

J. H. PARSONS.

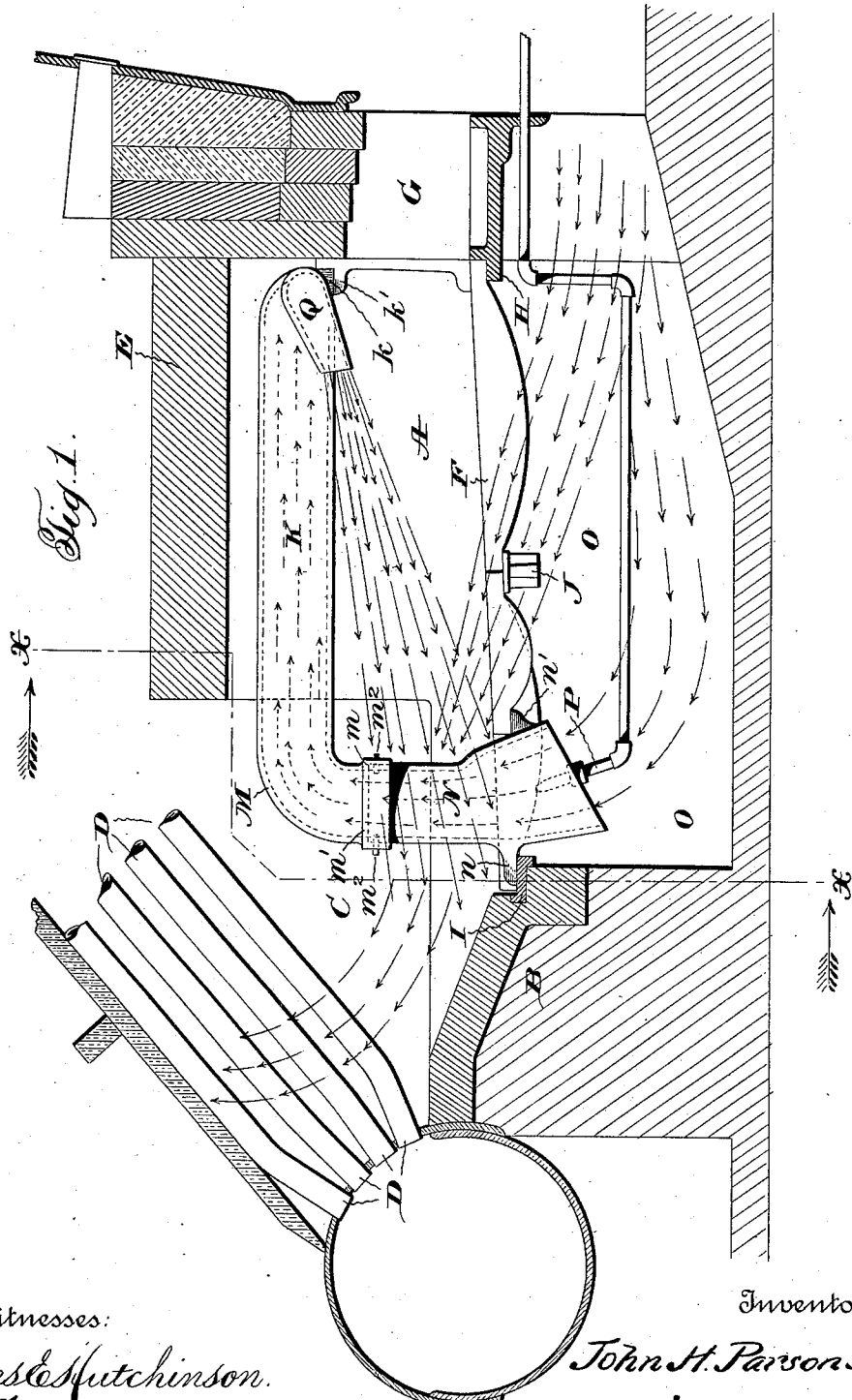
FURNACE.

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Witnesses:

Jose Hutchinson.
Calvin V. Wiland.

Inventor:

John H. Parsons,

By T. McWilliams Attorneys:

UNITED STATES PATENT OFFICE.

