

O. D. ORVIS.
UPDRAFT FURNACE.

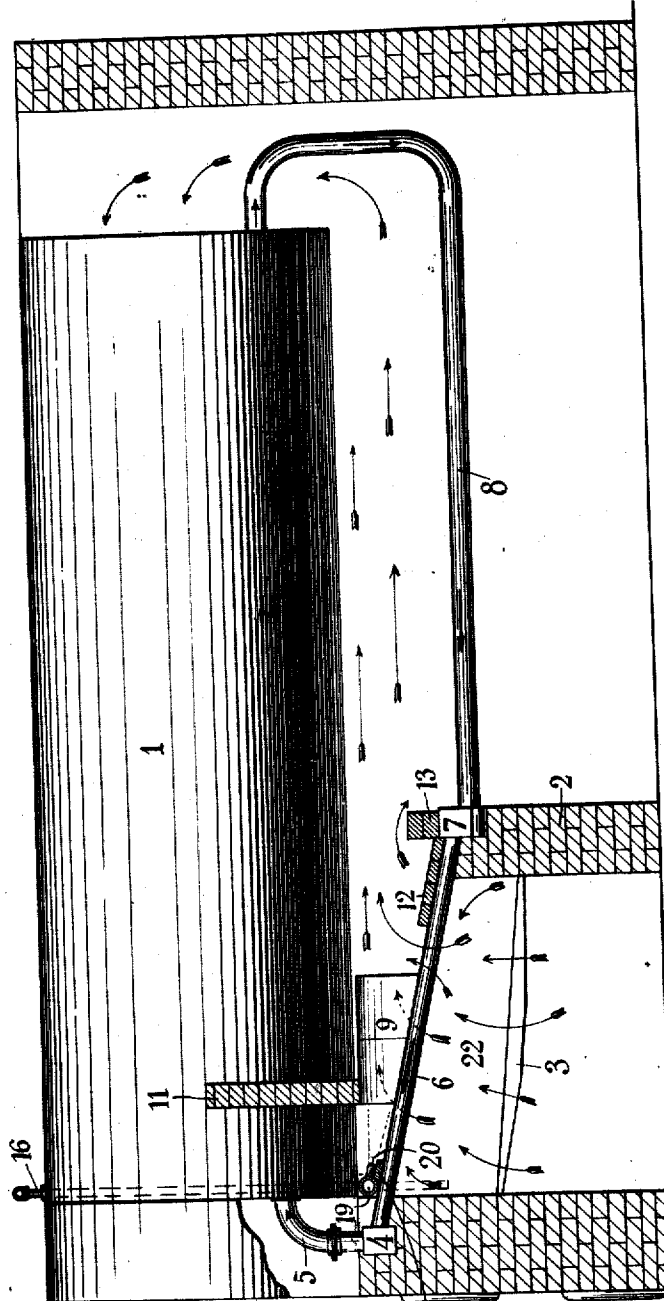
APPLICATION FILED NOV. 11, 1907. RENEWED DEC. 14, 1908.

Patented July 27, 1909.

3 SHEETS—SHEET 1.

929,624.

Fig. 1



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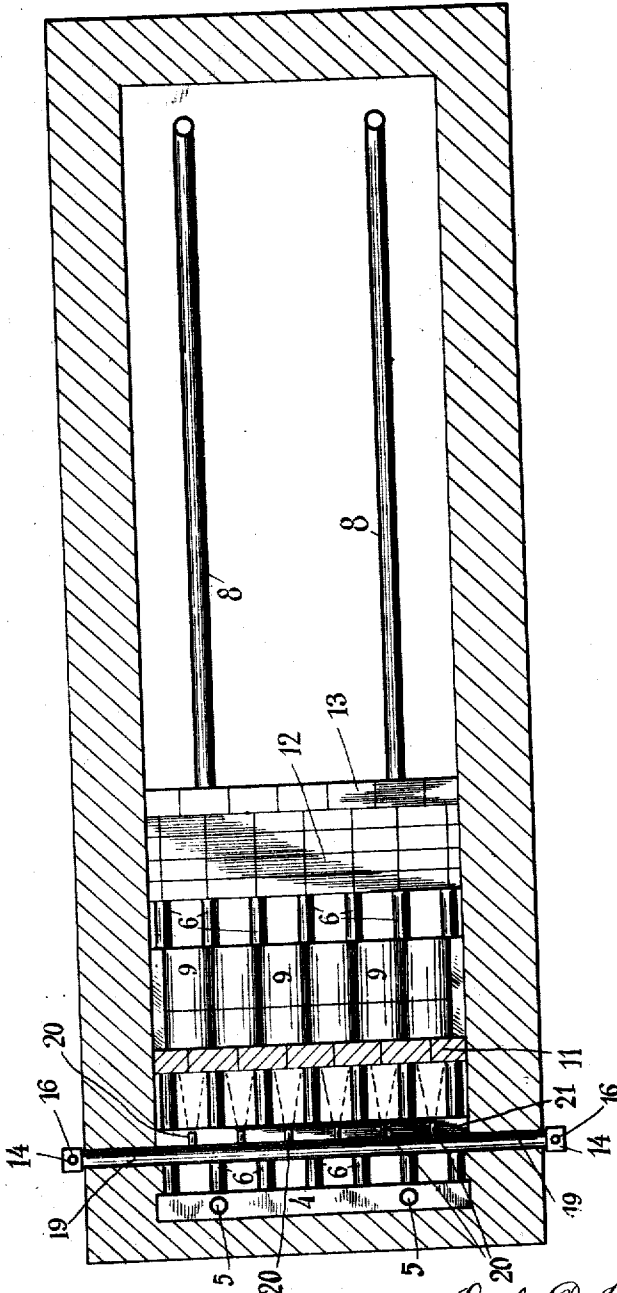
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3 SHEETS—SHEET 2.

