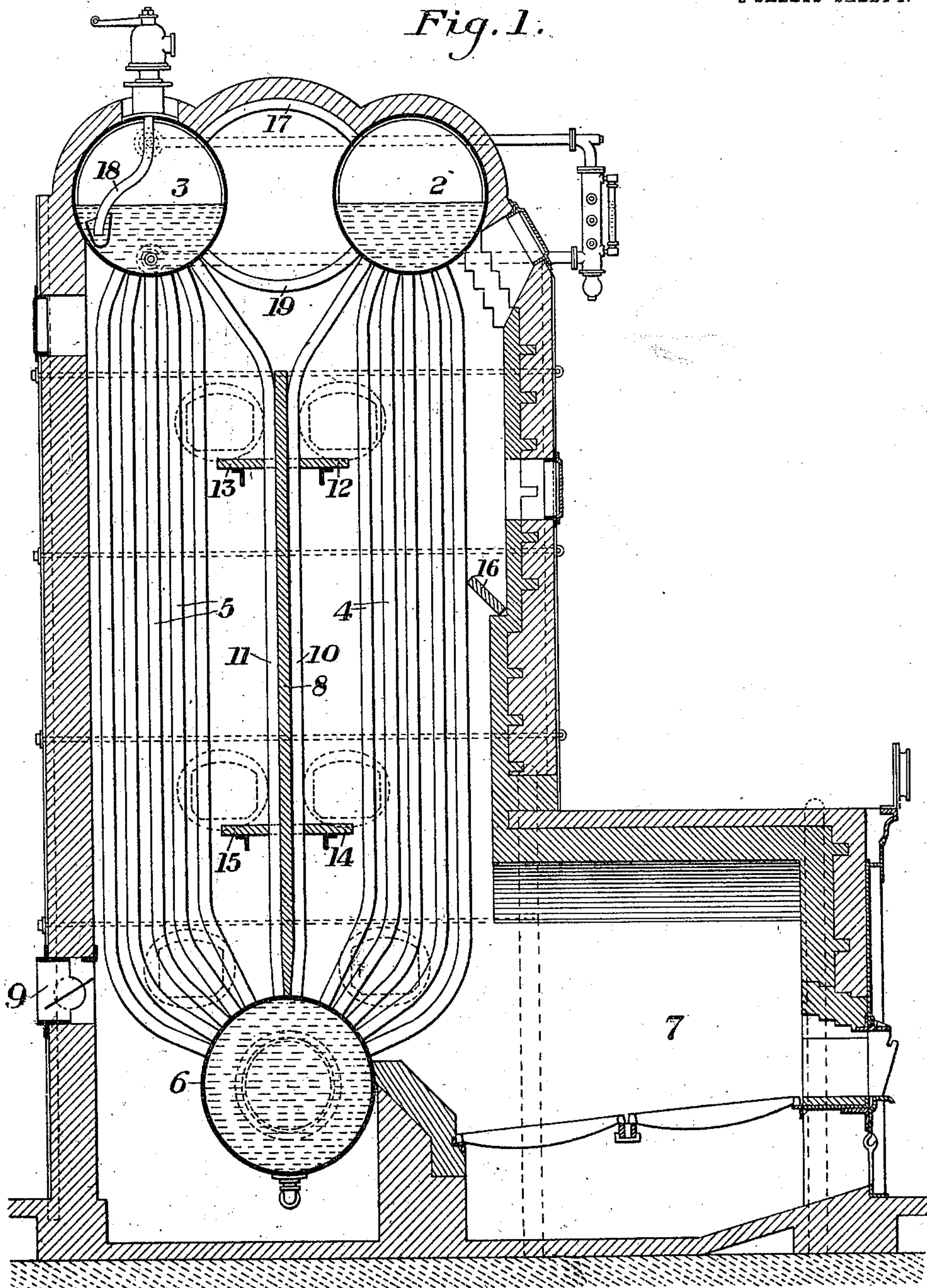


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2 SHEETS—SHEET 1.

Fig. 1.



