

No. 744,470.

PATENTED NOV. 17, 1903.

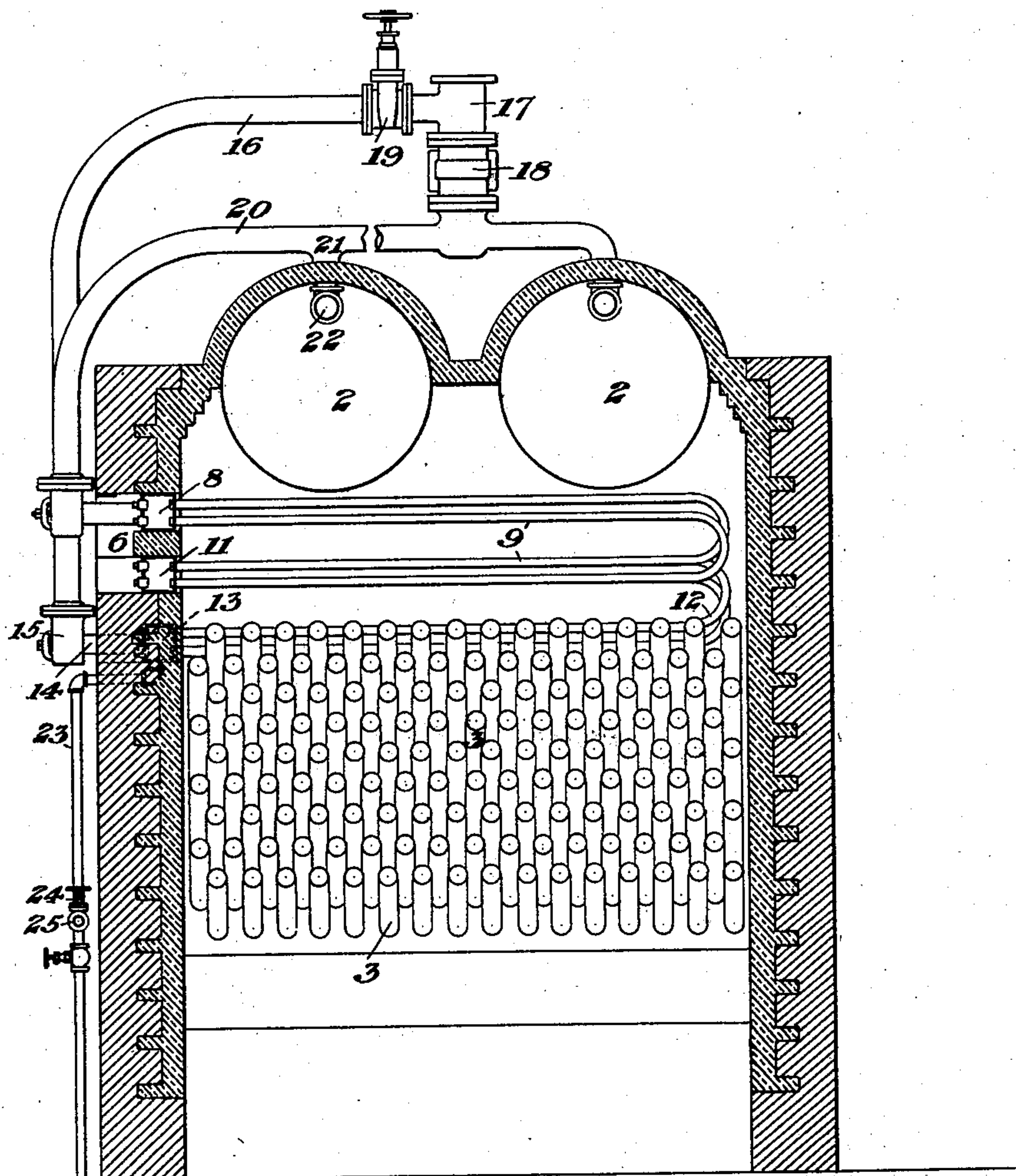
J. R. BROWN.  
SUPERHEATER.