JOHN H. PARSONS, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO PARSONS ENGINEERING COMPANY, OF WILMINGTON, DELAWARE, A CORPORATION OF DELAWARE.

FURNACE.

1,066,041.

Specification of Letters Patent.

Patented July 1, 1913.

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To all whom it may concern:

Be it known that I, JOHN H. PARSONS, a citizen of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Furnaces, of which the following is a specification, reference being had therein to the accompanying drawing.

This invention relates to improvements in furnaces, and has for its object the provision of means facilitating the combustion of fuel with the resultant saving in the fuel and increased efficiency of the furnace.

The invention comprehends an attachment which may be readily put in place or removed from the fire box of a furnace, formed to inject air, steam, or both, into the products arising from the burning fuel bed to insure complete combustion of said products.

The invention embraces in a device of this character, a specially formed injecting nozzle having a heating portion passing over the fuel bed and one or more discharge portions directed backwardly relative to said heating portion to supply the air to the products arising from the fuel in sufficient quantity to insure practically complete combustion, the heating portion of the device being so arranged that said air in passing therethrough prior to its discharge is heated to substantially the point of ignition when commingled with the gaseous products from the fire.

The invention also includes the device formed of sections, and means for securing the parts in operative and removable relation.

All of the foregoing characteristics of the invention, and also other novel details in the construction and arrangement of parts will be fully understood from the detailed description hereinafter contained when read in connection with the accompanying drawings forming part hereof and wherein one convenient embodiment of the invention is illustrated.

In the drawings: Figure 1 is a vertical longitudinal sectional view, parts being broken away, through a steam boiler furnace of ordinary type having the improvements applied to the fire box thereof; and Fig. 2 is a transverse sectional view on the

line X—X of Fig. 1 looking in the direction of the arrow.

Referring more specifically to the drawings wherein like reference characters refer to corresponding parts in the several views, A designates the fire box of a steam boiler furnace, B the bridge wall at the rear of the fire box, C the combustion chamber or area in rear of the fuel bed and above the bridge wall, D the water tubes, E the top of the fire box, F the grate bars thereof, and G the furnace charge opening.

Running transversely across the fire chamber in a plane near the bottom of the opening G is a horizontal ledge H and at the forward upper edge of the bridge wall B is a corresponding ledge I, while intermediate the two and midway the fire chamber is a supporting bar J, said ledges and bar co-operating to support the grate bars F resting thereon.

The attachment constituting the present invention comprises an elongated substantially horizontally disposed pipe K preferably of fire-brick. One end of this pipe K is formed into a T-head L occupying a horizontal plane, as clearly seen in Fig. 2. The other end is formed into an elbow M directed downwardly substantially at right angles to the horizontal portion of the pipe K. This pipe K is designed to occupy a position high up within the fire chamber A, as will be clearly seen from the drawings, the T-headed end thereof being supported by means of a lug *k* resting upon a ledge *k'* above the furnace charge opening G, while the rear or elbowed end of the same has a shouldered portion *m* resting upon the upper end of a section of pipe N also of fire-brick supported through the medium of a lug *n* resting upon the grate bar supporting ledge I. The elbowed portion M also has an annular collar or flange *m'* surrounding the end of the pipe section N, the two sections K and N being connected in assembled operative relation by means of coupling pins *m*² engaging registering apertures in the end of the section N and the annular flange *m'*. (Fig. 1.) The lower end of the pipe section N constitutes the air inlet of the attachment, and projects down into and opens within the ash pit O. To this end, I also connect an injector nozzle P communicating with any suitable source of sup-

ply whereby to secure a greater force or supply of air through the attachment when desired. Owing to the arrangement of the device, it will be appreciated that some of the grate sections F immediately adjoining the pipe section N are relatively short and to support their rear ends said section N is provided with a ledge n' .

