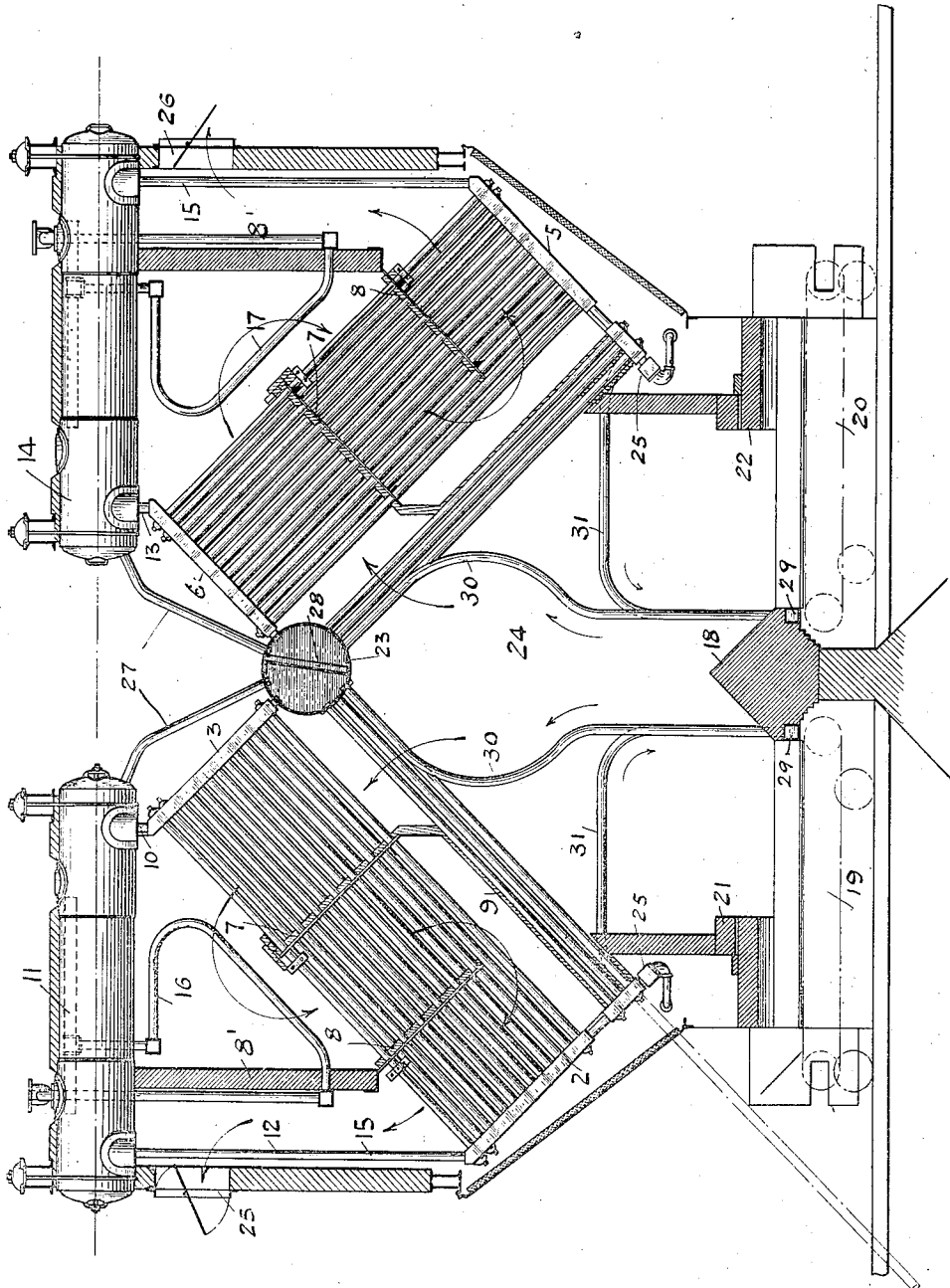


A. D. PRATT.
 WATER TUBE BOILER.
 APPLICATION FILED JULY 3, 1912.

1,051,913.

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 BAYONNE, NEW JERSEY, A CORPORATION OF NEW JERSEY.

WATER-TUBE BOILER.

1,051,913.

Specification of Letters Patent.

Patented Feb. 4, 1913.

Application filed July 3, 1912. Serial No. 707,420.

To all whom it may concern:

Be it known that I, ARTHUR D. PRATT, a citizen of the United States, residing at 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 water tube boilers of the type in which two units, each comprising a bank of inclined water tubes, are symmetrically arranged above a common fuel and combustion chamber extending from one side of the boiler to the other. The disposition of the boiler units provides an A-shaped combustion chamber of large volume, separate portions of the 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 longitudinal section through a boiler embodying the same.

