

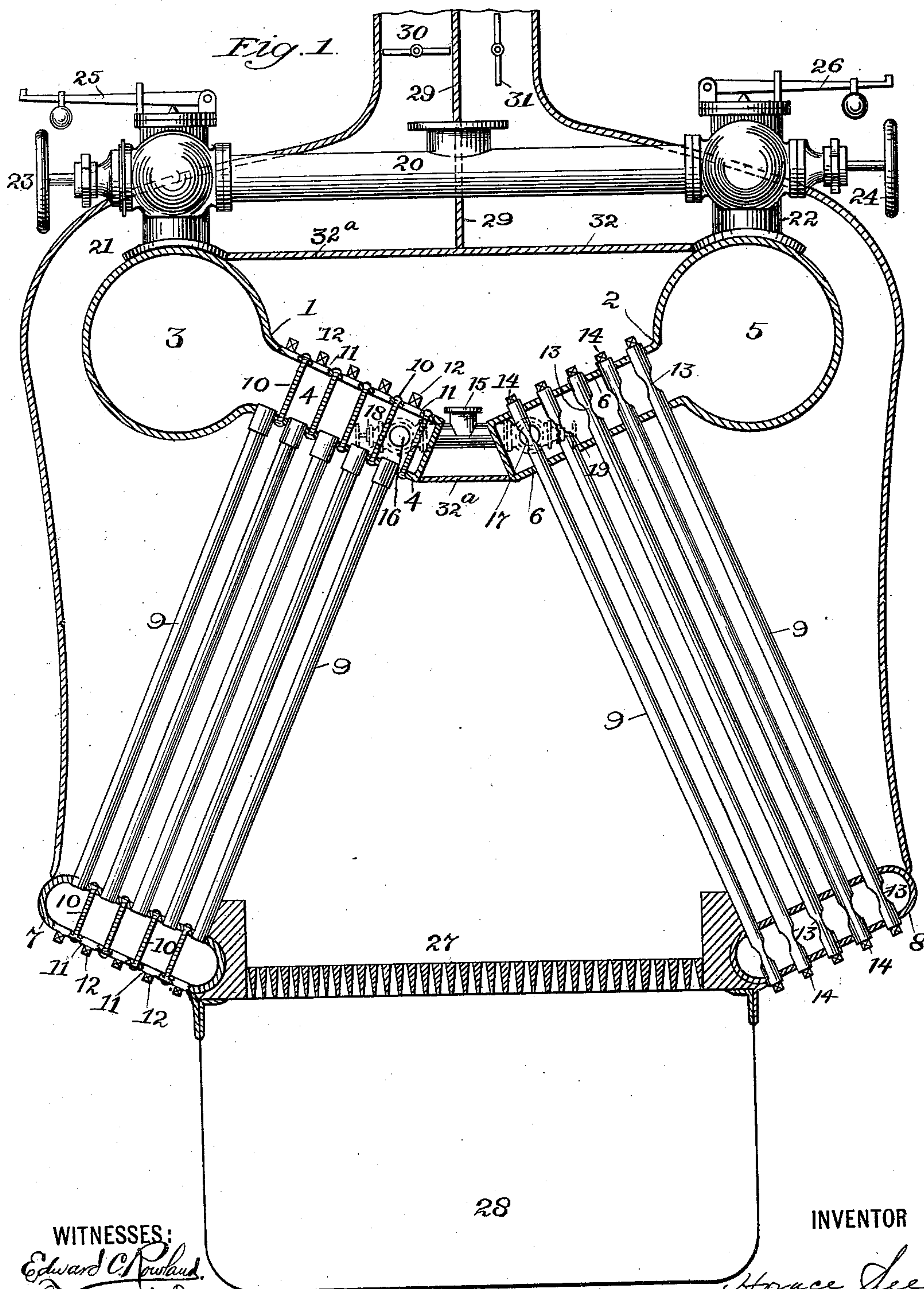
(No Model.)

2 Sheets—Sheet 1.

H. SEE.  
WATER TUBE BOILER.

No. 556,108.

Patented Mar. 10, 1896.



