

No. 846,738.

PATENTED MAR. 12, 1907.

W. S. ELLIOTT.
WATER TUBE BOILER.
APPLICATION FILED MAR. 21, 1906.

Fig. 1.

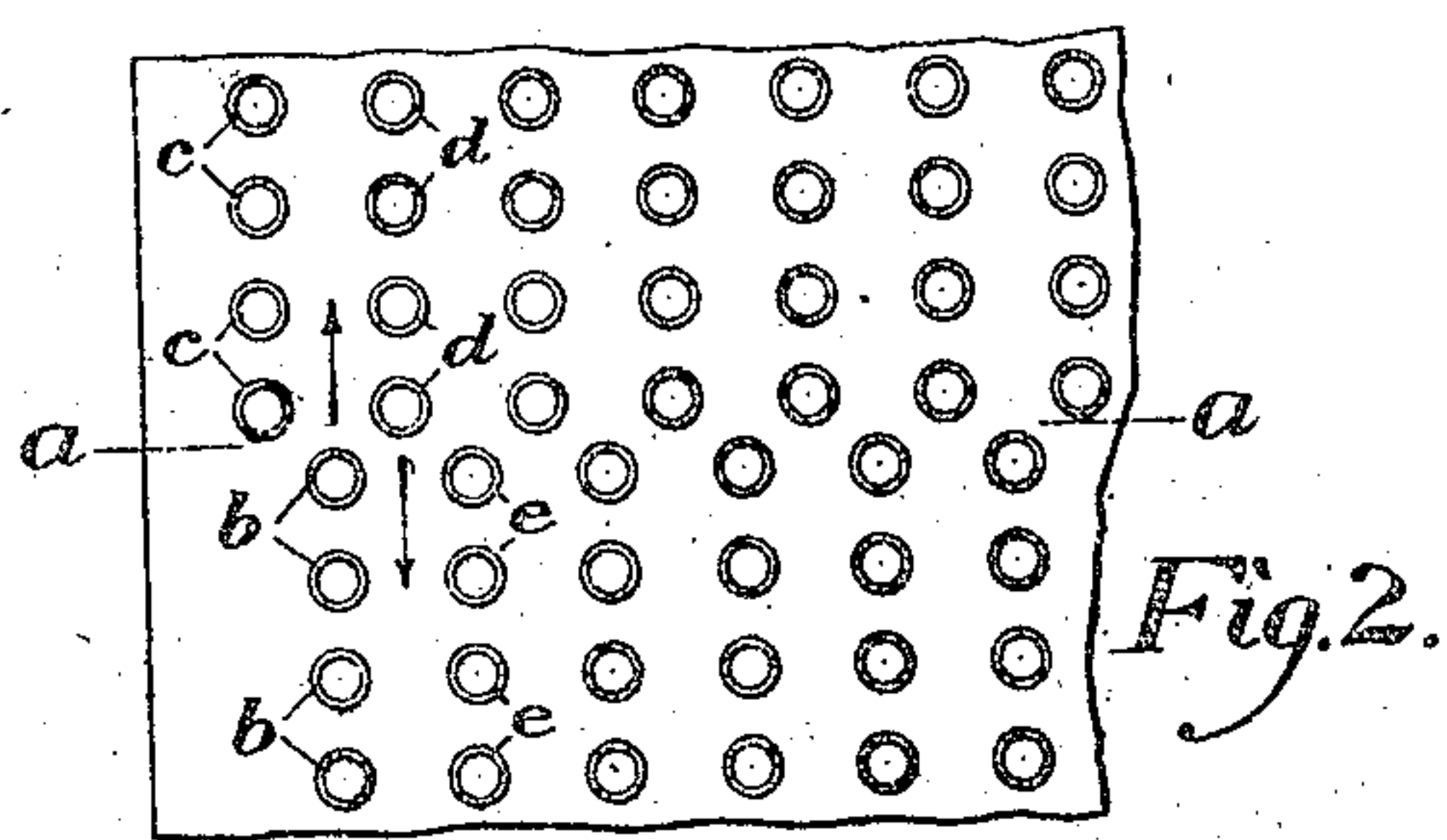
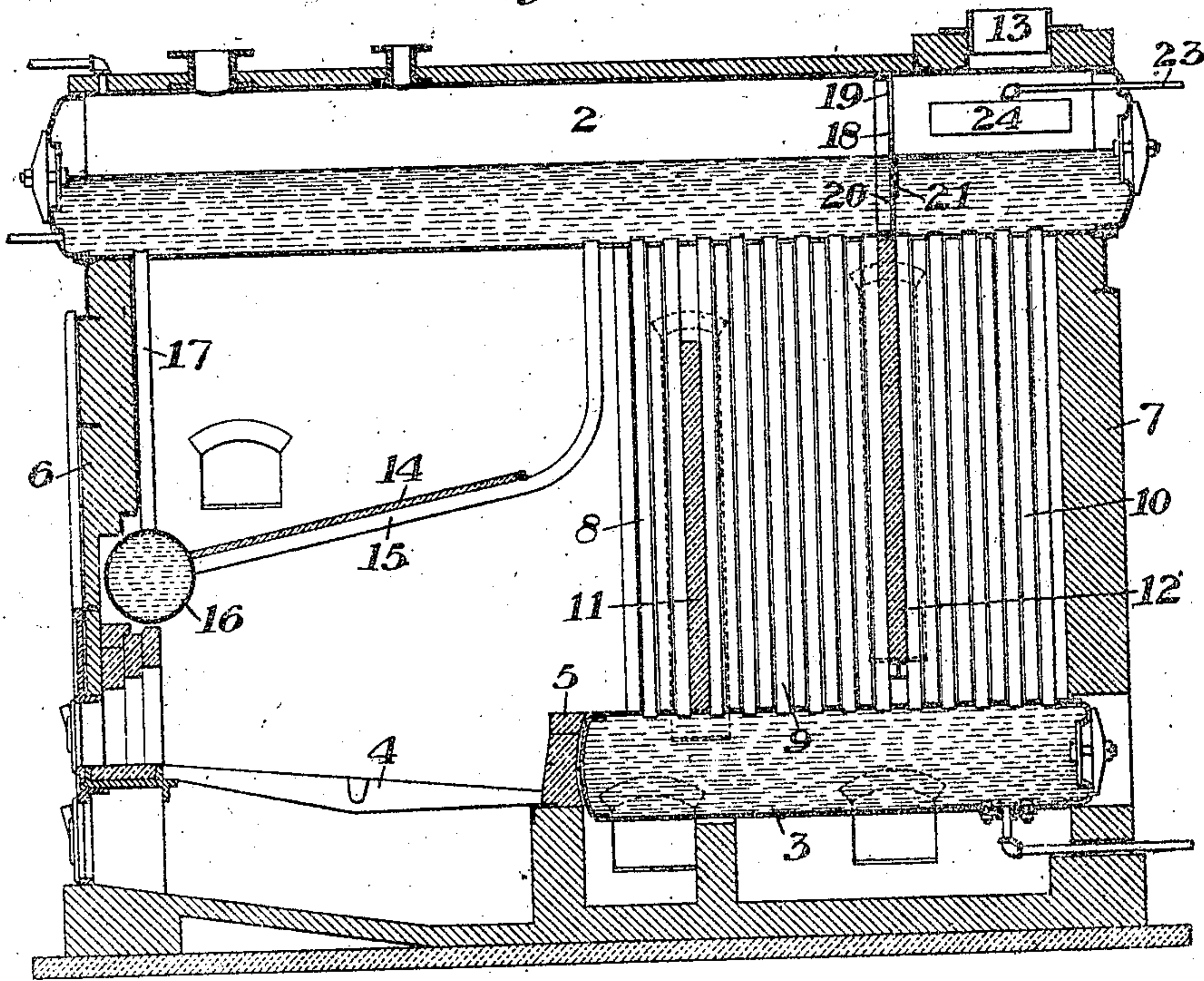
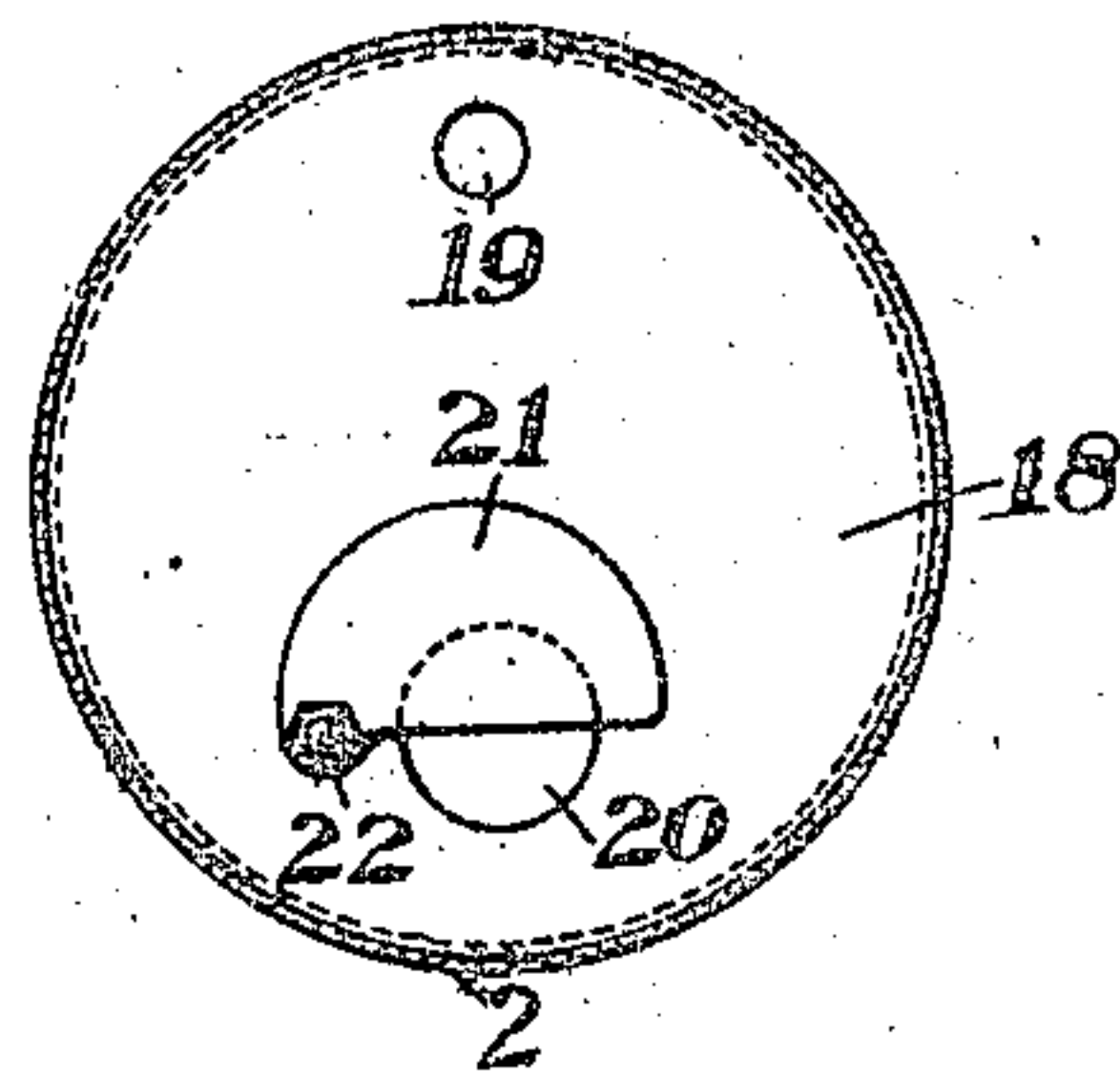


