No. 744,471. PATENTED NOV. 17, 1903.

J. R. BROWN.

SUPERHEATER.

APPLICATION FILED APR. 30, 1903.

NO MODEL.

Fig. 1.

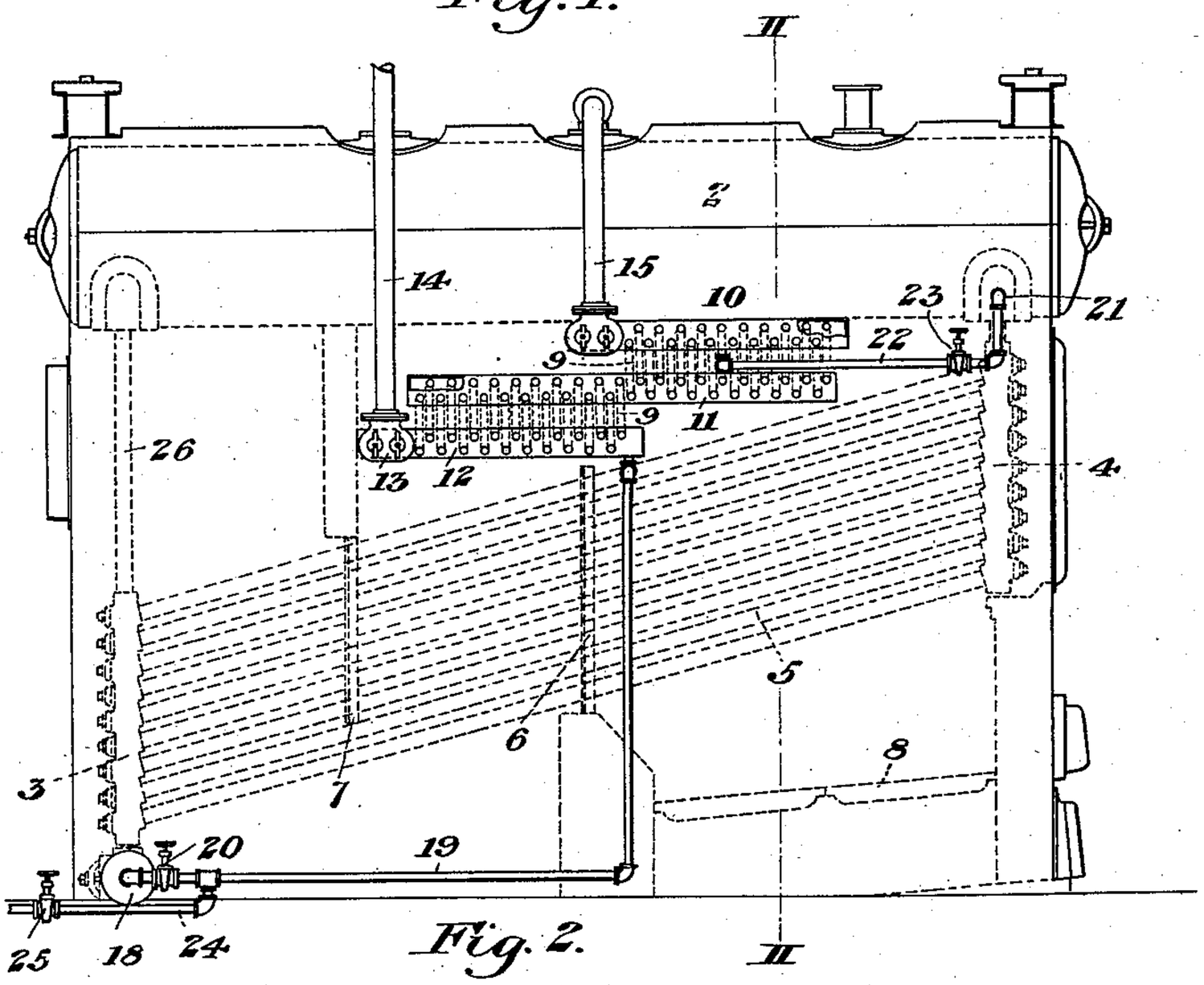
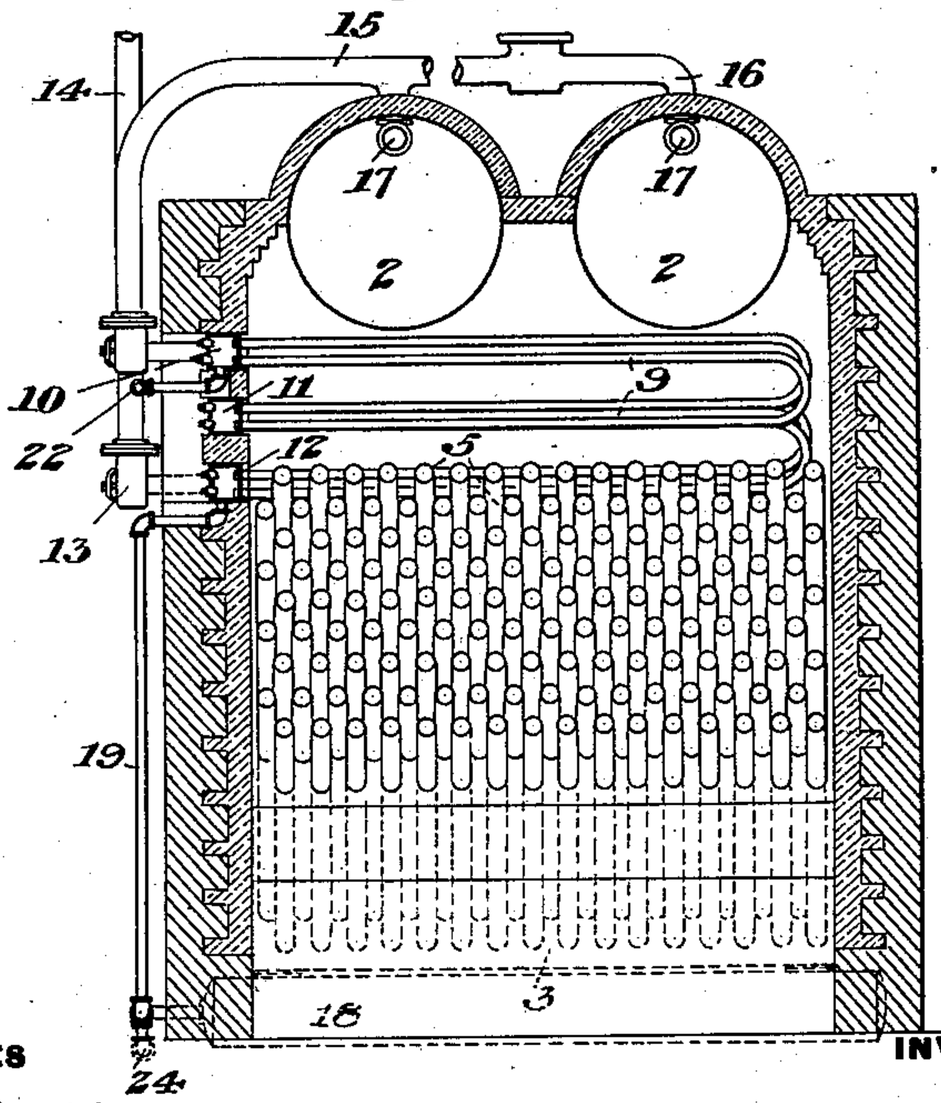