APPLICATION FILED NOV. 3, 1902.

NO MODEL.

3 SHEETS—SHEET 1.

*Fig. 1.*



WITNESSES

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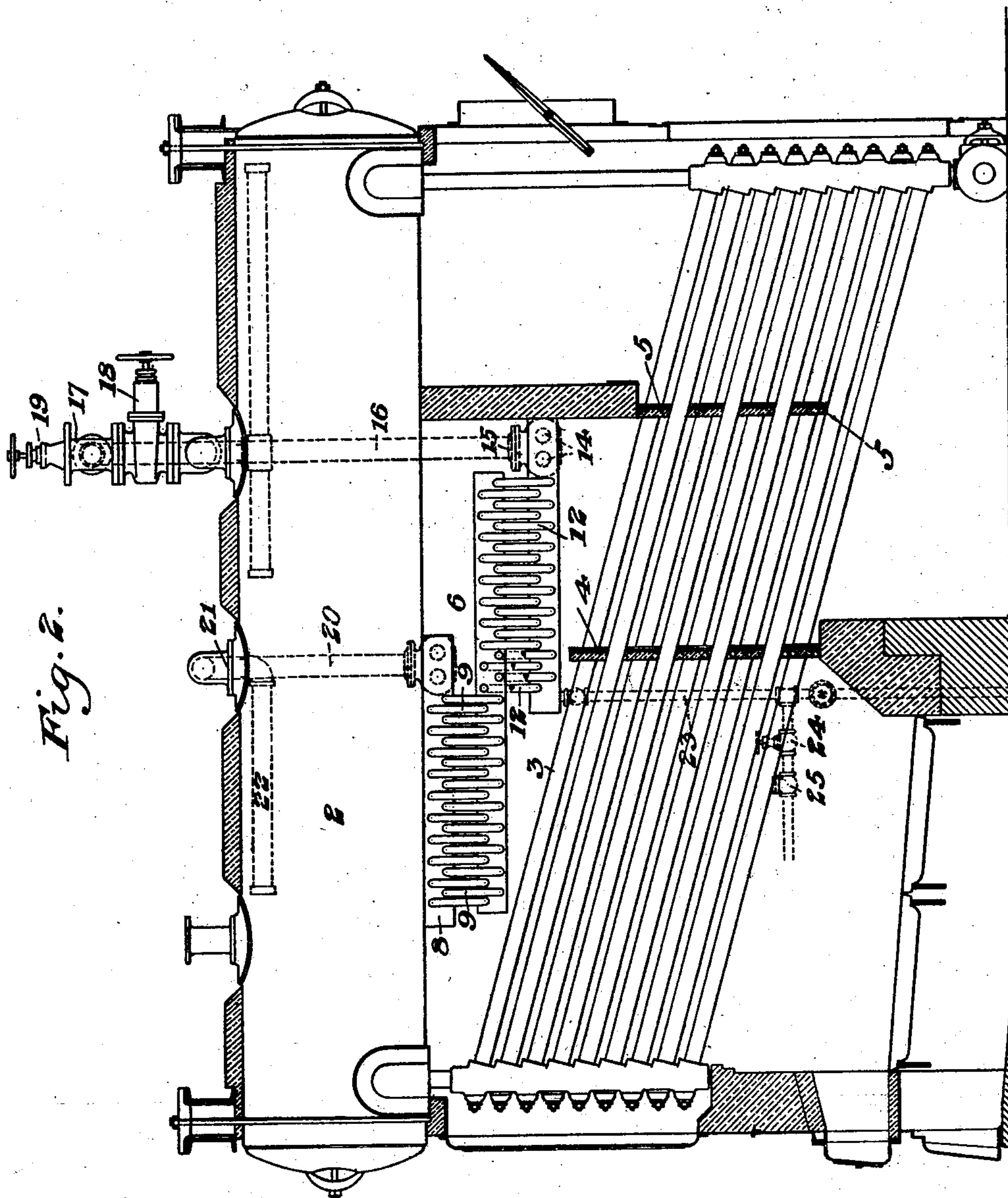
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APPLICATION FILED NOV. 3, 1902.