WITNESSES:

*Edward C. Pugh.*

*Francis P. Reilly.*

INVENTOR

BY

*Horace Lee*  
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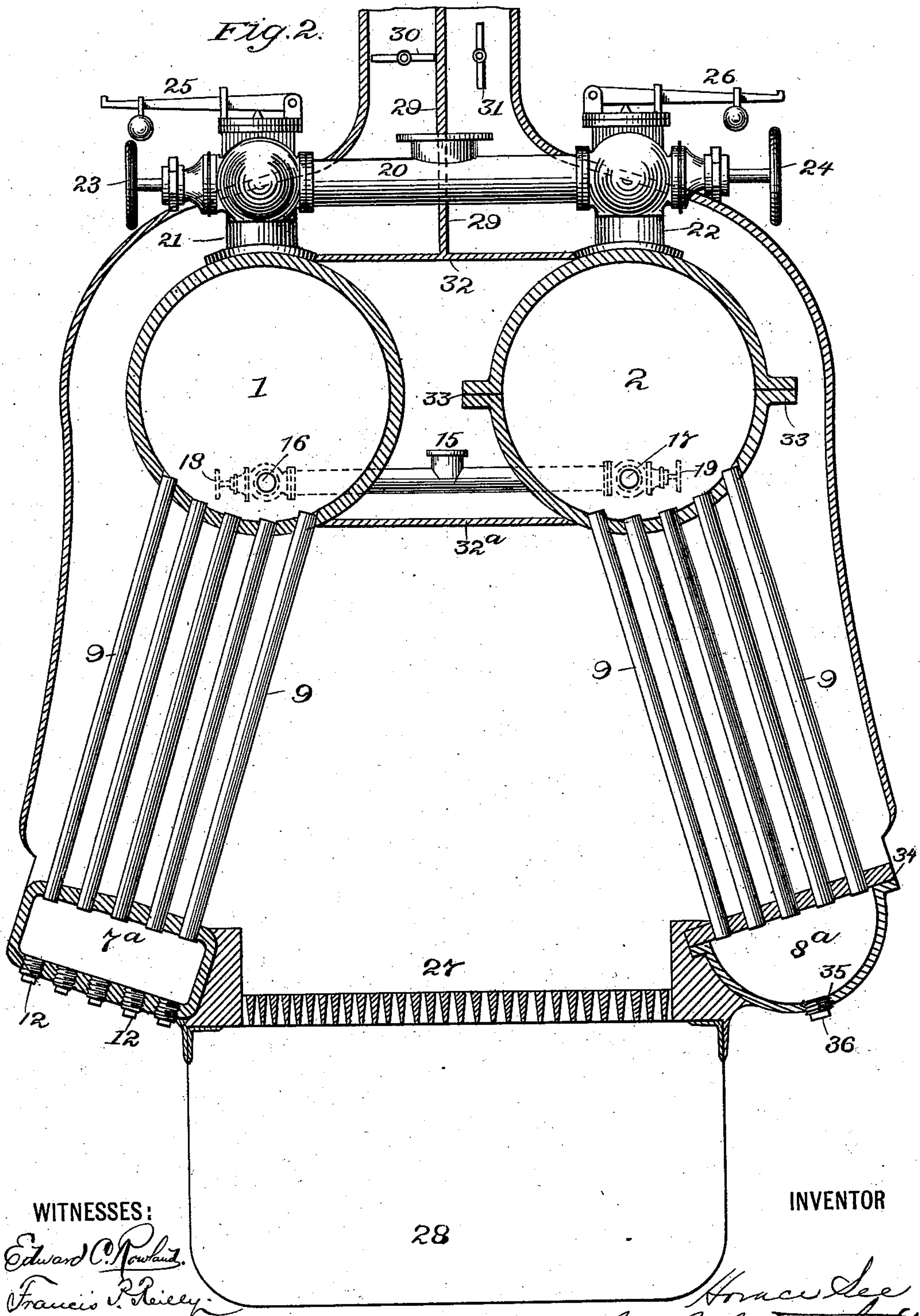
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WATER TUBE BOILER.

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**WITNESSES:**

Edward C. Rowland.

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# UNITED STATES PATENT OFFICE.

HORACE SEE, OF NEW YORK, N. Y.

## WATER-TUBE BOILER.

SPECIFICATION forming part of Letters Patent No. 556,108, dated March 10, 1896.

Application filed June 25, 1894. Serial No. 515,561. (No model.)

*To all whom it may concern:*

Be it known that I, HORACE SEE, of the city of New York, in the county and State of New York, have invented certain new and useful  
5 Improvements in Water-Tube Boilers, which invention is fully set forth and illustrated in the following specification and accompanying drawings.

The object of this invention is to provide a  
10 water-tube boiler of simple construction, the tubes of which shall be readily accessible and can be removed or renewed without interfering with the continued generation of steam by the boiler.

15 The invention will first be described in detail, and then set forth in the claims.

In the accompanying drawings, Figure 1 shows, in front sectional elevation, a water-tube boiler embodying my invention. Fig. 2  
20 shows, in front elevation, a modified form of water-tube boiler embodying my invention.

