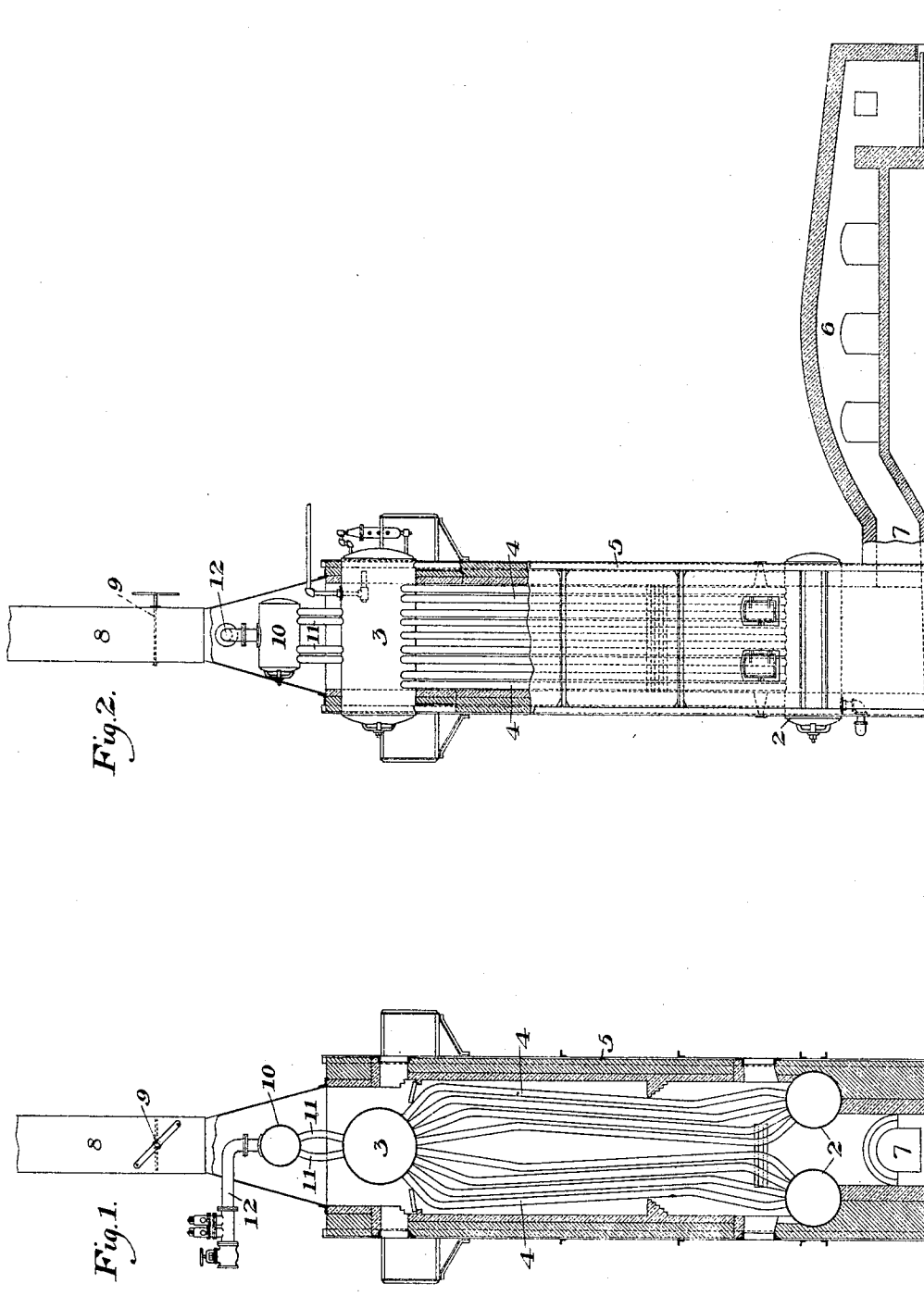


No. 765,830.

