2 Sheets—Sheet 1.

H. E. PARSON.

FURNACES FOR STEAM-BOILERS.

No. 187,170. Patented Feb. 6, 1877.

Fig. 1.

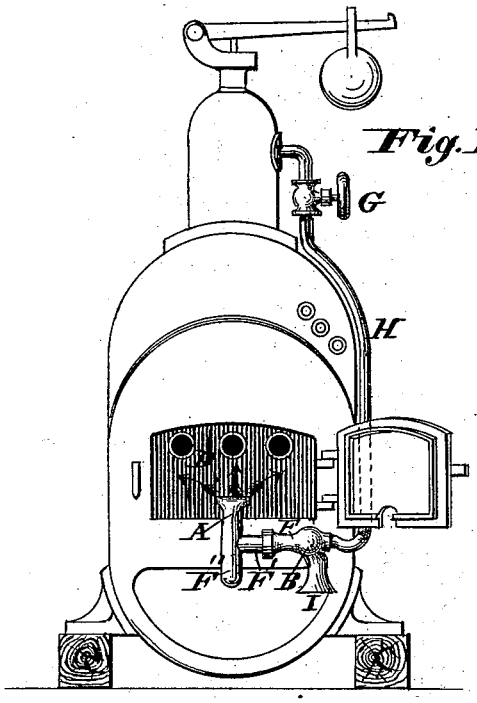
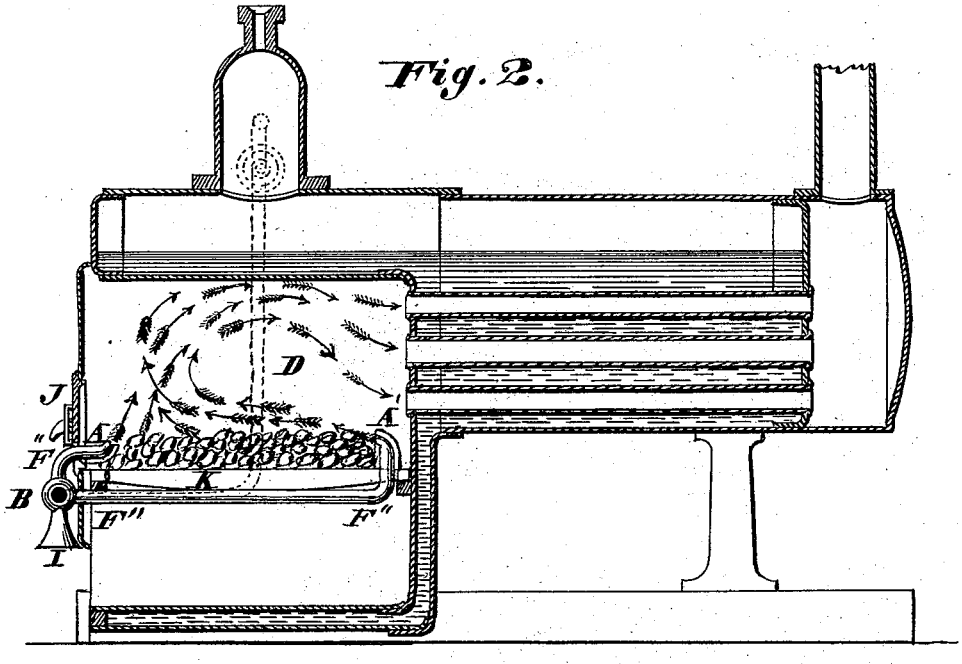


Fig. 2.



WITNESSES

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2 Sheets—Sheet 2.

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Fig. 3.