Fig. 3.



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WILLIAM S. ELLIOTT, OF PITTSBURG, PENNSYLVANIA.

WATER-TUBE BOILER.

No. 846,738.

Specification of Letters Patent.

Patented March 12, 1907.

Application filed March 21, 1906 Serial No. 307,190.

To all whom it may concern:

Be it known that I, WILLIAM S. ELLIOTT, of Pittsburg, Allegheny county, Pennsylvania, 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 longitudinal section of my improved boiler. Fig. 2 is a detail view of the tube-spacing, and Fig. 3 is a detail view showing the control device for the diaphragm-opening.

My invention relates to water-tube boilers, and more particularly to the boiler of my pending application, Serial No. 278,438, filed September 14, 1905.

The present application relates to certain improved features, more especially the providing of a rear circulation which passes through the diaphragm and in providing an adjustable throttle device for the hole in the diaphragm through which the water circulation passes.

It also consists in an improved arrangement of tube-spacing and in certain combinations hereinafter described and claimed.

In the drawing, 2 represents the upper longitudinal drum, and 3 the shorter longitudinal mud-drum, which is below and parallel to the upper drum. The upper drum extends over the combustion-chamber, which is shown as provided with grates 4, extending between the bridge-wall 5 and the front wall 6. The mud-drum extends from the rear wall 7 to the bridge-wall 5. That portion of the upper drum which is above the mud-drum, is connected therewith by sets of tubes 8, 9, and 10. These tubes may be of any desirable size and may be connected into the drums either by curving their ends, or by using straight tubes with struck-up tube-seats in the drums. The three sets of tubes are separated by the baffles 11 and 12, the baffle 11 extending upwardly between the tubes 8 and 9, while the baffle 12 extends downwardly between the tubes 9 and 10. The gases are thus given three up and down passes after they pass the bridge-wall before they reach the outlet-flue 13.