PATENTED JULY 26, 1904.

R. GRAY.
WATER TUBE BOILER.
APPLICATION FILED OCT. 20, 1902.

NO MODEL.



WITNESSES

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UNITED STATES PATENT OFFICE.

ROBERT GRAY, OF LOWELLVILLE, OHIO, ASSIGNOR TO THE MEEHAN BOILER & CONSTRUCTION COMPANY, OF LOWELLVILLE, OHIO, A CORPORATION OF OHIO.

WATER-TUBE BOILER.

SPECIFICATION forming part of Letters Patent No. 765,830, dated July 26, 1904.

Application filed October 20, 1902. Serial No. 127,916. (No model.)

To all whom it may concern:

Be it known that I, ROBERT GRAY, of Lowellville, Mahoning county, Ohio, have invented a new and useful Water-Tube Boiler, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a sectional end elevation of my improved boiler; and Fig. 2 is a side elevation, partly broken away, showing the same attached to a heating-furnace.

My invention relates to boilers of the vertical water-tube type, and is designed to improve such boilers by providing means for drying or superheating the steam after it leaves the steam and water drum or drums.

In the drawings I show a boiler having mud-drums 2 2 and a single steam and water drum 3. The steam and water drum is connected with the mud-drums by banks of tubes 4 4, and the boiler is inclosed in a vertical setting or shell 5, which is provided with suitable lining and baffles. The drums 2 and 3 extend horizontally and are of cylindrical form, their ends preferably extending through the casing, as shown in Fig. 2. I have shown the boiler as set in the outlet-flue of the heating-furnace 6, the waste heat entering the port 7 at the bottom and thence rising between the mud-drums and among the tubes and passing out through an upper stack 8, having a suitable valve 9.

The parts above described are old in this art, and I make no claims herein to the boiler itself.

Above the steam and water drum 3 and within the enlarged lower portion of the stack-flue I provide a steam-drum 10, which is connected with the upper part of the steam and water drum by curved tubes 11. These tubes are substantially vertical and being inserted along the lowest portion of the drum 10 serve to keep it continually drained and to prevent saturation of the steam in the superheater-drum. The drum 10 is preferably of cylindrical form, extending parallel with the drum 3, their axes being approximately in the same vertical plane, the drum 10, however, being

smaller and shorter. The steam-offtake pipe 12 leads from the upper part of the drum 10.

In the operation of the boiler the steam formed in the tubes and drums rises from the drum 3 through the tubes 11 into the drying or superheating drum 10 and is thence taken to the point of supply. The heated gases after passing upwardly among the boiler-tubes encircle the tubes 11 and drum 10, and thereby heat the steam therein, thus increasing its heat and power.

The advantages of my invention result from the locating of the drying or superheating drum above the steam and water drums and connecting them by superheating-pipes which are exposed to the gases.

Many variations may be made in the form and arrangement of the boiler, the superheating-drum, and the connecting-tubes without departing from my invention.

I claim—

1. A vertical water-tube boiler having in the outlet-flue above the steam and water drum or drums, a steam-drying drum, and a plurality of rows of drum-draining superheater-tubes connecting it with the steam and water drum or drums; substantially as described.

2. A vertical water-tube boiler having a single steam and water drum, a stack-flue above the same, a superheater-drum in the stack-flue, and a plurality of rows of drum-draining tubes connecting the superheating-drum with the steam-space of the steam and water drum, said tubes presenting a heating-surface to the gases; substantially as described.

3. A vertical water-tube boiler having a single horizontal cylindrical steam and water drum, and a similar superheating-drum above the same in the stack-flue, and connected with the same by a plurality of rows of curved, drum-draining and superheating tubes; substantially as described.

In testimony whereof I have hereunto set my hand.

ROBERT GRAY.

Witnesses:

L. M. REDMAN,
H. M. CORWIN.