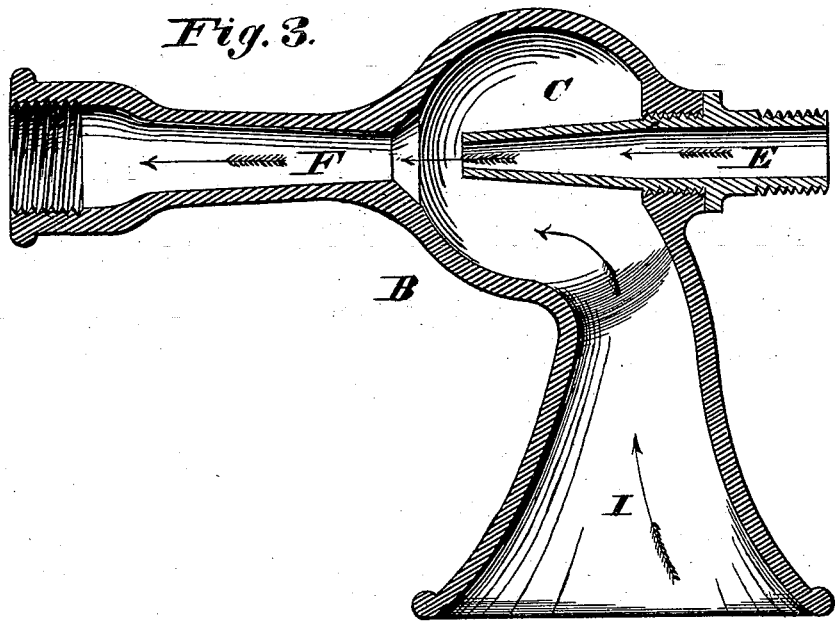


Fig. 4.

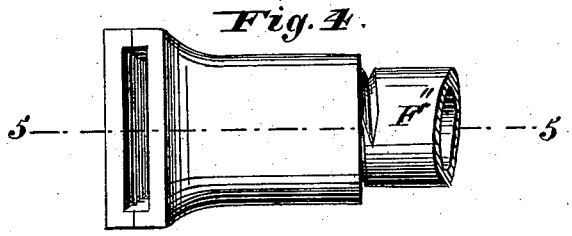
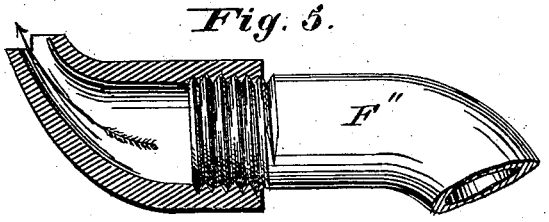


Fig. 5.



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UNITED STATES PATENT OFFICE.

HENRY E. PARSON, OF WATERTOWN, NEW YORK.

IMPROVEMENT IN FURNACES FOR STEAM-BOILERS.

Specification forming part of Letters Patent No. **187,170**, dated February 6, 1877; application filed February 29, 1876.

To all whom it may concern:

Be it known that I, HENRY E. PARSON, of Watertown, in the county of Jefferson and State of New York, have invented certain new and useful Improvements in Furnaces for Steam-Boilers, of which the following is a specification:

I have found by experiment that when coal is heated in a retort it yields volatile hydrocarbons amounting from twenty to thirty-two per cent. of its weight, and the hydrogen robs the fuel of six times its own weight of carbon. When fresh fuel is added to live coal in the furnace the same result ensues, so that in using coal fifty to sixty-seven per cent. of carbon burns on the grate, and twenty to thirty-two per cent. of carbon and hydrogen have to be burned in the open space above the fuel or escape unconsumed.

To consume the smoke and gases, as above described, contained in the upper part of the chamber, is a very important and desirable result to attain. This result I accomplish in my invention by peculiar means, adapted to throw into the upper chamber or open space in the furnace, above the fuel, (under pressure,) a sufficient amount of air or oxygen, in combination with the hydrogen of steam to produce perfect combustion.

This apparatus is under absolute control of the engineer, and therefore the amount of air and steam, as required, can be increased or diminished at will by use of a steam-blower. The air is heated, and therefore produces, I have found, more ready combustion than cold air.

The heating of the air is accomplished by means of a steam-jet used in an injector and heated flattened flaring nozzle, against which the combined air and steam are thrown as they leave the conducting-pipe in combination, and are brought in contact with the gases contained in the upper chamber of the furnace.

Perfect control of the fire is obtained by the use of my blower.