In said figures the several parts are respectively indicated by reference-numbers as follows:

25 Referring first to Fig. 1, the numbers 1 and 2 indicate two separate water and steam chambers similar in form. The chamber 1 has a cylindrical portion 3 and a rectangular portion 4, and the chamber 2 also has a cylindrical portion 5 and a rectangular portion 6.  
30

The numbers 7 8 indicate two rectangular water chambers or bottoms, one on each side of a central furnace, which are connected respectively with the rectangular portions 4 6  
35 of the upper water and steam chambers by straight tubes 9. Said tubes may be expanded at their ends into holes in the metal of the respective chambers or otherwise secured thereto, as may be desired.

40 At the left-hand side of Fig. 1 the tubes 9 are shown expanded in the lower sheet of the chamber 4 and upper sheet of the chamber or water-bottom 7, said chambers being stayed between the tubes by stay-bolts 10, preferably screw stay-bolts. For obtaining access  
45 to the interior of the tubes 9 holes 11, somewhat larger in diameter than the external diameters of the tubes, are made in the top of the chamber 4 and bottom of the water-chamber 7, opposite the ends of each tube. Said  
50 holes are closed by removable screw-plugs 12.

On the right-hand side of Fig. 1 the tubes

9 are shown passed through and expanded in both sheets of both upper and lower chambers 6 and 8, said tubes being cut out, as at  
55 13, in the water-spaces between said sheets for the circulation of the water. The ends of the tubes are closed by removable screw-plugs 14, in order that the tubes may be  
60 cleaned when required or removed.

Leading from the usual source of water-supply is a feed-pipe 15, which is connected by a branch 16 to the rectangular portion 4 of the chamber 1 and by a branch 17 to the rectangular portion 6 of the chamber 2, said  
65 branches being provided with feed-stop valves 18 19. The steam and water chambers 1 2 are connected, respectively, with a steam-drum 20 by pipes 21 22, said pipes being provided with stop-valves 23 24 and safety-valves 25  
70 26. Said stop and safety valves may be of any suitable construction and may be inclosed within the same casing or within separate casings.

The furnace proper, between the two sets  
75 of tubes 9, which tubes are inclined crosswise of the same, is provided with grate-bars 27 and a suitable ash-pit 28 below said grate-bars. A vertical division-plate 29 divides the boiler and its chimney into two parts, two dampers  
80 or draft-regulators 30 31 being provided, one on each side of said division-plate. Transverse division-plates 32 32<sup>a</sup> also divide the boiler above and below the chambers 1 2.

In Fig. 2 the upper steam and water chambers 1 2, instead of being made partly cylindrical and partly rectangular in shape, as shown in Fig. 1, are made cylindrical in form. In said Fig. 2 the chamber 1 is shown made in one piece of metal, while the chamber 2 is  
85 shown made in two semicylindrical parts, separably bolted together, as at 33, so that the top section may be removed and the tubes 9 withdrawn or inserted from the top. If either of said chambers be made in one piece,  
90 its end or head may be provided with any suitable manhole to allow access to the top of the tubes. The upper ends of the tubes 9 are shown in Fig. 2 expanded into holes in the lower portions of the chambers 1 2. At  
100 the left-hand side of said figure the lower ends of said tubes are shown expanded into holes in the upper sheet of a water chamber or bottom 7<sup>a</sup>, the same means being provided



in the lower sheet of said chamber for obtaining access to the tubes as are shown at the left-hand side of Fig. 1. Said chamber 7<sup>a</sup>, if desired, may be stayed between the tubes by screw stay-bolts or otherwise. At the right-hand side of Fig. 2 the lower ends of the tubes 9 are shown connected to a water chamber or bottom 8<sup>a</sup>, consisting of a flat plate and a dished plate or semicylindrical part bolted together through flanges, as shown at the point 34. The tubes 9 may be expanded in holes in the flat plate of said water-bottom or otherwise secured thereto, and the dished plate of said bottom may be provided with a hand-hole 35 closed by a plug 36 to facilitate access to the lower ends of said tubes.

The arrangement of feed-pipes, steam-drum, valves, dampers, &c., is the same in Fig. 2 as in Fig. 1, like parts being similarly numbered.

It is obvious that any one of the various forms of water-bottom shown can be used in the boiler, but it may be found desirable to use the rectangular form shown in Fig. 1, in which case the tubes can be secured to rectangular chambers both at top and bottom. The upper chambers and the water-bottoms may be braced in any suitable manner if not made of sufficient strength to dispense with bracing.

From the above description it will be seen that the boiler herein described is composed of two generating portions or units having a common furnace, each of which may be utilized for generating purposes independently of the other by shutting off the draft, steam, and feed-water on one side of the boiler. More than two of such generating portions or units may be employed if desired.