The extremities of the T-headed end L of the attachment are formed into nozzles Q of an elongated or flat type projecting rearwardly relative to the fire box or back beneath the horizontal pipe K. The combined capacity of the outlets of the nozzles Q is slightly less than the capacity of the pipe K, whereby the heated air as it passes through the pipe K and gradually expands is discharged from the nozzles Q with considerable force and in such volume as to pass the air over the bed of fuel without materially consuming the oxygen in the air, whereby the greater volume thereof is delivered in the combustion area in rear of the fuel bed, where it commingles with the products arising from the burning fuel, immediately ignites, and consumes the same. The arrangement of the attachment is such that the air during the period between its admission into the attachment and its discharge therefrom is heated to substantially the point of ignition when commingled with the gases or other products arising from the fuel bed. The flat shape of the nozzles also insures a sheet of air passing backwardly through the combustion area to practically overhang all of the products arising from the fuel and insure contact with the air, while at the same time the general direction of movement of the sheet of air is that of the draft through the furnace, hence the draft is not conflicted with or impaired, but rather assisted owing to the force with which the air passes over the fuel. Under ordinary conditions, the force of the draft through the furnace stack and the heating and expansion of the air as it is forced through the nozzles Q will be sufficient to carry the air over the fuel and obtain the results herein sought.

It will be appreciated that the attachment may be readily installed in any furnace now in use with practically no alteration therein, save perhaps the furnishing of the ledge k' , to support the nozzle end of the device at the upper front end of the fire chamber.

I claim:

1. In combination with a furnace having the usual fire box, grate and ash pit, of an air injecting attachment therefor arranged centrally of the fire box comprising an imperforate heater portion located at the rear of the fire box therewithin, and opening below the grate, an offset elongated imperforate heater portion constituting a continuation of said first mentioned portion extending

forwardly within the fire box, near the top thereof to near the forward wall of the same, nozzles at the end of said last mentioned heater portion arranged at opposite sides thereof to discharge air from points adjacent said forward wall of the fire box rearwardly through the fire chamber in the general direction of the draft, substantially as described.

2. In combination with a furnace having the usual fire box, grate and ash pit, of an air injecting attachment therefor arranged centrally of the fire box comprising an imperforate heater portion located at the rear of the fire box therewithin, and opening below the grate, an offset elongated imperforate heater portion constituting a continuation of said first mentioned portion extending forwardly within the fire box, near the top thereof to near the forward wall of the same, nozzles at the end of said last mentioned heater portion arranged at opposite sides thereof to discharge air from points adjacent said forward wall of the fire box rearwardly through the fire chamber in the general direction of the draft, said nozzles being flat and elongated transversely of the fire box to emit the air in sheet formation.

3. In combination with a furnace having the usual fire box, grate and ash pit, of an air injecting attachment therefor arranged centrally of the fire box comprising an imperforate heater portion located at the rear of the fire box therewithin, and opening below the grate, an offset elongated imperforate heater portion constituting a continuation of said first mentioned portion extending forwardly within the fire box, near the top thereof to near the forward wall of the same, nozzles at the end of said last mentioned heater portion arranged at opposite sides thereof to discharge air from points adjacent said forward wall of the fire box rearwardly through the fire chamber in the general direction of the draft, said nozzles being flat and elongated transversely of the fire box and inclining downwardly to emit the air in merged sheet formation beneath the elongated heater portion thereabove, substantially as described.

4. In combination with a furnace having the usual fire box, grate and ash pit, of an air injecting attachment therefor comprising an imperforate heater portion located at the rear of the fire box therewithin, and opening below the grate, an offset elongated imperforate heater portion separably connected to be lifted from and constituting a continuation of said first mentioned portion extending forwardly within the fire box near the top thereof to near the forward wall of the same, and a nozzle at the end of said last mentioned heater portion arranged to discharge air from a point adjacent said forward wall of the fire box rearwardly

through the fire chamber in the general direction of the draft, substantially as described.

5 In combination with a furnace having the usual fire box, grate and ash pit, of an air injecting attachment therefor comprising an imperforate heater portion located at the rear of the fire box therewithin, and opening below the grate, an offset elongated imperforate heater portion separably connected to be lifted from and constituting a continuation of said first mentioned portion extending forwardly within the fire box near the top thereof to near the forward wall of the same, removable means for normally fastening the heater portions together, and a nozzle at the end of said last mentioned heater portion arranged to discharge air from a point adjacent said forward wall of the fire box rearwardly through the fire chamber in the general direction of the draft, substantially as described.