Fig. 2.



WITNESSES

M. J. Cobran

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INVENTOR

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No. 744,471. Patented November 17, 1903.

UNITED STATES PATENT OFFICE.

JOHN ROWLAND BROWN, OF MANSFIELD, OHIO, ASSIGNOR TO THE AULTMAN & TAYLOR MACHINERY COMPANY, OF MANSFIELD, OHIO, A CORPORATION OF OHIO.

SUPERHEATER.

SPECIFICATION forming part of Letters Patent No. 744,471, dated November 17, 1903.

Application filed April 30, 1903. Serial No. 155,016. (No model.)

To all whom it may concern:

Be it known that I, JOHN ROWLAND BROWN, of Mansfield, Richland county, Ohio, have invented a new and useful Superheater for Steam-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—

Figure 1 is a side elevation showing a water-tube boiler provided with my improved superheater system, and Fig. 2 is a vertical cross-section on the line II II of Fig. 1.

My invention relates to the class of superheaters, and is designed to provide an improved superheater system wherein a water-circulation may be maintained through the superheater when it is flooded with water. These superheaters have ordinarily been connected to the water-circulation by a single pipe for flooding the superheater; but in such cases there is no substantial circulation in the superheater, such as is important in keeping the tubes from burning out and giving the tubes long life. The superheater arranged in accordance with my invention becomes when flooded a part of the boiler proper and forms a part of the water-heating surface.

In the drawings, 2 2 represent the steam and water drums, 3 and 4 the end headers, and 5 the inclined tubes of a water-tube boiler. I have shown the boiler as provided with baffles 6 and 7, by which the gases are given three passes in flowing from the grate 8 to the outlet. In the intermediate space between the tubes and drums and in the intermediate path of the gases I place the superheater, which preferably consists of longitudinal headers built in the side wall and connected by a series of U-shaped tubes 9, which extend transversely of the boiler-setting. I have shown a duplex system in which the steam entering the upper header or box 10 passes through the upper U-shaped tubes into the intermediate longer box 11. The steam flows from this box through another set of U-shaped tubes into the lower box 12, which is staggered relatively to the upper box. Into the rear side portion of this lower box two tubes are expanded which extend into a fitting 13 at the lower end of an external pipe 14, which is connected into the steam-main, preferably at a point above the main control-valve, and may be provided with a valve. The steam-inlet pipe 15 is provided with two branches 16, which extend downwardly into the steam-spaces of the steam and water drums and are provided with dry-pipes 17. The lower end of the pipe 15 is preferably connected to the upper superheater-box by a fitting and expanded tubes similar to those at the superheater-outlet. The superheater-boxes are preferably set in dead-air spaces in the side wall and are out of the path of the gases. Their inner surfaces may be protected by a covering of fire-clay or suitable material.

In order to flood the superheater with water and provide for circulation of water through it, I connect the front end of the lower box 12 with the mud-drum 18 by means of a pipe 19, having a control-valve 20 near the mud-drum, and I connect the upper header or box 10 of the superheater with the forward cross-box 21 of the steam and water drum or to any part of the drum below the water-line by a pipe 22, having a valve 23. In the pipe 19 between the valve 20 and the connection with the superheater-box I connect a pipe 24, forming a by-pass containing a control-valve 25. To flood the superheater, the valves in pipes 19 and 22 are opened, thus permitting a water-circulation from the mud-drum through the pipe 19 to the lower superheater-header, thence through the superheater and through pipe 22 to the water-space of the steam and water drum, and thence to the mud-drum through the rear circulating-tubes 26. To blow off the superheater, the valve 20 is closed and the valve 25 is opened. If the valve 23 and the pipe 22 are closed during the blowing off of the superheater, the superheater will be drained; but if the valve 23 is open the sediment will be removed from superheater tubes and headers, while the circulation of water is maintained.

The advantages of my invention result from the connections arranged to cause a circulation of water through the superheater by which it becomes an integral part of the boiler; also from the blow-off device for cleaning the superheater.

Many variations may be made in the form and arrangement of the boiler, the super-

heater, and the water connections without departing from my invention.

I claim—

1. In combination with a boiler, a superheater having suitable connections with the steam-space of the boiler, and connections with the water-space of the boiler by which a circulation of water may be maintained through the superheater; substantially as described.

2. In combination with a boiler having upper and lower water-spaces, a superheater connected to the steam-space of the boiler and connected also with said upper and lower water-spaces; substantially as described.

3. In combination with a boiler having upper and lower water-spaces, a superheater connected to the steam-space of the boiler, and valved connections between the superheater and said upper and lower water-spaces; substantially as described.

4. In combination with a boiler having upper and lower water-spaces, a superheater connected to the steam-space of the boiler, valved connections between the superheater and said upper and lower water-spaces, and a blow-off pipe in the connection between the superheater and the lower water-space; substantially as described.

5. A water-tube boiler having front and rear headers connected by inclined water-tubes, an upper steam and water drum, a superheater arranged in the intermediate path of the gases over the water-tubes, a lower mud-drum, and water-circulating pipes connecting the superheater with the mud-drum and the water-space of the steam and water drum, said pipes having control-valves; substantially as described.

In testimony whereof I have hereunto set my hand.

JOHN ROWLAND BROWN.

Witnesses:
M. J. COBEAN,
A. F. BLACK.