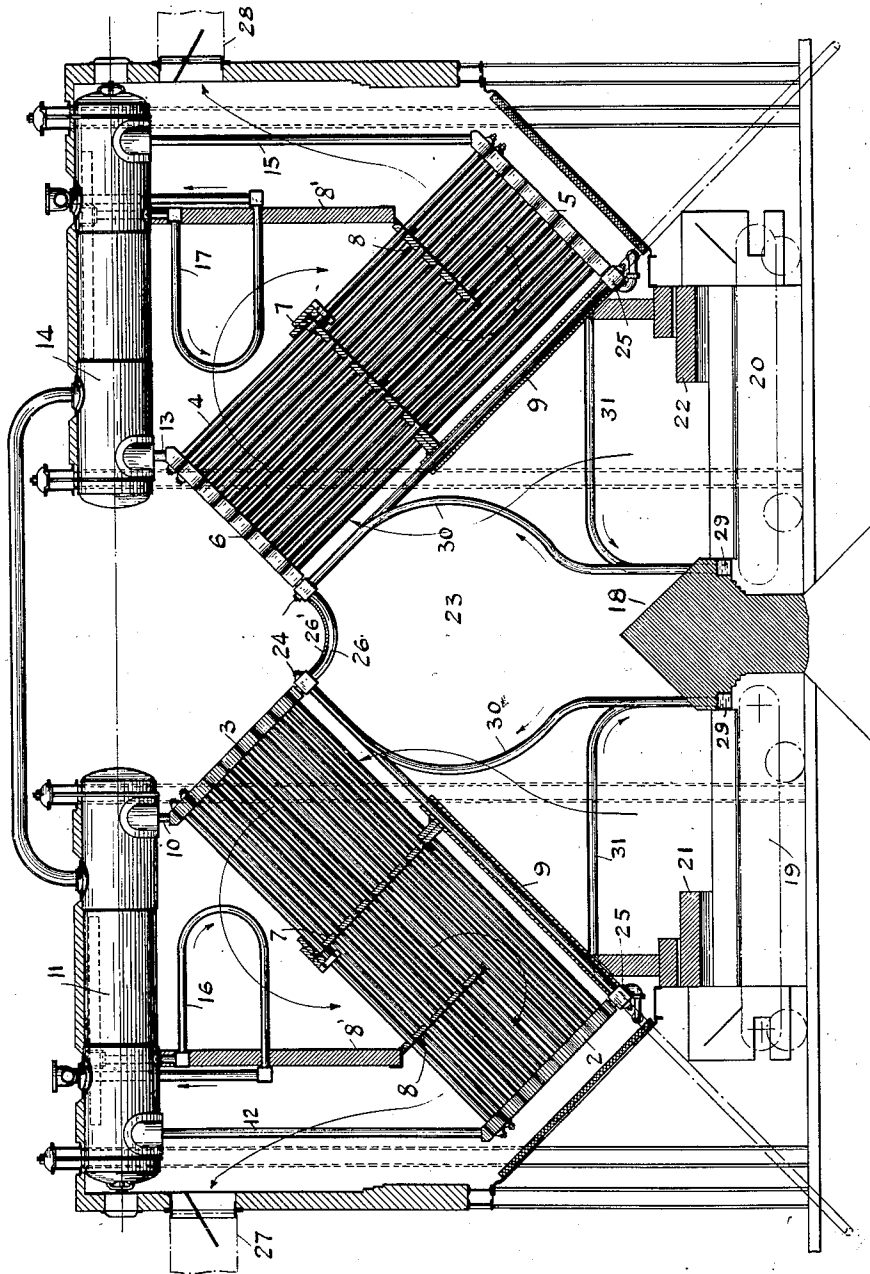


A. D. PRATT.
 WATER TUBE BOILER.
 APPLICATION FILED JULY 3, 1912.

1,051,912.

Patented Feb. 4, 1913.



WITNESSES:

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UNITED STATES PATENT OFFICE.

ARTHUR D. PRATT, OF NEW YORK, N. Y., ASSIGNOR TO THE BABCOCK & WILCOX COMPANY, OF RAYONNE, NEW JERSEY, A CORPORATION OF NEW JERSEY.

WATER-TUBE BOILER.

1,051,912.

Specification of Letters Patent.

Patented Feb. 4, 1913.

Application filed July 3, 1912. Serial No. 707,419.

To all whom it may concern:

Be it known that I, ARTHUR D. PRATT, a citizen of the United States, residing in New York city, borough of Manhattan, in the county of New York and State of New York, have invented certain new and useful Improvements in Water-Tube Boilers, of which the following is a specification.

My invention relates to a water tube boiler of the type in which two units, each comprising a bank of inclined water tubes, are symmetrically arranged above a common fuel chamber extending from one side of the boiler to the other and fired at both the front and rear. The disposition of the boiler units provides an A-shaped combustion chamber of large volume, separate portions of the furnace gases being directed from the central combustion chamber in independent streams toward the outlet flues.

The invention will be understood by reference to the accompanying drawing which is a section through a boiler embodying the invention.