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Fig. 2



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3 SHEETS—SHEET 3.

929,624.

Fig. 4

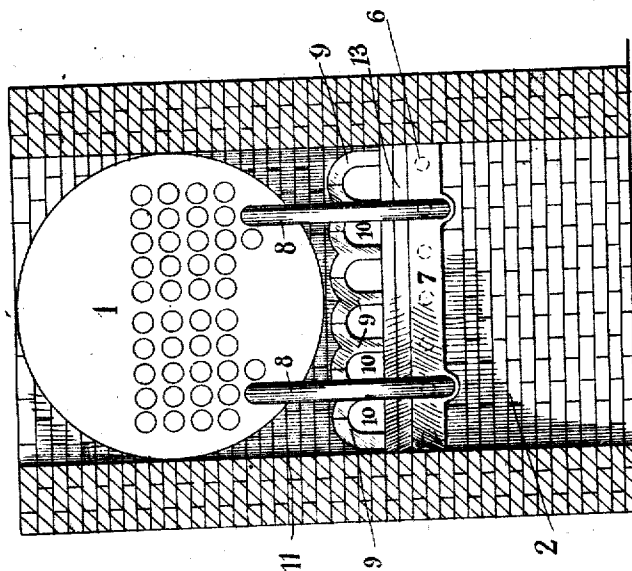
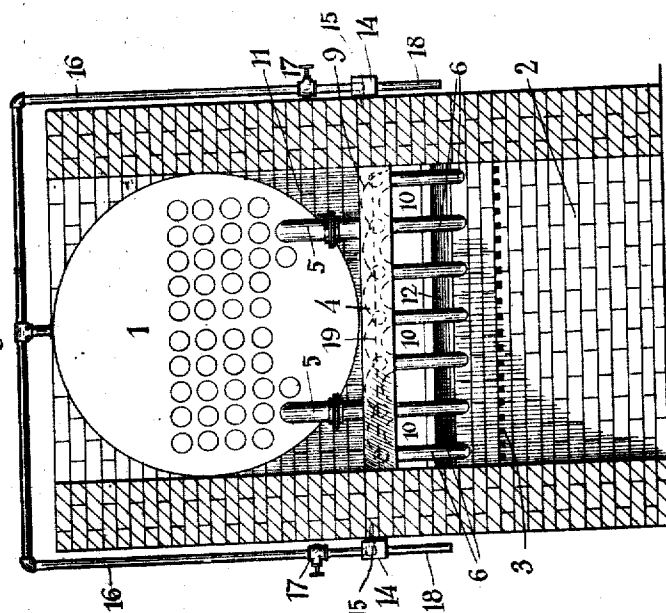


Fig. 3



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UNITED STATES PATENT OFFICE.

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UPDRAFT-FURNACE.

No. 929,624.

Specification of Letters Patent.

Patented July 27, 1909.

Application filed November 11, 1907, Serial No. 401,537. Renewed December 14, 1908. Serial No. 467,536.

To all whom it may concern:

Be it known that I, OREL D. ORVIS, a citizen of the United States of America, and a resident of Bayonne, county of Hudson, State of New Jersey, have invented certain new and useful Improvements in Updraft-Furnaces, of which the following is a specification.

This invention relates to furnaces and has particular reference to a furnace of the up-draft type.

The object of the invention is to provide novel and useful means for increasing the efficiency of a boiler by equipping it with a furnace comprising the features as hereinafter will be set forth, and which in particular contain means for smokeless combustion and a better distribution of the heat whereby the same may be utilized for the purpose of producing steam quickly.