The roof of the combustion-chamber is preferably formed of tiles or refractory bricks 14, which lie upon a series of bent tubes 15, extending from front transverse drum or chamber 16 upwardly and rear-

wardly, the upper portions being bent and connected to the upper drum. The water-chamber 16 is also connected to the front end of the upper drum by vertically-extending tubes or pipes 17. The number of pipes 17 is preferably less than the pipes 15. I may use more than one row of tubes 15 and also more than one row of the tubes 17. The chamber 16 may be entered by suitable man-holes at the ends if drums are employed, or hand-hole plates may be used on the sides if the chamber is of header form.

Each steam and water drum is provided in its rear portion with a transverse separating-partition 18, preferably having an upper steam-hole 19 and a lower hole 20 at or below the water-level. The hole 20 is preferably provided with an adjustable cover or valve device 21, which is hinged and clamped to the partition by the nut and bolt 22. By entering the drum this closure can be set at any desirable point, which will depend on the character of the water used and perhaps on other factors. If bad water is used, the closure should be arranged to partly close the hole, while if good water is used the hole may be left of greater area. The boiler may thus be adjusted for different localities using different kinds of water. The partition 18 is preferably in line with the baffle 12. The tubes 9 are heated more highly than the tubes 10, and consequently there is a circulation up through some of the tubes 9, back through the hole 20, and down through the tubes 10. The feed-water preferably enters the rear chamber of the upper drum through pipe 23 and overflow-pan 24.

In order to provide for easy removal and replacing of the tubes, I preferably arrange them as shown in Fig. 2. *a a* representing the center line of the drum, I arrange the tubes in transverse rows, of which I have shown four to each row, the rows on one side being staggered relative to those on the other side. Thus the tubes *b* of the first row on one side are in line with the space between the two rows of tubes *c* and *d* on the opposite side. The lateral space between the adjacent rows is greater than the external diameter of the tube, so that the innermost tube *b* may be taken out by passing it between the rows of tubes *c* and *d*, as indicated by the arrow. Similarly the innermost tube *d* may be passed out between the rows of tubes *b* and *c*, as indicated by the arrow. These in-

nermost tubes of the rows are the most difficult to remove, and by arranging the rows in this peculiar manner I am enabled to cut out and replace them without removing any other tubes.

The advantages of my invention result from the water-circulating hole in the partition with the adjustable closure, also from the partition in line with the baffle in the combination, and, further, from the arrangement of the tube-spacing.

Variations may be made in the form and arrangement of the parts without departing from my invention.

I claim—

1. In a longitudinal-drum, water-tube boiler, a steam and water drum having a transverse partition with an opening at or below the water-line, and means for varying the area of said opening; substantially as described.

2. In a longitudinal-drum water-tube boiler, an upper drum having a transverse partition with a steam-opening in its upper part, and a water-opening in its lower part, and an adjustable closure for the water-opening; substantially as described.

3. In a longitudinal-drum water-tube boiler, a shorter longitudinal mud-drum, a bridge-wall in front of the mud-drum, a longer upper drum extending over the furnace in front of the mud-drum, tubes connecting the rear part of the upper drum with the mud-drum and located in the rear of the bridge-wall, a transverse baffle among the tubes, and a partition in the upper drum in line with the baffle and having a hole through

it at a point not above the water-line of the boiler; substantially as described.

4. In a longitudinal-drum water-tube boiler, a shorter mud-drum, a longer upper drum extending over the furnace in front of the mud-drum, tubes connecting the rear part of the upper drum with the mud-drum, a transverse baffle among the tubes, a partition in the upper drum in line with the baffle and having a hole through it, and an adjustable closure for said hole; substantially as described.

5. In a longitudinal-drum water-tube boiler, a shorter mud-drum, an upper longer steam and water drum having its rear part connected by tubes to the mud-drum, a pair of transverse baffles among said tubes, a partition in the upper drum substantially in line with the second baffle, said partition having a hole with an adjustable closure therefor; substantially as described.

6. A cylindrical drum having tubes connected thereto and arranged in transverse rows on opposite sides of a longitudinal plane, each row upon one side of said plane being in line with the space between two adjacent rows on the opposite side, the space between the rows on each side being sufficient for the passage of a tube therethrough from the intermediate row on the other side; substantially as described.

In testimony whereof I have hereunto set my hand.

WILLIAM S. ELLIOTT.

Witnesses:

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JOHN MILLER.