No. 880,977. PATENTED MAR. 3, 1908.

W. P. DARLING.

STEAM BOILER FURNACE.

APPLICATION FILED APR. 22, 1907.

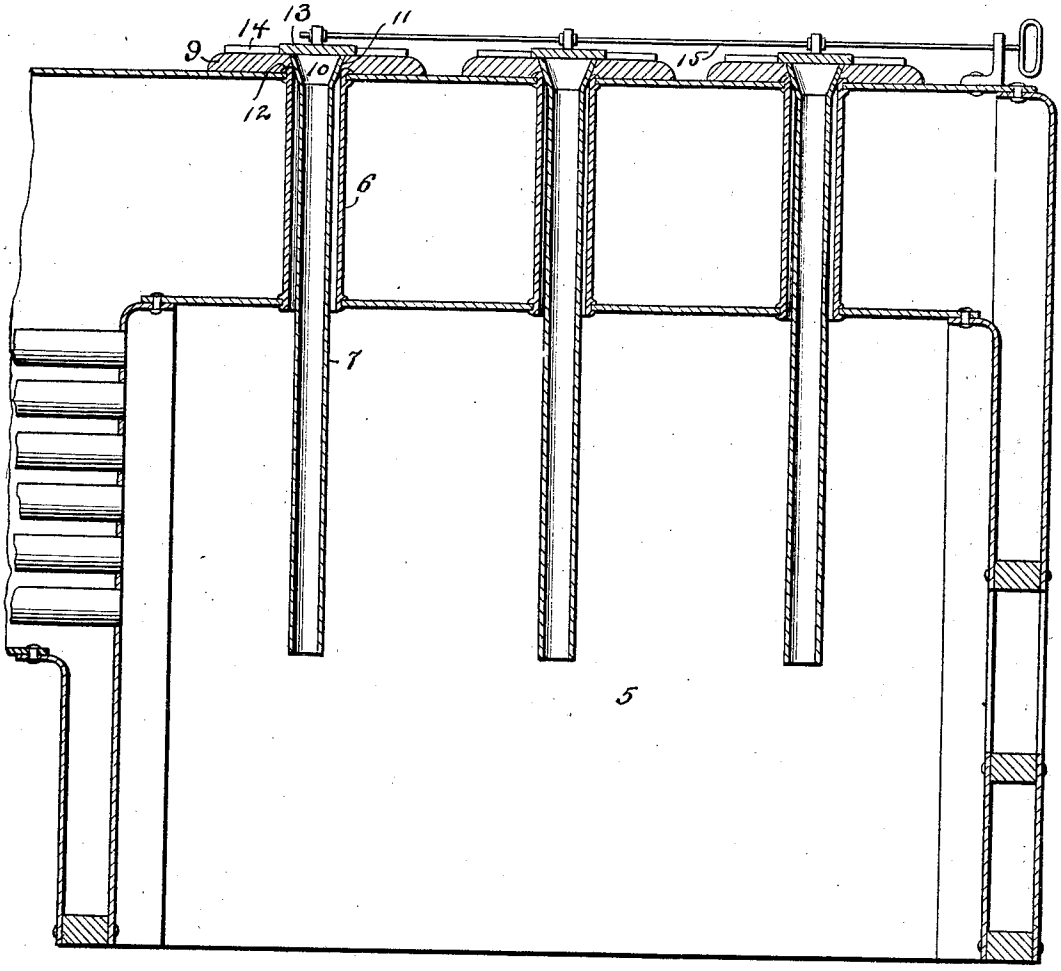


Fig. 1.

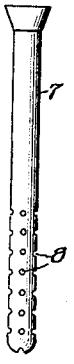


Fig. 2.

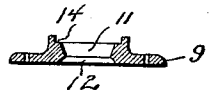


Fig. 3.

W. P. Darling Inventor

Witnesses

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UNITED STATES PATENT OFFICE.

WILLIAM PETER DARLING, OF MEADVILLE, MISSOURI.

STEAM-BOILER FURNACE.

No. 880,977. Specification of Letters Patent. Patented March 3, 1908.

Application filed April 22, 1907. Serial No. 369,534.

To all whom it may concern:

Be it known that I, WILLIAM PETER DARLING, a citizen of the United States, residing at Meadville, in the county of Linn and State of Missouri, have invented certain new and useful Improvements in Steam-Boiler Furnaces, of which the following is a specification.

