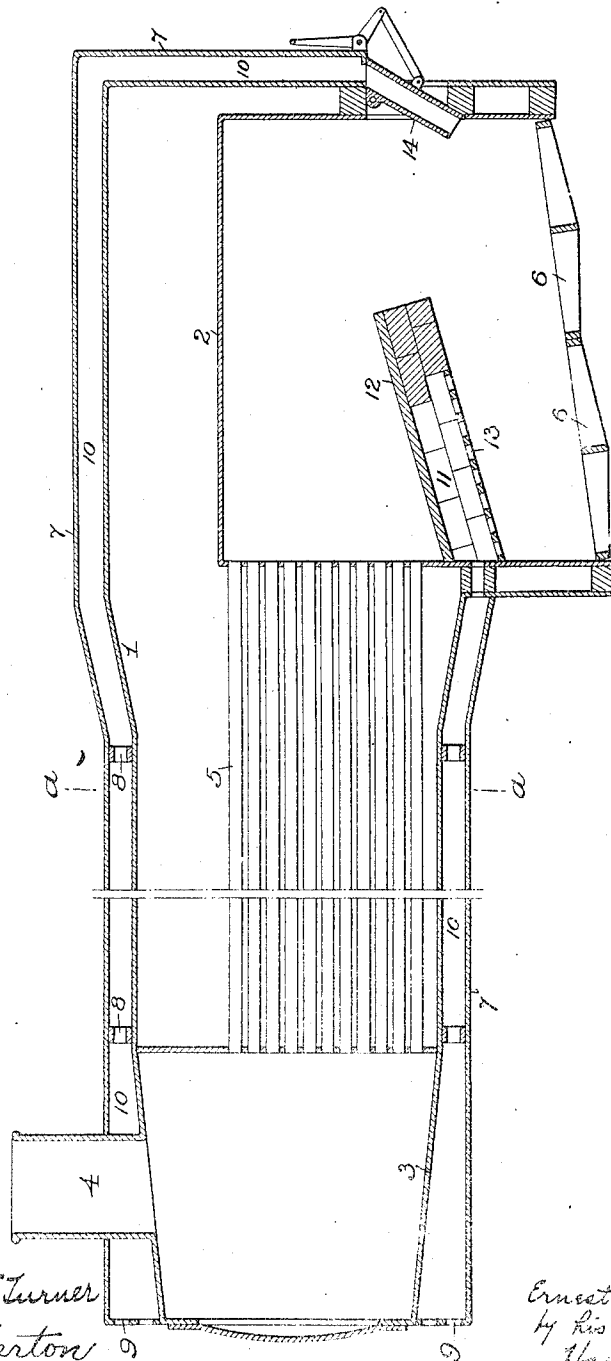


E. BUCKLEY.
 STEAM BOILER FURNACE.
 APPLICATION FILED MAY 27, 1912

1,051,546.

Patented Jan. 28, 1913.



Witnesses
 Hamilton D. Turner
 Elsie Fullerton

Inventor
 Ernest Buckley
 by his Attorney
 Harry A. Smith

UNITED STATES PATENT OFFICE.

ERNEST BUCKLEY, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR OF ONE-HALF TO
SAVILLE SMITH, OF PHILADELPHIA, PENNSYLVANIA.

STEAM-BOILER FURNACE.

1,051,546.

Specification of Letters Patent.

Patented Jan. 28, 1913.

Application filed May 27, 1912. Serial No. 699,914.

To all whom it may concern:

Be it known that I, ERNEST BUCKLEY, a subject of the King of Great Britain and Ireland, residing in Philadelphia, Pennsylvania, have invented certain Improvements in Steam-Boiler Furnaces, of which the following is a specification.

The object of my invention is to insure the proper combustion of the gases discharged from the fuel in steam boiler furnaces, an object which I attain in the manner herein-after set forth, reference being had to the accompanying drawing, which represents a longitudinal vertical section of a boiler of the locomotive type having combustion devices in accordance with my invention.

In the drawing, 1 represents the barrel or casing of a boiler of the locomotive type, 2 the fire box casing, 3 the smoke box casing, 4 the stack, 5 the tubes, and 6 the grate, all of these parts being constructed and arranged in the ordinary manner. Surrounding the boiler shell, however, is an outer casing 7 which is supported and braced at suitable points by means of perforated rings 8 and has, in its forward end, openings 9 for the inlet of air into the chamber 10 which intervenes between the boiler shell and said outer casing 7, this air chamber communicating at its rear end with a chamber 11 in a hollow brick arch 12, which projects inwardly into the fire box and is located at a point some distance above the level of the bed of fuel maintained upon the grate 6, the lower member of this arch 12 being perforated as at 13 for the escape of the air therefrom into the fire box. The chamber 10 also communicates with the interior of the fire box through a hollow door 14 which closes the usual feed opening into the fire box, this door being pivoted at the top in such manner as to swing inwardly in order to open it. The air entering the front end of the chamber 10 is therefore caused to circulate first around the shell 3 of the smoke box and then around the shell of the boiler; and in its rearward travel becomes highly heated and hence issues from the hollow arch 12 and hollow fire door 14 in the condition

best calculated to cause effective combustion of the gases arising from the fuel upon the grate 6, the latter receiving its supply of cold air from below in the customary manner, and the heated air constituting a secondary supply which is directed downwardly toward the surface of the bed of fuel and consequently becomes intimately mixed with the gases arising therefrom, which mixture is completed as the gases are concentrated in their upward passage around the rear end of the arch so that by the time the gases reach the upper portion of the fire box the oxygen of the secondary air supply has been so thoroughly commingled therewith that all of the carbon contents of the gases will have become ignited and complete combustion of the gases will be effected either in the upper portion of the fire box or during the passage of said gases through the tubes 5, the emission of unconsumed carbon in the form of smoke and the loss of heat due to this cause being prevented.

I have not shown the usual stays for the side walls and crown sheet of the fire box as such illustration is not necessary for the proper understanding of my invention.

I claim:

The combination, in a steam boiler furnace, of a fire box having therein a deflecting arch containing a chamber discharging into the fire box, a fire door with passage therethrough also discharging into the fire box, a casing outside of the shell of the boiler and forming between the two an air heating and circulating chamber which communicates both with the hollow arch and with the passage through the fire door, whereby a secondary supply of air heated by contact with the shell of the boiler is directed into the fire box partly through the hollow arch and partly through the fire door.

In testimony whereof, I have signed my name to this specification, in the presence of two subscribing witnesses.

ERNEST BUCKLEY.

Witnesses:

ELSIE FULLERTON,
HAMILTON D. TURNER.