Means are also provided for increased and rapid circulation of the water, and other novel features will appear as this specification proceeds.

In the accompanying drawings the invention is disclosed in its preferred form, but I claim, of course, all changes which may come within the legitimate scope of the claims.

In the said drawings: Figure 1 is a side elevation of a furnace embodying my invention, with the one side wall removed and parts in section. Fig. 2 is a sectional plan view just below the boiler. Fig. 3 is a sectional front elevation with the boiler front removed. Fig. 4 is a rear elevation with the rear furnace wall removed.

In the drawings the reference numeral 1 indicates a boiler of suitable construction and supported in the usual manner between the side walls of the furnace, 2 denotes the usual fire brick wall while 3 is the grate of any convenient design.

Suitable means for increasing the circulation and the heating surface are provided which in the present instance take the following form.

Located transversely in the front wall of the furnace and adjacent the boiler is the square header 4, connected to the front of the boiler by the bent pipes 5, 5. A number of inclined water tubes 6 connect the aforesaid header 4 with a second transverse header 7, which latter is suitably supported in the wall 2, and from the header 7 the pipes 8, 8

lead to the rear of the boiler. These tubes and pipes are preferably expanded into the boiler and the header as an economical and easy method of connecting the various parts. The circulation of the water is indicated in the drawings by arrows without tails and it will be noted right here that by reason of the tubes 6 which are located right over the fire on the grate, I have increased the heating surface considerably and a rapid circulation is obtained.

In order to consume all the combustible and to obtain smokeless combustion and also in order to utilize to the greatest extent all of the heat the following means are provided.

Supported on the tubes 6 and located between the front wall and the wall 2 are a series of arches 9 forming retorts or chambers 10 upon which is supported the wall 11 surrounding the lower half of the boiler. To the rear of said arches and on the tubes 6 I provide a transverse bridge or nearly horizontal wall 12 of firebrick and in the rear of this bridge and on the header 7 I build a low transverse wall of firebrick 13. On either side of the boiler I provide a vacuum box 14 provided with a steam jet 15 supplied with steam from the top of the boiler through pipes 16, 16 having valves 17, 17. Pipes 18, 18 supply fresh air to the vacuum boxes. The steam and fresh air from the vacuum boxes is injected into the transverse jet pipe 19 which is provided with a number of jets 20, each of which is so located that it ejects the steam and air directly into and through the retorts or chambers 10 in a plane parallel to the plane of the inclined tubes 6. A row of bricks forming a narrow bridge 21 is provided under said jets 20.

The paths of the combustible, produced by the up draft, are indicated in the drawings by arrows with tails and it will be seen from an inspection of Fig. 1 that the gases and highly heated air all commingle and the combustible is fully consumed before leaving the firebox 22 and passes out through the chambers 10, and in front of the bridge 12. Furthermore, by the location and form of the different elements above and around the firebox, an intense heat is obtained and by the use of the vacuum boxes fresh air is constantly supplied so that all gases are fully consumed and only pure hot air passes out under the boiler and then through the same.

By means of this construction, all smoke is consumed, the water is rapidly heated and as rapidly circulated and the general efficiency of the furnace and the boiler greatly increased.

What I claim is.

1. In an updraft furnace the combination of a boiler, a firebox below the same, a fire brick wall at the rear of said firebox, a transverse square header supported in said wall, a second square header supported in the front wall of the furnace, inclined water tubes connecting said headers, arched retorts above and supported by the said inclined tubes, the said retorts being located about midway between the front furnace wall and the said fire brick wall, a transverse jet pipe, jets in said pipe adapted to eject fresh hot air into and through said retorts, connections between the said jet pipe and said boiler, a layer of bricks supported on the rear ends of the said inclined water tubes, a vertical wall above the first mentioned square header and connections between the said headers and the boiler.

2. In an updraft furnace the combination of a boiler, a firebox below the same, a fire brick wall at the rear of said firebox, a transverse header supported in the top and to the

rear of said fire brick wall, a second header supported in the front furnace wall, water tubes connecting the said header and inclined upwardly to the last mentioned one, a plurality of arched retorts of a length less than the length of said tubes and having open ends supported by and above the said water tubes, a passage being formed between the front face of said retorts and the front furnace wall, a layer of bricks supported above the said inclined tubes adjacent said fire brick wall, a passage being formed between the front edge of said layer of brick and the rear face of the said retorts, a fire brick wall supported above the first mentioned header, a passage being formed above said wall and below said boiler for the exit of the combustible, a horizontal wall supported above said retorts and surrounding the lower half of the said boiler, jets for ejecting hot air under steam pressure into and through the said retorts and connections between the said headers and the boiler.

Signed at New York this 9th day of Nov. 1907.

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Witnesses:

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