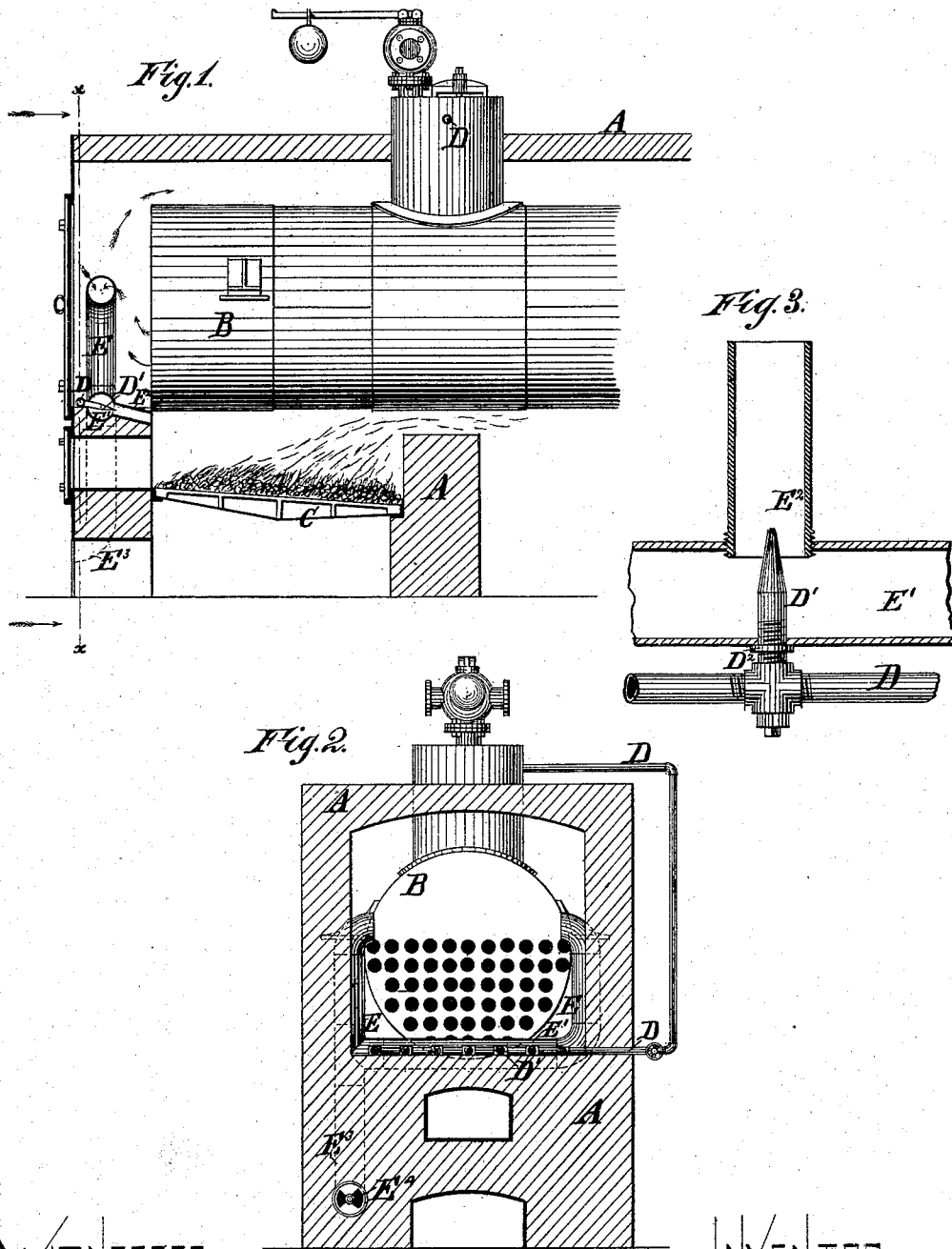


(No Model.)

W. H. ODELL.
STEAM BOILER FURNACE.

No. 263,663.

Patented Aug. 29, 1882.



WITNESSES

Charles C. Stetson
B. C. Dafford.

INVENTOR

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UNITED STATES PATENT OFFICE.

WILLIAM H. ODELL, OF YONKERS, NEW YORK.

STEAM-BOILER FURNACE.

SPECIFICATION forming part of Letters Patent No. 263,663, dated August 29, 1882.

Application filed October 15, 1881. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM H. ODELL, of Yonkers, Westchester county, in the State of New York, have invented certain new and useful Improvements relating to Steam-Boiler Furnaces, of which the following is a specification.

