

J. H. PARSONS.
FURNACE.
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1,066,042.

Patented July 1, 1913.

2 SHEETS—SHEET 1.

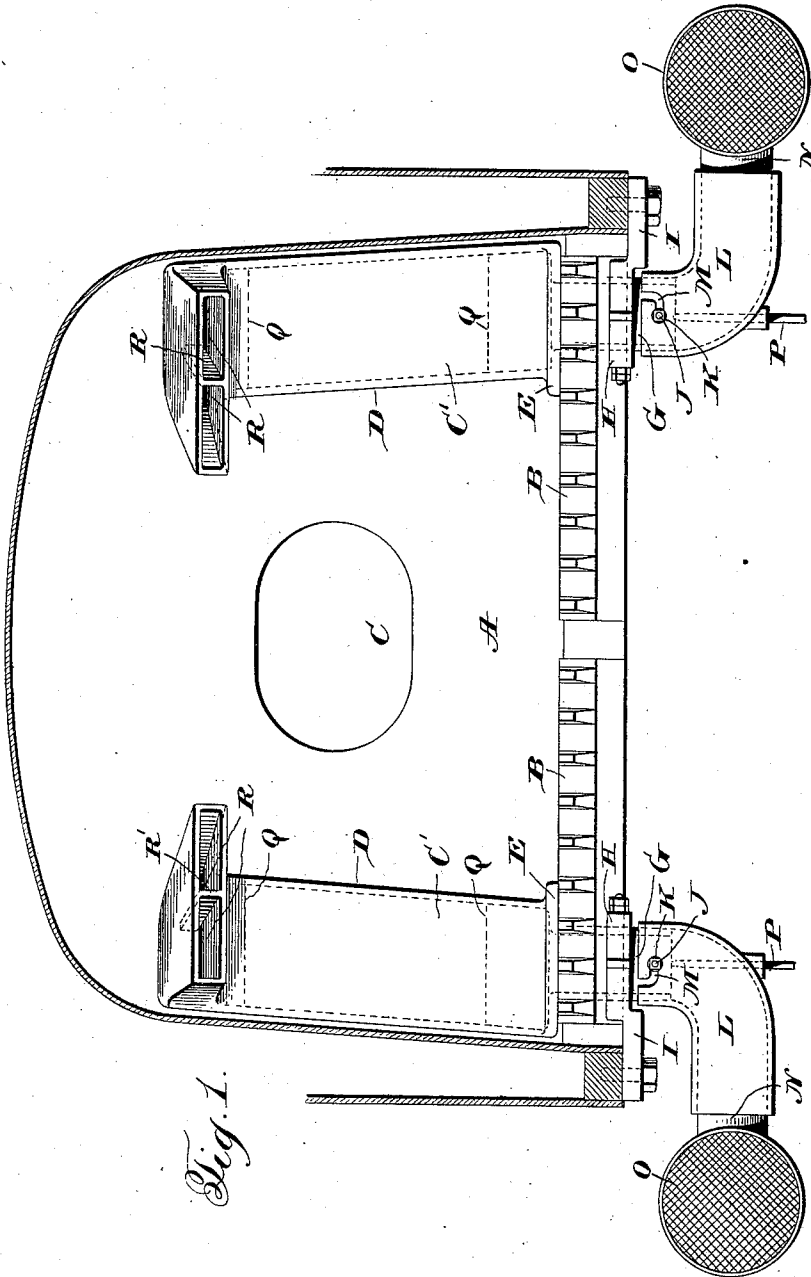


Fig. 1.

Witnesses:

James Hutchinson
Clavin T. Milam

Inventor:

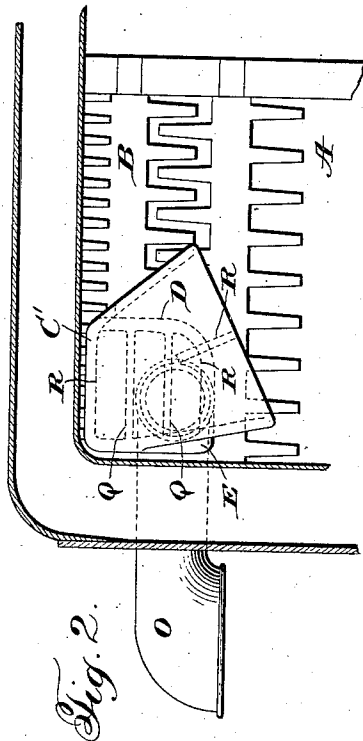
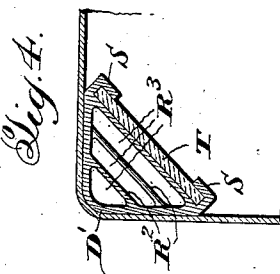
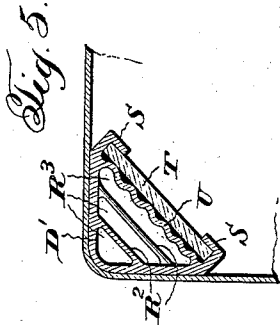
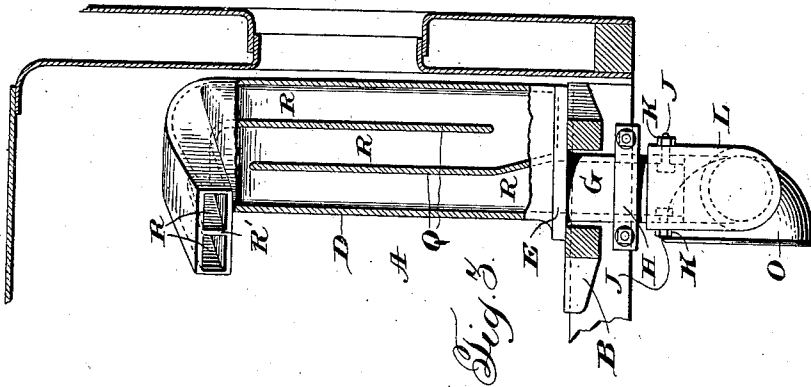
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2 SHEETS—SHEET 2.



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UNITED STATES PATENT OFFICE.

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FURNACE.

1,066,042.

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.

10 This invention relates to improvements in furnaces, and has for its primary object the provision of means for introducing into the combustion chamber of the furnace a supply of air, steam or both, in such a quantity, 15 temperature, force and direction to insure the commingling of said air, etc., with the gaseous products or finer particles of fuel passing off from the burning fuel bed or body, thus enabling substantially perfect 20 combustion to be obtained.

More specifically, the present invention comprehends a supply nozzle or nozzles for directing the air, etc., into the furnace, of special interior formation, compelling the 25 air in passing through the nozzle prior to its discharge therefrom, to follow a circuitous path, whereby to become properly heated (preferably to the point of ignition when mixed with the gaseous products in the furnace), the nozzle being arranged whereby it 30 will be subjected to the influence of a suitable source of heat, conveniently by arranging the nozzle at a proper place within the fire chamber.

35 The invention also embraces simple and efficient means operatively associated with the nozzles, whereby they may be readily installed or removed and replaced in the furnaces of standard types.

40 Novel details in the construction and arrangement of the several features of the invention will be apparent from the detailed description hereinafter contained, when read in connection with the accompanying drawings forming part hereof and wherein a convenient embodiment of the invention is 45 illustrated.

In the drawings: Figure 1 is a fragmentary transverse sectional view through the fire 50 box of an ordinary steam locomotive looking rearwardly or toward the door opening thereof, Fig. 2 is a sectional elevation of one corner of the fire box showing the nozzle therein, Fig. 3 is a detail vertical sectional 55 view showing the interior formation of one

of the nozzles, and Figs. 4 and 5 are transverse sectional views of different nozzles constituting other embodiments of the invention.

Referring more specifically to the drawings, wherein like reference characters refer to corresponding parts in the several views, A designates the fire box of the locomotive, B the grate, and C the fuel opening.