NO MODEL.

3 SHEETS—SHEET 2.



WITNESSES

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No. 744,470.

PATENTED NOV. 17, 1903.

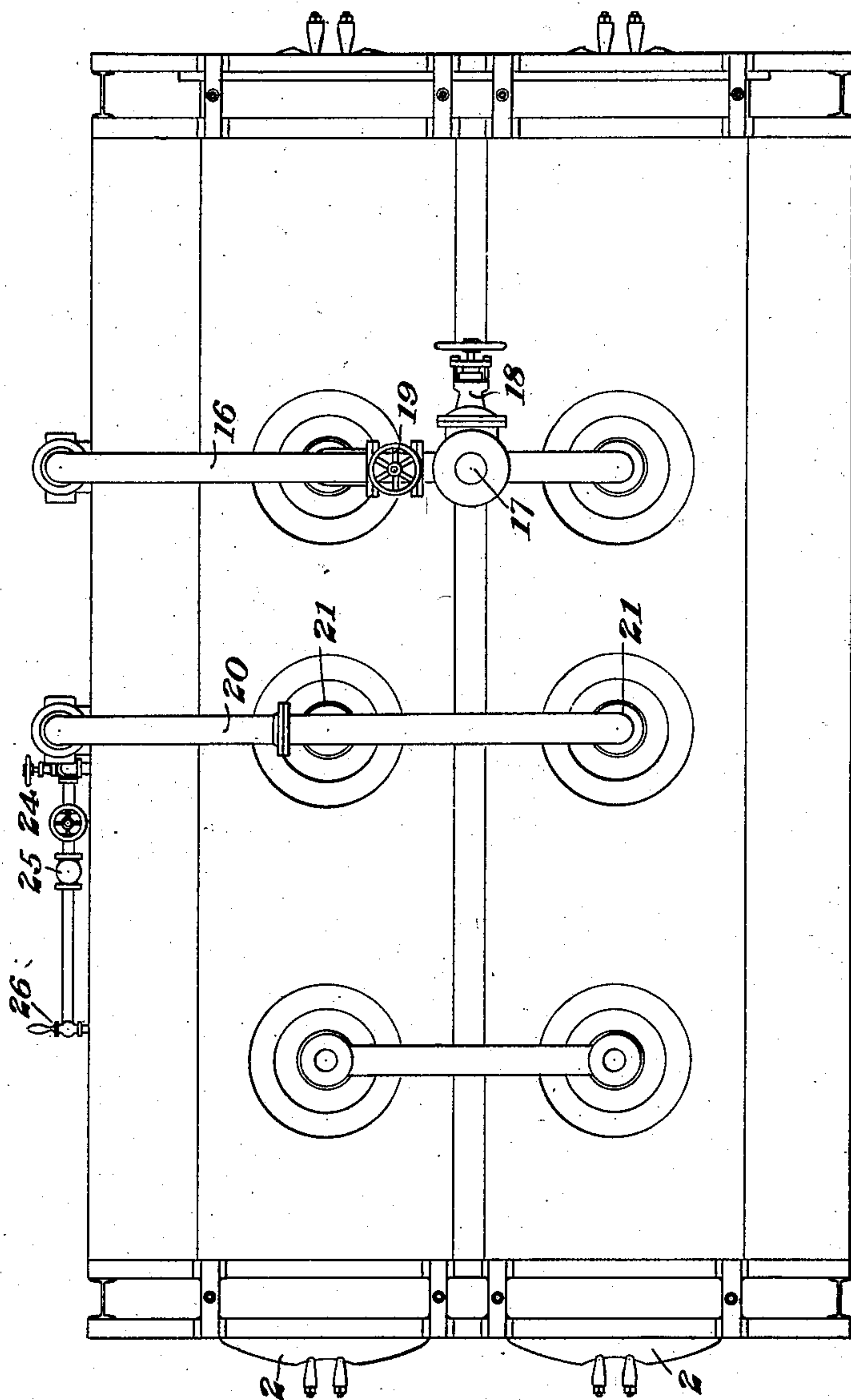
J. R. BROWN.  
SUPERHEATER.

