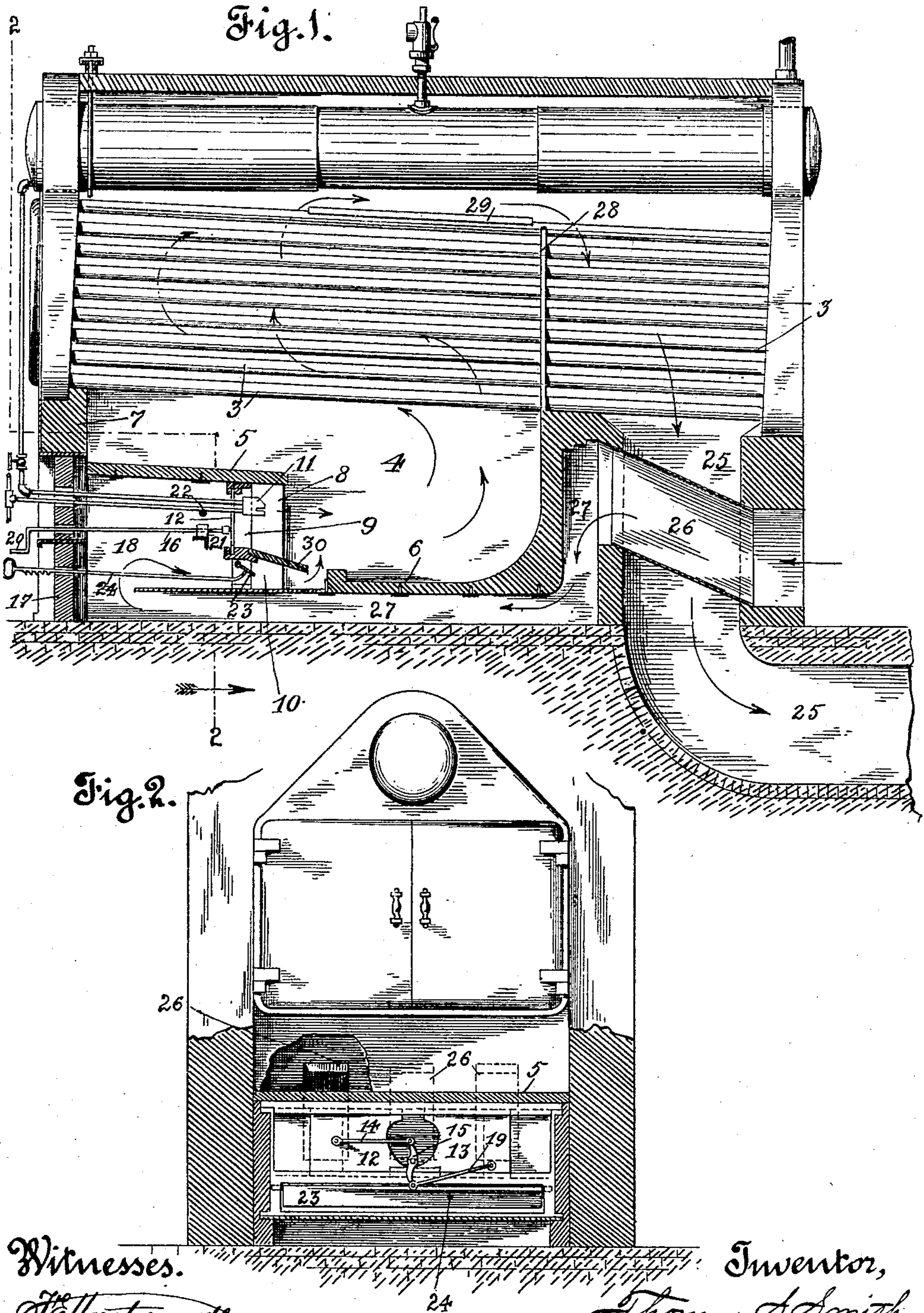


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FURNACE.
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Witnesses.
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UNITED STATES PATENT OFFICE.

THOMAS S. SMITH, OF LOS ANGELES, CALIFORNIA.

FURNACE.

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To all whom it may concern:

Be it known that I, THOMAS S. SMITH, a citizen of the United States, residing at the city of Los Angeles, county of Los Angeles, and State of California, have invented new and useful Improvements in Furnaces, of which the following is a specification.

My invention relates to a furnace in which the fuel used therein is crude petroleum burned by the use of steam or compressed air, and the object thereof is to so arrange the burner and draft and fire walls that the air supplied for combustion will keep the fire wall from becoming overheated and to deliver the air required for combustion into the fire box around the burner, and a portion in front of the burner if desired and to so place the burner that a maximum efficiency can be produced with a minimum consumption of fuel. I accomplish this object by the furnace described herein and illustrated in the accompanying drawings in which;

Figure 1 is a side elevation of the boiler and a central longitudinal section of the fire box, fire walls and some of the flues. Fig. 2 is a front elevation of the upper portion of the parts shown in Fig. 1 with the lower part in section on the line 2—2 of Fig. 1, the burner being omitted.