In Fig. 1, C' C' represent my improved 65 air supply nozzles, one being arranged at each of the rear corners of the fire box, whereby to direct the air in sheet form forwardly over the bed of fuel and into the combustion chamber therebeyond, the relative arrangement of the discharge ends of 70 the nozzles being such that they incline slightly toward each other and toward the center of the fire box, whereby the fan like sheets of air meet in the center of the fire 75 box toward the forward portion thereof, and jointly constitute an enveloping or completely overhanging sheet of air in the combustion chamber, compelling the mixing of the products arising from the fuel bed there- 80 with. Inasmuch as the nozzles just referred to are of identical formation and mounted in the same manner, a description of one will suffice for both. D represents the up- 85 right portion of the nozzle which is of approximately rectangular cross section having a flat bottom E resting upon the grate bars B and terminating in a downwardly projecting tubular extension G firmly clamped 90 in place in properly adjusted position, by the divided ring clamp H carried by the bracket I secured to the bottom of the fire box. Near the end of the tubular extension G, I provide oppositely projecting studs J, threaded for the accommodation of clamping nuts K. 95 These studs and nuts are furnished to provide a simple and highly efficient means whereby to secure to the nozzle an elbow L provided with bayonet slots M adapted to slip over the studs and be prevented from 100 accidental escape therefrom by the impingement of the clamping nuts turned down on said studs against the surface of the elbow. The elbow is formed as shown, whereby its horizontal arm receives the stem N of the 105 air intake funnel O opening to the atmosphere and facing forwardly of the locomotive whereby, in the travel of said locomotive, the air will be forced into the funnel and through the elbow and nozzle, as is ob- 110

vious. The elbow has an injector or jet nozzle P therein arranged to point upwardly into the elbow and be coupled with any suitable source of supply,—compressed air, steam, etc.,—whenever it may be found expedient to utilize the same to create the proper forced current through my attachment.

The arrangement of the nozzle at the corner of the fire box places the same at a point where the air passing therethrough will become highly heated, and while I have found that by simply passing the air through the nozzle the same is sufficiently heated in some instances, there are, however, other instances where the circumstances demand that the air remain in the nozzles for a longer period of time. To provide for these latter cases, I form the interior of the nozzle with a series of alternately disposed partitions Q whereby to provide a long circuitous passage R opening at one end (its inlet) to the tubular extension at the bottom of the device, and at the opposite end to the outlet of the nozzle, the outlet end being formed flat and elongated as shown, with the reinforcing partition R' preventing the buckling or collapsing of the same under the high heat to which it is subjected. By having the inlet to the passage R at the lower inner corner of the device it will be observed that the air when entering in its coldest condition will first come in contact with the front portion of the heater which is immediately exposed to the fire, thus tending to protect said front while the air is taking up the heat at said relatively exposed portion.

The capacity of the outlet end of the air supply nozzle above described is slightly less than the cross area of the circuitous passage, in the nozzle, whereby the gradual expansion of the air as it becomes heated, in the nozzle, causes the sheet which is emitted from the outlet end of the nozzle to travel with considerable force over the bed of fuel and into the combustion chamber.

The air is moved in the general direction of the draft through the furnace whereby not to oppose said draft, and is in such a quantity and moves with such impetus that the same cannot be consumed directly above the fuel, but will pass therebeyond into the combustion chamber which is the point I have found the air must be supplied to se-

cure the combustion of all of the products escaping from the fuel bed or body, and to secure the greatest efficiency of the furnace whether it be that of the locomotive or stationary type.

In Figs. 4 and 5, I have illustrated two other embodiments of my present invention. In both of these instances, it will be seen that the nozzles D' are triangular in cross section, and have the partitions R² forming the circuitous passage R³. Each also has overhanging vertically disposed flanges S constituting vertical ways into which slabs of fire-brick T may be dropped to protect the face of the nozzle from direct contact with the fire at such portions thereof, and at such times as may be found expedient. The face or front wall U of that nozzle which is shown in Fig. 5 is corrugated in a vertical direction to provide a more extensive surface as is obvious. By extending the corrugations vertically instead of transversely of the heater the flow of the air would not be impeded as might be the case with transverse corrugations, and the vertical corrugating also facilitates the insertion and removal of the slabs of fire brick which would be hindered by transverse or horizontal corrugations. These structures are advantageous, in that the nozzles may be formed throughout of iron and have the protective facing of firebrick, for example, on its exposed portion above the bed of fuel, while the corrugated wall will be presented to the heating influence of the fire within said bed of fuel.

Having thus described the invention, what is claimed is:—

The combination with the fire box of a furnace, of means for discharging air thereinto comprising a combined heater and nozzle arranged within the fire chamber, the heater portion being formed with vertically disposed corrugations, and a separate protecting facing detachable in a vertical direction from the heater normally fitting portions thereof to secure the same in place.

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

JOHN H. PARSONS.

Witnesses:

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