The present design comprises two units each consisting of a bank of inclined water tubes, the tubes 1 of the left hand bank 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. The uptake ends of the lowermost rows of tubes are expanded into a transverse drum 23 as hereafter explained.

Each bank is divided by transverse baffles 7 and 8, the baffles 7 rising from baffles 9 extending from the lower headers toward the upper to the first pass, 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 spaces between these walls and banks of inclined tubes above the first and second passes, are placed superheaters 16

and 17 of any approved type. The form shown comprises two transverse boxes connected by U-shaped tubes, the upper boxes being connected to the steam space 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 from one side wall to the other. This wall serves as a rear wall of 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 of the boiler are above and protected by the ignition arches 21 and 22.

The two boiler units are disposed symmetrically with reference to the center line of the fuel chamber, and so disposed relative to each other that the upper headers 3 and 6 converge toward each other downwardly, and at their lower ends may be nipped to a transverse drum 23, or they may not be directly connected to the same. The uptake ends of the lower rows of the banks of tubes, three rows being so shown, those which are exposed to the direct radiant heat from the fire, are expanded into said drum 23. The latter extends from one side wall of the setting to the other and this arrangement provides an A-shaped combustion chamber 24 common to both units. This combustion chamber is closed at the apex by the drum 23 and open for the escape of the gases along the upper portions of its inclined sides, the gases flowing across and around the tubes through the three transverse passes to the two outlet flues 25 and 26.

The drum 23 is connected by pipes 27 with the drums 11 and 14 so that the steam generated in the lower tubes of the two units, which come in contact with the direct radiant heat from the fire, is discharged through said pipes 27 into the drums 11 and 14 and does not have to travel through the upper headers. A diaphragm 28 divides drum 23 into two separate chambers so that the steam and water circulation of the right unit is independent of that of the left unit. Additionally the presence of the drum 23 insures against the burning of the lower ends of the upper headers.

With the inclination of the boiler units, and the arrangement above described, providing an A-shaped combustion chamber, the character of the combustion may be maintained constant from one side of the boiler to the other, and the loss often experienced through a stream or lane of excess air or unconsumed combustible gases passing through the boiler and escaping to the stacks will be avoided. Any irregularity in the composition of the gases from the front to the rear of the furnace disappears before the gases pass from the upper part of the combustion chamber resulting in a more efficient and economical operation.

The baffles 9 instead of being supported on the second or third of the lower rows of tubes may be supported on the lowermost row, extending from the lower headers to the first pass, as shown in a companion application Serial No. 707,419, filed July 3, 1912.

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 transverse drum 23 and the lower headers respectively.

What I claim is:

1. 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, whereby an A-shaped combustion chamber is formed between the units, a transverse drum at the apex of the combustion chamber to which the lower ends of said upper headers are nippedled, and a furnace chamber common to said units.

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, whereby an A-shaped combustion chamber is formed between the units, a transverse drum at the apex of the combustion chamber to which the lower ends of said upper headers are nippedled, a vertical longitudinal diaphragm in said transverse drum, and a furnace chamber common to said units.

3. 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,

whereby an A-shaped combustion chamber is formed between the units, a transverse drum at the apex of the combustion chamber to which the lower ends of said upper headers and the uptake ends of the lower rows of tubes of said banks are connected, and a furnace chamber common to said units.

4. 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, whereby an A-shaped combustion chamber is formed between the units, a transverse drum at the apex of the combustion chamber to which the lower ends of such upper headers are nippedled, a steam and water drum for each unit, and pipes connecting said transverse drum and said steam and water drums, and a furnace chamber common to said units.

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 units being so disposed that the upper headers converge toward each other downwardly, whereby an A-shaped combustion chamber is formed between the units, transverse baffles dividing said banks into a plurality of passes beginning at the steam uptake ends, a transverse drum at the apex of the combustion chamber to which the lower ends of said upper headers are nippedled, and a furnace chamber common to said units.

6. 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, whereby an A-shaped combustion chamber is formed between the units, transverse baffles dividing said banks into a plurality of passes beginning at the steam uptake ends, baffles extending from the lower headers upwardly to the first pass, a transverse drum at the apex of the combustion chamber to which the lower ends of said upper headers are nippedled, and a furnace chamber common to said units.

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

ARTHUR D. PRATT.

Witnesses:

M. E. McNinch,
CHARLES S. JONES.