In the accompanying drawings, Figure 1 is a front view of a boiler, showing the manner in which blower, front nozzles, and steam-pipe are attached to the furnace, the arrows in the fire-chamber showing the direction of the blast as given by the peculiar construction of the nozzles. Fig. 2 is a longitudinal section of a boiler and furnace, showing the blower attached and deflectors in the chamber, the arrows in the chamber indicating the direction of the air-currents as forced into the chamber for producing a rotary movement to the currents of heat. Fig. 3 is a longitudinal section of the blower, showing the separate passages for steam and air, also the chamber in pipe, into which the steam and air combine, and from which they are delivered, through the nozzles, to the furnace-chamber. Fig. 4 is a top view of one of the nozzles. Fig. 5 is a longitudinal vertical section of one of the nozzles on the line 5 5, Fig. 4.

B is my improved blower attached to the front part of the furnace under the door J of the fire-chamber D. The blower B is constructed with a flaring mouth-piece, I, an air-chamber, C, and expanding blast-pipe F. To the end of the blast-pipe F is attached a pipe, F′, connecting the blower with a pipe, F″, extending upwardly into the fire-chamber and downwardly under and to the rear of the grate and upwardly into the fire-chamber. The ends of the pipe F″ are provided with flattened flaring nozzles, the nozzle A in front being applied in such a position as to be on a level with the top of the fuel, and adapted to direct the blast upwardly, and the nozzle A′ so applied at the rear of the fuel as to direct the blast horizontally over the fuel, causing it to mingle with the blast proceeding from the front nozzle A. At the rear side of the chamber C of the blower is inserted a pipe, E, connecting, by means of a pipe, H, with the steam-box. The steam-pipe H is provided with a valve, G.

The operation is as follows: Steam, being admitted to the pipe E, passes through chamber C, thence into the expanding-pipe F, where it combines with the air as it is brought in through the flaring mouth-piece I. The steam passing through chamber C with great velocity, and expanding in pipe F, exhausts the air in chamber C, and a fresh current of air rushes in to supply the vacant space.

The blower is operated by opening valve G in steam-pipe H, which connects with pipe E of the blower. After combination, the steam

and air are forced through pipes F and F″ to the nozzles A and A′, into chamber D. It is here distributed, as represented by the arrows in Figs. 1 and 2, from nozzles A and A′. By dividing the blast and carrying a part in front and a part to the back of the fuel, a still more perfect combustion is obtained than simply with the front blast. The portion of the blast-pipe under the fire-chamber being contiguous to the grate, the air passing therethrough will be additionally heated. The blast passing out of the rear nozzle produces a suction through the grate-bars, and, in combination with the blast from the front nozzle, compels the return of all unconsumed gases and smoke, forcing them to pass over the heated coal or flame, whereby they are all consumed in the fire-chamber.

These nozzles, combined in this way and made of the peculiar shape described, and operating at certain angles with respect to each other, give a complete rotary movement to the products of combustion, and compels these products to remain longer in the fire-chamber and to become thoroughly exhausted.

By this device great power and complete control of the fire are obtained.

The blower may also be used as a blast for blacksmiths' forges and for smelting-cupolas.

This device will be found to possess the advantages of a perfect blower, a smoke and gas consumer, and a fuel-economizer, all combined in one simple device.

Having thus described my invention, the following is what I claim as new and desire to secure by Letters Patent:

1. The combination, with the blower B, consisting of steam-pipe H and flaring mouth-piece I, of the upturned flattened flaring nozzle A, connected by pipe F″ to said blower, and located in front of the fuel, to adapt it to draw the products of combustion toward the upwardly-ascending blast, substantially as and in the manner set forth.

2. The combination, with the blower B, consisting of steam-pipe H and flaring mouth-piece I of the pipe F″, and flattened flaring nozzles A A′, the nozzle A located in front of the fuel, and adapted to direct a blast upwardly, and the nozzle A′ located at the rear of the fuel and adapted to direct a blast horizontally over the fuel, causing it to mingle and pass upwardly with that proceeding from the nozzle A, substantially as described, for the purpose set forth.

HENRY E. PARSON.

Witnesses:
L. H. AINSWORTH,
GEO. V. NATHEY.

1, 2, 5-0 words.