In the drawing I have shown two units each comprising a bank of inclined water tubes, the tubes 1 of the left hand unit being expanded into lower and upper headers 2 and 3, and the tubes 4 of the right hand unit being expanded into lower and upper headers 5 and 6. These headers extend transversely of the boiler from one side wall of the setting to the other side wall. Each bank is divided by transverse baffles 7 and 8, the baffles 7 rising from baffles 9 supported upon the lowermost row of tubes and extending from the lower headers toward the rear, thus providing a plurality of transverse passes for the gases across and around the tubes, as indicated by the arrows. The upper headers 3 are connected by short vertical pipes 10 with a longitudinal steam and water drum 11, and the latter is connected with the lower headers by pipes 12. The upper headers 6 are connected by short vertical pipes 13 with a longitudinal steam and water drum 14, and the latter is connected with the lower headers 5 by pipes 15. Walls 8' extend from the transverse baffles 8 to the drums 11 and 14, and in the space between these walls and the roof of the setting above the banks of tubes, and above the first and second passes, are placed superheaters 16 and 17 of any approved type. In the form shown these con-

sist of transverse boxes connected by U-shaped pipes, the upper boxes being connected to the steam spaces of the corresponding drum.

The boiler units above described are suspended over a common furnace extending from the front to the rear of the boiler. In the design shown, the furnace is divided along its center by a low wall 18 extending transversely of the setting from one side wall to the other. This wall serves as a rear wall for the two fuel bed sections, in this instance two chain grate stokers, 19 and 20 of any approved construction, and operated independently of each other, one from the front and the other from the rear of the setting. The mud drums 25 of the boiler are at the rear of and protected by the ignition arches 21 and 22.

The two boiler units are so disposed relative to each other that the upper headers 3 and 6 converge toward each other downwardly and their lower ends are in proximity to the central transverse vertical plane of the setting. There is thus provided a large A-shaped combustion chamber 23 common to the boiler units. To insure against burning the lower ends of the upper headers I nipple to said headers transverse boxes 24, the lowermost row of tubes of the bank being expanded into said boxes and into the mud drums 25.

In the present design I connect the upper headers 3 and 6, through the boxes 24, by a series of short circulation pipes 26 covered by roof tiles 26'. The A-shaped combustion chamber is therefore closed at the apex and is open only along the upper portions of the inclined sides thereof, that is, at the uptake ends of the inclined tubes. The gases from the combustion chamber divided into separate streams, enter the banks of tubes at their uptake ends and, following the path indicated by the arrows, escape through the outlet flues 27 and 28.

It may be desirable to connect the water boxes 29 below the wall 18 with the circulation. For such purpose I have shown them connected by pipes 30 and 31 with the upper and lower headers respectively.

With the arrangement above described, the character of the combustion may be maintained constant from one side of the boiler to the other, and the loss often experi-

enced through a stream or lane of excess air or unconsumed combustible gases passing through the boiler and escaping to the stacks will be avoided.

5 The angle of inclination of the tubes and the heating surfaces is approximately 45° to the horizontal, and the planes of the upper headers approximately at an angle of 90° to each other. I do not however restrict
10 myself to these angles, the essential feature being the disposition of the units relative to each other over a common furnace and combustion chamber to provide an A-shaped combustion chamber of relatively large
15 volume.

In my application Serial No. 707,420, filed July 3, 1912, I have described a water tube boiler of the same general type as described herein, the design shown in said application
20 comprising a transverse drum at the apex of the combustion chamber to which the lower ends of the upper headers are nipped.

What I claim is:

1. In a water tube boiler, the combination
25 of two units each comprising a bank of inclined water tubes, lower and upper headers into which said tubes are expanded, said units being so disposed that the upper headers converge toward each other downwardly,
30 pipes connecting said upper headers with each other, drums located above and connected with the lower and upper headers of the corresponding unit, and a central combustion chamber common to said units.

35 2. In a water tube boiler, the combination of two units each comprising a bank of inclined water tubes, lower and upper headers into which said tubes are expanded, said units being so disposed that the upper headers converge toward each other downwardly,
40 pipes connecting said upper headers with each other, and a baffle in each unit extending from the lower header toward the upper, whereby an A-shaped combustion chamber is
45 provided common to the two units and open to the gases along the upper portions of the inclined sides thereof, and a furnace cham-

ber extending from the front to the rear of the boiler.

3. In a water tube boiler, the combination
50 of two units each comprising a bank of inclined water tubes, lower and upper headers into which said tubes are expanded, said units being so disposed that the upper headers converge toward each other downwardly,
55 pipes connecting said upper headers with each other, superheaters above said banks of tubes, and a central combustion chamber common to said units.

4. In a water tube boiler, the combination
60 of two units each comprising a bank of inclined water tubes, lower and upper headers into which said tubes are expanded, said units being so disposed that the upper headers converge toward each other downwardly,
65 pipes connecting the lower ends of the upper headers, transverse baffles dividing said banks into a plurality of passes beginning at the steam uptake ends, and a baffle extending from the rearward to the first pass,
70 whereby an A-shaped combustion chamber is provided common to the two units and open to the gases along the upper portions of the inclined sides thereof, and a furnace chamber extending from the front to the rear of
75 the boiler.

5. In a water tube boiler, the combination of two units each comprising a bank of inclined water tubes, lower and upper headers into which said tubes are expanded, said
80 units being so disposed that the upper headers converge toward each other downwardly, pipes connecting the lower ends of said upper headers, a refractory covering for said pipes, and a furnace chamber extending
85 from the front to the rear of the boiler.

In testimony whereof I have hereunto signed my name in the presence of two subscribing witnesses.

ARTHUR D. PRATT.

Witnesses:

CHARLES A. JONES,
M. E. McNinch.