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by Katherine Rhymes
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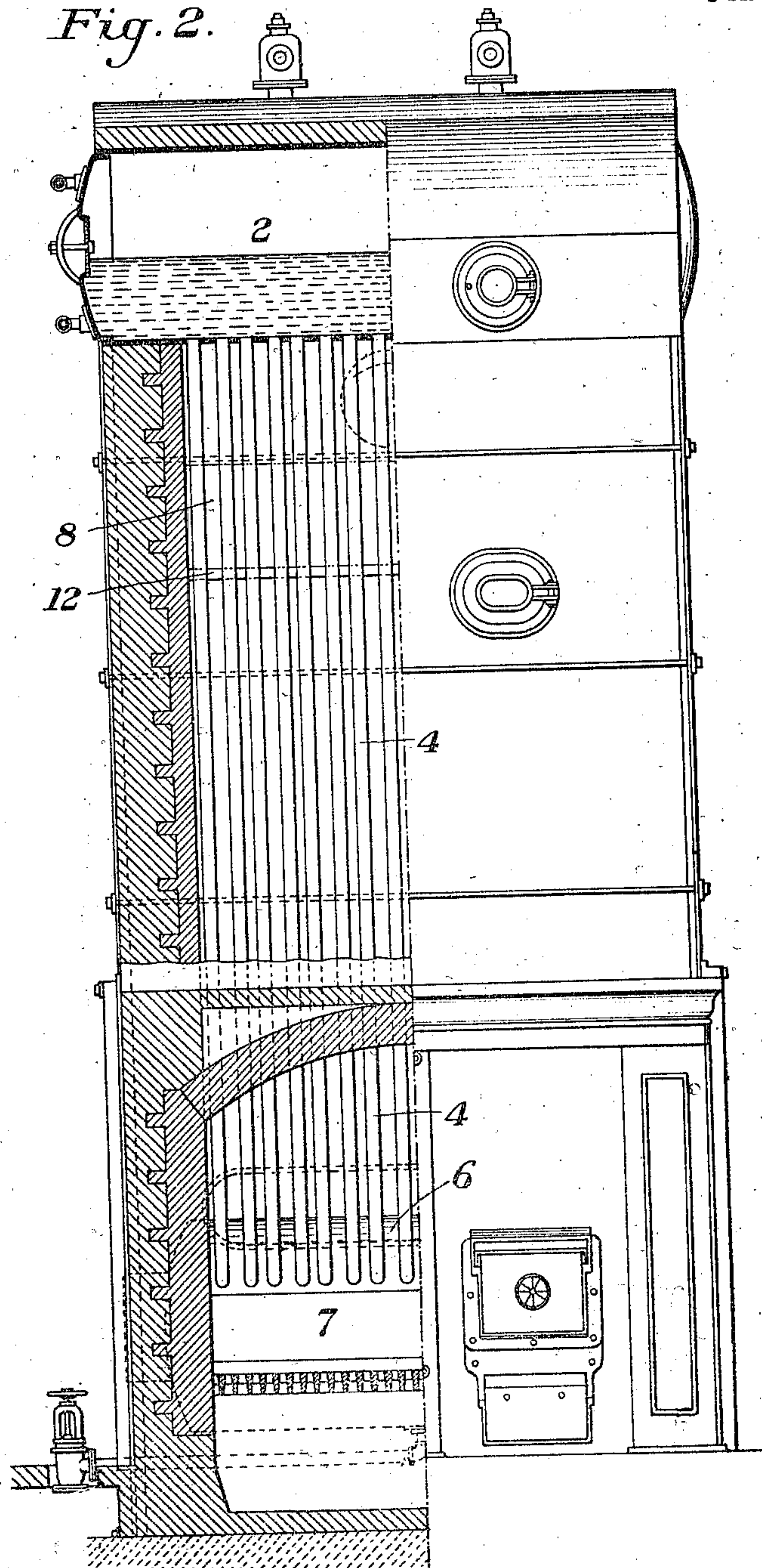
J. E. BELL.
WATER TUBE BOILER.
APPLICATION FILED OCT. 6, 1906.

Patented Feb. 21, 1911.

2 SHEETS-SHEET 2.

984,880.

Fig. 2.



WITNESSES

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UNITED STATES PATENT OFFICE.

JOHN E. BELL, OF NEW YORK, N. Y., ASSIGNOR TO THE BABCOCK & WILCOX COMPANY,
OF NEW YORK, N. Y., A CORPORATION OF NEW JERSEY.

WATER-TUBE BOILER.

984,880.

Specification of Letters Patent. Patented Feb. 21, 1911.

Application filed October 6, 1906. Serial No. 337,703.

To all whom it may concern:

Be it known that I, JOHN E. BELL, of New York, New York county, New York, have invented a new and useful Improvement in
5 Water-Tube Boilers, 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—

10 Figure 1 is a sectional side elevation of my improved boiler, and Fig. 2 is a front elevation of the same partly broken away.

My invention relates to the class of water tube boilers wherein upper transverse steam
15 and water drums are connected by banks of tubes to a lower transverse mud drum.

The object of my invention is to provide a compact boiler of this type in which a desirable amount of heating surface may be obtained by adding tubes in a peculiar manner
20 between the main banks; also to provide for good circulation of the water throughout the various tubes.