In the drawings 3 are the tubes of a tubulous boiler, under the front portion of which is the fire box 4, the rear portion of which is of greater depth than the front portion.

5 is the floor of the front portion of the fire box, and 6 is the floor of the rear portion of the fire box.

7 is the front wall of the upper portion of the fire box, and 8 is the front wall of the lower portion of the fire box, which last wall is preferably near the center of the fire box and is provided with two openings 9 and 10 through which the air for combustion passes. The burner 11 is placed centrally transversely and near the top of the upper opening of wall 8. This burner may be of any of the ordinary types of oil burners in which crude oil is burned by the use of steam or compressed air.

The burner opening is controlled by two sliding dampers 12 and 13. To damper 12 is pivotally secured a link bar 14 which is pivotally connected to lever 15 which is secured centrally upon an operating rod 16 which extends through the front wall 17 of draft chamber 18. To damper 13 is pivot-

ally secured link bar 19 which is also pivotally connected to lever 15. Operating rod 16 terminates in an operating handle or crank 20 by means of which the dampers may be operated. Rod 16 passes through a bearing 21 near the damper. The burner is supported by rod 22 just in front of the dampers. A swinging damper 23 controls the lower opening in wall 8 and is operated by a pull rod 24.

25 is the down draft flue which connects with the stack not shown. Extending across the down draft flue are a plurality of air flues 26 of which I have shown three in Fig. 2 but there may be more or less as desired. These flues open into an air chamber 27, which is at the back of the back wall of the fire box and beneath a portion of bottom wall of the fire box and opens into the draft chamber near the front thereof.

Extending from the back wall of the fire box upwardly and surrounding the flues is a vertical baffle plate 28 and on the top of the flues is a horizontal baffle plate 29. These baffle plates cause the products of combustion to travel as shown by the arrows in Fig. 1.

It will be observed that the burner discharges fuel into the fire box near the center thereof, and that the direction of the discharge from the burner is toward the back wall of the fire box, but the baffle plates and draft cause the products of combustion to pass toward the front of the furnace, whereby the air is more thoroughly commingled with the products discharged from the burner than it would be if the discharge from the burner was on a direct line with the draft. Another advantage of my invention is that the air is admitted into the fire box below the discharge from the burner so that it must mix with the product discharged from the burner before it can reach the stack. By having the admission of air into the fire box controlled by dampers at the burner the fireman can more readily control his fire than where the same is controlled by a damper in the stack. Another advantage is that the velocity of the air is relatively the same whether a small fire or a large fire is used. By causing the air used for combustion to enter the air chamber at the back of the back wall of the fire box and to pass along beneath the bottom of a portion of the fire box these walls are kept from overheating and the air is supplied into the fire box in a

heated condition. The passing of the air through flues which pass across the down draft warms the air somewhat before it contacts with the back of the fire box.

5 If desired the flues across the down draft could be omitted and the air supplied into the top of chamber 27 in any appropriate manner, but I prefer their use as thereby the air for combustion is delivered into the fire
10 box more highly heated than it would be if it did not pass through flues crossing the down draft. In order to cause the delivery of the air passing through the lower opening in wall 8 some distance in front of the burner
15 I provide a deflector plate 30.

By this construction all of the air required for combustion can be admitted into the fire box directly around the burner or at a point some distance from the burner, or a
20 portion of it can be admitted around the burner and the remainder at some distance in front of the burner. By admitting a portion of the air for combustion at some distance in front of the burner and through the
25 bottom wall of the fire box both the bottom wall and back wall of the fire box is protected from excessive heat.

Having described my invention what I claim is;

30 1. A furnace having the bottom of the combustion chamber divided into two nearly equal parts lying at different elevations, the plane of the front portion being higher than the plane of the rear portion; a wall extending from near the rear of the front portion of
35 the bottom of the combustion chamber to the front of the rear portion of the bottom of the combustion chamber, said wall having a

burner opening therein near the top thereof; a hydrocarbon burner projecting through
40 said opening and terminating near the rear of the bottom of the front portion of the combustion chamber; and a damper to control said opening so arranged that the air passing therethrough is discharged below the
45 burner.

2. A furnace having the bottom of the combustion chamber composed of parts lying at different elevations, the front part being higher than the rear part, and having a
50 burner opening into said chamber below the rear portion of the front part of said bottom; and dampers to regulate said opening; and an air chamber at the rear of the back wall of the combustion chamber in communi-
55 cation with the burner opening.

3. A furnace having the bottom of the combustion chamber composed of parts lying at different elevations, the front part being higher than the rear part, and having
60 a burner opening into said chamber below the rear portion of the front part of said body; dampers to regulate said openings; an air chamber at the rear of the back wall of the fire box and extending below the bottom
65 of the fire box and opening into a draft chamber; and a draft chamber below the front part of the bottom of the combustion chamber.

In witness that I claim the foregoing I
70 have hereunto subscribed my name this 22nd day of November, 1907.

THOMAS S. SMITH.

Witnesses:

G. E. HARPHAM,
S. B. AUSTIN.