Witnesses:
S. H. NOURSE,
ALLEN ALBERT.