This invention relates to steam-boiler furnaces and has for its object to provide improved means for feeding air into the furnace above the bed of fuel to promote combustion.

The invention is more particularly designed for locomotive boilers in which the draft is from below the grate. In this type of boilers when the fuel bed is thick there is a great waste of fuel from the lack of air as more carbon is liberated from the fuel than there is oxygen to take care of. This causes the unconsumed carbon to pass into the outer air which results in soot and smoke and consequently a waste of fuel.

By the present invention highly heated jets of air are fed into the furnace above the fuel to complete the combustion of carbon that would otherwise go to waste.

In the accompanying drawing, Figure 1 is a longitudinal sectional view showing the application of the invention. Fig. 2 is a modified form of air tube. Fig. 3 is a transverse section of one of the supporting brackets of the air tubes.

Referring specifically to the drawing, 5 denotes the fire box of a locomotive type of boiler. At 6 are indicated flues which pass through the water and steam space of the boiler being expanded and bedded in the top and crown sheets of the boiler in the ordinary manner of setting boiler flues. The air tubes 7 enter the fire-box through the flues 6, one end of the tubes opening into the outer air and the other into the fire-box a suitable distance above the fuel.

In the modified form of air tube shown in Fig. 2, the inner end of the tube is closed and the air is discharged through perforations 8 in the tube. Either style of air tube is to be used as in practice may prove most effective.

The air tubes are supported at their outer ends in brackets 9 secured to the top sheet of the boiler over the outer ends of the flues 6. The outer ends of the tubes are made flaring as indicated at 10 and the brackets having similarly shaped openings 11 in which said flared ends snugly seat. The brackets are also recessed as indicated at 12 to receive the expanded ends of the flues 6. Each air tube is provided with a damper 13 for controlling the draft. The dampers fit over the open outer ends of the air tubes and are slidably mounted in guide-ways 14 on top of the brackets. The dampers are connected to an operating rod 15 so that they may be simultaneously operated.

The air tubes 7 are spaced from the inside of the flues 6 which allows the heat from the furnace to enter the flues and surround the air tubes so that the air which passes into the fire-box through said tubes is highly heated before reaching the fuel. The air space around the air tubes also protects the flues 6 from sudden contraction and expansion if currents of cool air should be drawn through the air tubes when the engine is pulling heavily. The flues 6 are closed at their outer ends by the flaring portion 10 of the air-tubes 7 whereby the entrance of cold air into the fire-box through the flues is prevented. By thus excluding the outside air the boiler walls will not be cooled.

In the drawing, three air feeding tubes are shown but a greater or less number may be used as practice may deem necessary for the size of the fire-box used, the object being to obtain as good a distribution of the heated air as possible.

The apparatus herein described is a fuel economizer and practically eliminates smoke. It can be readily applied to old and new boilers and adds but little weight thereto. The manner in which the air tubes are mounted permits their ready removal for cleaning and also for cleaning the flues 6.

I claim:—

1. The combination with the fire-box and the crown and top sheets of a boiler, of flues mounted in the crown and top sheets, and closed at their outer ends, and air-feeding pipes entering the fire-box through said flues, and spaced from the inside thereof.

2. The combination with the fire-box and the crown and top sheets of a boiler, of flues mounted in the crown and top sheets, brackets fastened to the top sheet over the outer ends of the flues, air-feeding pipes mounted in said brackets and entering the fire-box through the flues, and means for excluding outside air from the flues.

3. The combination with the fire-box and the crown and top sheets of a boiler, of flues mounted in the crown and top sheets, recessed brackets on the top sheet over the

outer ends of the flues, and air-feeding pipes having flaring ends seating in the recesses of the brackets and closing the outer ends of the flues to exclude outside air therefrom.

4. The combination with the fire-box and the crown and top sheets of a boiler, of flues mounted in the crown and top sheets, brackets fastened to the top sheet over the outer ends of the flues, air-feeding pipes mounted in said brackets and entering the fire-box through the flues, means for excluding air from the flues, and dampers for the air-pipes mounted on the brackets.

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

WILLIAM PETER DARLING.

Witnesses:
SILAS E. TIPTON,
JOHN BILLINGTON.