In the drawings, 2 and 3 represent the upper transverse steam and water drums connected by banks of curved tubes 4 and 5 with
25 a lower transverse mud drum 6. The furnace is indicated at 7 and the gases are directed in up and down passes by a central baffle 8 which I have shown as located centrally between the main banks 4 and 5. The
30 gases rise among the tubes of the front bank, cross through the tubes above the baffle, and flow down through the tubes in the rear bank to the outlet flue 9.

In addition to the heating surface of the main banks, I provide two rows of tubes 10 and 11 which extend along the front and the rear faces of the baffle and are connected at
40 their upper ends to the water space of the steam and water drums and at their lower ends to the mud drum. In order to deflect the gases from these baffle tubes 10 and 11 and hold such gases within the main
45 bank, I provide the baffle shelves 12, 13, 14 and 15. These shelves project horizontally from the baffle 8 and hold the gases among the tubes of the banks proper. For the same purpose, I may employ inclined bricks 16
50 which may rest against the front row of tubes of the front bank, as shown, or against the rear tubes of the rear bank, or both.

The steam spaces of the steam and water drums are preferably connected by tubes 17
55 and the steam is preferably taken off from

the rear upper drum 3. I also feed the water into this drum through the pipe 18.

With the construction above described, the water will flow up the bank of tubes 4 and down the tubes 10; it will also flow up the
60 bank of front tubes 5 and down the tubes 11. In addition to the above circulations, I preferably employ direct water circulators 19 which extend between the water space of the steam and water drums. This causes the
65 circulation to be up the front bank of tubes, back through these circulators 19 into the rear upper drum and thence down the rear bank to the mud drum. These circulators may be used or not as desired.
70

The advantages of my invention result from the compact form and arrangement of the heating surface; from the small number of drums used and from the good circulation
75 afforded.

Straight or curved tubes may be used for any of the tubes shown. Boxes or headers may be employed instead of drum shaped receptacles and other changes may be made
80 without departing from my invention.

I claim:—

1. In a water tube boiler, a pair of spaced steam and water drums, a mud drum below the upper drums, a baffle rising from the mud drum, symmetrically arranged banks
85 of tubes upon opposite sides of the baffle and communicating between the mud drum and the respective upper drums, and an additional row of tubes between each bank and the baffle and connecting the mud drum and
90 the adjacent steam and water drum, substantially as described.

2. In a water tube boiler, a pair of spaced steam and water drums, a mud drum below and in line with the interval between the
95 upper drums, a baffle rising from the mud drum, symmetrically arranged banks of tubes upon opposite sides of the baffle and communicating between the mud drum and the respective upper drums, and an additional row of tubes between each bank and the baffle and connecting the mud drum and the adjacent steam and water drum, substantially as described.
100

3. In a water tube boiler, a setting, a pair
105 of upper spaced transverse steam and water drums, a lower transverse mud drum in alinement with the interval between the steam and water drums, a baffle rising from the mud drum and disposed in a plane sub-
110

stantially midway between the steam and water drums, a symmertically arranged bank of upright tubes at each side of the baffle with their upper ends connected to the adjacent steam and water drum, and their lower ends inclined inwardly and connected to the mud drum at the adjacent side of the baffle, an added row of upright tubes against and at each side of the baffle with their lower ends communicating with the top of the mud drum and their upper ends inclined outwardly and connected to the adjacent steam and water drum, substantially horizontal baffles extending from the upright baffle, and a fire-box in direct communication with the lower end of one of the banks of tubes and the adjacent side of the mud drum, substantially as described.

4. In a water tube boiler, the combination with a pair of steam and water drums, a mud drum, and a symmetrically arranged bank of tubes connecting each steam and water drum with the mud drum, of a baffle located between the banks of tubes, and an added row of tubes at each side of the baffle, each added row of tubes being connected to

one of the steam and water drums and to the mud drum, substantially as described.

5. A unit for a water tube boiler made up of a pair of steam and water drums, a mud drum, a bank of upright symmetrically-arranged tubes connecting the mud drum and one of the steam and water drums, another bank of upright symmetrically-arranged tubes connecting the mud drum with the other steam and water drum, there being a space between the two banks of tubes, an upright baffle dividing the space into front and rear passes, a row of added tubes in the rear pass leading upwardly from the mud drum to the rear steam and water drum, and another row of added tubes in the front pass leading upwardly from the mud drum to the front steam and water drum, substantially as described.

In testimony whereof, I have hereunto set my hand.

JOHN E. BELL.

Witnesses:

G. K. WANNEMACHER,
CHAS. B. KNUDSON