The boiler can be readily constructed, and when it is desired to remove or renew a tube in one of the units such removal or renewal can be effected without interfering with the continued generation of steam by the boiler by closing the draft-regulator, steam-valve, and feed-valve on the side of the boiler where the generating portion or unit containing such tube is located.

Having thus fully described my invention, I claim—

1. In a water-tube boiler, the combination of separate generating portions, set above a common furnace, each consisting of a steam and water chamber and generating-tubes; separate feed-valves for each of said portions; a vertical division-plate; and a draft-regulator on each side of said vertical division-plate; as and for the purposes set forth.

2. In a water-tube boiler, the combination of separate generating portions, each consisting of a steam and water chamber and generating-tubes; separate feed-valves for each of said portions; vertical and transverse division-plates; and a draft-regulator on each side of said vertical division-plate; as and for the purposes set forth.

3. In a water-tube boiler, the combination

of separate generating portions, set above a common furnace, each consisting of a steam and water chamber, generating-tubes and a water-bottom; separate feed-valves for each of said portions; a vertical division-plate; and a draft-regulator on each side of said division-plate; as and for the purposes set forth.

4. In a water-tube boiler, the combination of separate generating portions, set above a common furnace, each consisting of a steam and water chamber, generating-tubes and a water-bottom; separate feed-valves for each of said portions; vertical and transverse division-plates; and a draft-regulator on each side of said vertical division-plate; as and for the purposes set forth.

5. In a water-tube boiler, the combination of separate steam and water chambers; separate water-bottoms; straight tubes inclined crosswise of a common furnace and connecting said steam-chambers with said water-bottoms; separate feed-valves for each of said chambers and sets of tubes; a vertical division-plate; and a draft-regulator on each side of said division-plate; as and for the purposes set forth.

6. In a water-tube boiler, the combination of separate generating portions, having a common furnace, each consisting of a steam and water chamber and generating-tubes; separate feed-valves for each of said portions; a vertical division-plate; a draft-regulator on each side of said division-plate; a steam-drum; pipes connecting said chambers with said drum; and a stop-valve in each of said pipes.

7. In a water-tube boiler, the combination of separate generating portions, having a common furnace, each consisting of a steam and water chamber, generating-tubes and a water-bottom; separate feed-valves for each of said portions; a vertical division-plate; a draft-regulator on each side of said division-plate; a steam-drum; pipes connecting said chambers with said drum; and a stop-valve in each of said pipes; as and for the purposes set forth.

8. In a water-tube boiler, the combination of separate generating portions, having a common furnace, each consisting of a steam and water chamber and generating-tubes; separate feed-valves for each of said portions; a vertical division-plate; a draft-regulator on each side of said division-plate; and means substantially as described for obtaining access to the interior of said tubes; as and for the purposes set forth.

9. In a water-tube boiler, the combination of separate generating portions, having a common furnace, each consisting of a steam and water chamber, generating-tubes and a rectangular water-bottom, said bottom being braced as described; separate draft-regulators and feed-valves for each of said portions; and means substantially as described for obtaining access to the interior of said tubes.

10. In a water-tube boiler, the combination



of separate steam and water chambers set  
above a common furnace, each having a cy-  
lindrical portion and a rectangular portion;  
water-tubes connected to the rectangular por-  
tions of said chambers; and separate feed-  
valves for each of said chambers and sets of  
tubes.

11. In a water-tube boiler, the combination  
of separate steam and water chambers set  
above a common furnace, each having a cy-  
lindrical portion and rectangular portion, the  
rectangular portions being braced as de-  
scribed and having water-tubes connected  
thereto; and separate draft-regulators and  
feed-valves for each of said chambers and sets  
of tubes.

12. In a water-tube boiler, the combination  
of separate steam and water chambers set  
above a common furnace each having a cy-  
lindrical portion and a rectangular portion;  
separate water-bottoms; water-tubes secured  
to the rectangular portions of said chambers  
and connecting the same with said water-bot-

toms; and separate draft-regulators and feed-  
valves for each chamber and set of tubes.

13. In a water-tube boiler, the combination  
of separate steam and water chambers, each  
having a cylindrical portion and a rectangu-  
lar portion; separate rectangular water-bot-  
toms; and straight water-tubes, inclined  
crosswise of a common furnace and connect-  
ing said chambers with said water-bottoms.

14. In a water-tube boiler, the combination  
of separate steam and water chambers set  
above a common furnace, each having a cy-  
lindrical portion and a rectangular portion;  
separate rectangular water-bottoms; water-  
tubes connecting the rectangular portions of  
said chambers with said water-bottoms; and  
separate draft-regulators and feed-valves for  
each of said chambers.

HORACE SEE.

Witnesses:

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WILLIAM MOLLOY.