I blow in above the fuel a portion of the spent gases after they have imparted their heat to the boiler. I provide for mingling therewith variable quantities of fresh air. I take the gases from a high point in the exit-flue or uptake, leaving the lower portion of the smoke-box or uptake for the accumulation of cinders and soot, to be cleaned out at intervals.

The accompanying drawings form a part of this specification, and represent what I consider the best means of carrying out the invention.

Figure 1 is a longitudinal section. Fig. 2 is a cross-section on the line *xx* in Fig. 1. Fig. 3 is a horizontal section, representing a portion on a larger scale.

Similar letters of reference indicate like parts in all the figures.

A is the brick-work setting, B the boiler, and C the grate. These parts may be of the ordinary construction and arrangement.

D is a small steam-pipe leading from a convenient point in the dome of the boiler B to and across the front of the furnace-setting. It is provided with a series of nozzles, D', pointing toward the furnace, above the fire, and adapted to discharge the steam in small forcible jets. These jets will produce the well-known effect of powerfully dragging along any air or gases which may be presented in their vicinity and throwing the whole into the space between the fuel and the boiler-shell.

E E are pipes, which may be of thin sheet-iron, leading from a position close to the exit of the upper tubes of the boiler down each side of the smoke-box or uptake. They communicate at their lower ends with the two ends of a transverse pipe, E', provided with holes corresponding in position and size to the steam-discharging nozzles D'. The said nozzles are inserted in these holes, and are provided with light nuts or threaded collars D², which match on screw-threads on said nozzles. By turning

the nuts the extent to which the nozzles D' extend across the pipe E' may be adjusted with nicety. The branch pipes E², placed in line with the steam-nozzles D', lead from the pipe E' into the upper portion of the furnace. The pipe E' and its branches E² should be of tolerably stout metal. The steam-nozzles D' and the branch pipes E² are inclined downward, about as shown, so that the jets of steam and gas are thrown across the fire without blowing directly on it, except with the spent force retained after they have reached the back of the furnace. A pipe, E³, leads downward from the pipe E' at one end, and communicates through an adjustable valve or register, E⁴, with the external air.

In the working of my invention the fuel is supplied with somewhat less than the ordinary supply of air to ascend through the grate and burn the coal. As combustion is ordinarily conducted, much uncombined air passes off with the gaseous products of combustion. There is also much uncombined volatile matter similarly passing away. Neither of these has done its proper work. Both flow away with the high temperature of the furnace; and my invention provides for utilizing this heat and then returning a considerable portion to the furnace. The gases emerging from the flues of the boiler, having a liberal mingling of fresh air and of gas capable of further burning, are received by the inwardly-turned upper ends of the pipes E and drawn downward into the pipe E', whence they are ejected by the force of the jets of steam from the nozzles D' into the upper portion of the furnace. Here the incoming gases are again subjected to a high temperature and mixed with gases freshly rising through and from the stratum of glowing coal on the grate. If there is not sufficient fresh air in those gases to induce the most advantageous working, the register E⁴ is partially opened to allow the reception of additional air from that source, which enters mingled with the gases which have passed through the furnace. A small quantity of steam is of no disadvantage. It is believed to rather promote the union of the other elements and the production of the most complete combustion.

I attach importance to the arrangement of the pipes E at the sides of the smoke-box.

They take the gases from a point sufficiently high to avoid obstruction from deposit of ashes or the like, and, being out of the range of the tubes, offer no obstruction to the draft.

5 I do not claim blowing air into a furnace by the aid of steam; nor do I claim, broadly, passing gases from the fire again into the furnace by such means; but

I claim as my invention—

10 1. The passages E, arranged at the side of the smoke-box, and the transverse passage E', extending across the bottom, in combination with the branch passages E² and steam-nozzles D', and arranged relatively to the
15 boiler B, having return-tubes, as shown, so as to return to the furnace gases from a level

above the tubes in the smoke-box, as herein specified.

2. The passages E E' E² and the fresh-air passage E³, having a controlling-register, E⁴, 20 in combination with each other and with a return tubular boiler, B, steam-blowing means D D', and provisions D² for adjusting the position of the latter, substantially as specified.

In testimony whereof I have hereunto set my 25 hand, at New York city, New York, this 13th day of October, 1881, in the presence of two subscribing witnesses.

W. H. ODELL.

Witnesses:

CHARLES R. SEARLE,
CHARLES C. STETSON.