6. In combination with a furnace having the usual fire box, grate and ash pit, of an air injecting attachment therefor comprising an imperforate heater portion freely supported upon a part of the grate structure located at the rear of the fire box therewithin, and opening below the grate, an offset elongated imperforate heater portion constituting a continuation of said first mentioned portion extending forwardly within the fire box near the top thereof to near the forward wall of the same, and a nozzle at the end of said last mentioned heater portion arranged to discharge air from a point adjacent said forward wall of the fire box rearwardly through the fire chamber in the general direction of the draft, substantially as described.

7. In combination with a furnace having the usual fire box, grate and ash pit, of an air injecting attachment therefor comprising an imperforate heater portion freely supported upon a part of the grate structure located at the rear of the fire box therewithin, and opening below the grate, an offset elongated imperforate heater portion constituting a continuation of said first mentioned portion extending forwardly within the fire box near the top thereof to near the forward wall of the same, a nozzle at the end of said last mentioned heater portion arranged to discharge air from a point adjacent said forward wall of the fire box rearwardly through the fire chamber in the general direction of the draft, and a support adjoining said forward wall for the nozzle end of the attachment, substantially as described.

8. In combination with a furnace having the usual fire box, grate and ash pit, of an air injecting attachment therefor comprising an imperforate heater portion supported by a part of the grate structure located at

the rear of the fire box therewithin, and opening below the grate, an offset elongated imperforate heater portion constituting a continuation of said first mentioned portion extending forwardly within the fire box near the top thereof to near the forward wall of the same, a nozzle at the end of said last mentioned heater portion arranged to discharge air from a point adjacent said forward wall of the fire box rearwardly through the fire chamber in the general direction of the draft, and means on the first mentioned heater portion constituting a part of the grate bars support.

9. In combination with a furnace having the usual fire box, grate and ash pit, of an air injecting attachment therefor comprising an upright imperforate heater portion located at the rear of the fire box supported on the rear grate bars supporting ledge and opening below the grate, means on said heater portion for supporting the grate bar or bars immediately adjoining the same, a horizontally disposed elongated imperforate heater portion constituting a continuation of said first mentioned portion extending forwardly within the fire box near the top thereof to near the forward wall of the same, means adjoining said forward wall for supporting the end of said last mentioned heater portion, and a discharge nozzle at said end arranged to discharge air from a point adjacent said forward wall of the fire box rearwardly through the fire chamber in the general direction of the draft.

10. In combination with a furnace having the usual fire box, grate and ash pit, of supporting ledges at the rear and forward portions of the fire box, and an air injecting attachment for the furnace adapted to be maintained in operative position upon the insertion of the attachment in place in the fire box comprising an upright heater portion opening below the grate adapted to rest upon the rear ledge and be supported in approximately the plane of the grate, an offset elongated heater portion constituting a continuation of said first mentioned portion extending forwardly within the fire box near the top thereof and supported by the forward ledge, and a discharge nozzle at the end of said last mentioned heater portion arranged to discharge air from a point adjacent the forward wall of the fire box rearwardly through the fire chamber in the general direction of the draft.

11. In combination with a furnace having the usual fire box, grate and ash pit, of supporting ledges at the rear and forward portions of the fire box, and an air injecting attachment for the furnace adapted to be maintained in operative position upon the insertion of the attachment in place in the fire box comprising a heater portion opening below the grate adapted to rest upon

the rear ledge and be supported in approximately the plane of the grate and continuing forwardly within the fire box to near the forward wall thereof where it is supported on the forward ledge, and an offset discharge nozzle connected to the end of said last mentioned heater portion arranged to discharge air from a point adjacent the forward wall of the fire box rearwardly through the fire chamber in the general direction of the draft.

12. In combination with a furnace having the usual fire box, grate and ash pit, of an air injecting attachment therefor comprising a portion opening exteriorly of the fire box, an offset elongated imperforate heater portion arranged centrally of the fire box

constituting a continuation of said first mentioned portion, said heater portion extending forwardly within the fire box, and nozzles at the end of said heater portion arranged at opposite sides thereof to discharge heated air from points adjacent to the forward wall of the fire box rearwardly through the fire chamber in the general direction of the draft, substantially as described.

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

JOHN H. PARSONS.

Witnesses:

THOS. R. HEATH,
JOS. H. MILANS.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."