APPLICATION FILED NOV. 3, 1902.

NO MODEL.

3 SHEETS—SHEET 3.

Fig. 3.



WITNESSES

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# 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. 744,470, dated November 17, 1903.

Application filed November 3, 1902. Serial No. 129,868. (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, 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 sectional end elevation, partly broken away, showing my superheater connected to a water-tube boiler. Fig. 2 is a sectional side elevation of the same, and Fig. 3 is a top plan view.

My invention relates to the class of superheaters which are within the boiler-setting and is designed to provide a simple superheating system which may be readily accessible for repairs and can be applied to existing boilers, also to provide for passing steam direct from the steam-space to the outlet or for directing it through the superheater, as desired.

In the drawings, 2 2 represent the steam and water drums of a water-tube boiler of the type wherein inclined tubes 3 connect front and rear headers. As shown in Fig. 2, the gases are given three passes among the tubes by means of the baffles 4 and 5. 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 6, built in the side wall and connected by U-shaped tubes 9, which extend transversely of the boiler. I have shown a duplex system in which the steam entering the upper header or box 8 passes through the U-shaped tubes 9 into the next lower box 11. The steam then flows rearwardly through this box and thence through a second bank of U-shaped tubes 12 into the lower box 13. Into the rear side portion of this lower box two tubes 14 are expanded, which extend into a fitting 15 at the lower end of the external pipe 16. This pipe 16 extends upwardly and is connected into the steam-main 17 at a point above the main control-valve 18. The superheater outlet-pipe is provided with a control-valve 19, by which the flow of steam through the superheater is controlled.

The steam-inlet pipe 20 for the superheater

is provided with two branches 21, which extend downwardly into the steam-spaces of the steam and water drums and are provided therein with suitable dry pipes 22, and the lower end of this pipe is connected to the upper box of the superheater by a fitting and expanded tube similar to the superheater-outlet.

To provide for feeding water into the superheater during raising steam or at such other times as desirable, I provide a feed-water pipe 23, leading to the lower superheater-box, which is provided with a globe-valve 24 and a check-valve 25, and to enable the operator to ascertain the water-level in the superheater I show a gage-cock 26 attached to one of the boxes and of which any desired number may be used.

The boxes are set in dead-air spaces in the wall and are out of the path of the gases. Their inner surfaces may also be protected by a covering of fire-clay or other suitable material.

In starting the boiler the operator feeds water into the superheater to prevent its burning out, this being preferably continued as long as desired. The water may then be blown out through the blow-off valve or allowed to remain in the superheater and become evaporated. In the normal operation of the boiler when superheated steam is desired the main steam-valve is shut and the valve in the outlet-pipe from the superheater is opened, the steam then passing from the upper drums through the superheater and thence through the outlet-pipe to the steam-main. If a mixture of saturated steam and superheated steam is desired, the two valves are both partially opened, the amount of opening regulating the proportion, so that some steam will pass direct from the boiler and some will pass through the superheater and mix with it in the steam-main. If saturated steam alone is desired, the operator will keep a sufficient amount of water in the superheater to prevent its burning out.

It will be noted that one valve controls the superheater, and this valve is on the outlet from the superheater, so that in case the operator floods the superheater the water will pass up through its inlet-pipe into the steam



and water drum, where it will escape with the water therein. A simple and effective arrangement is thus obtained which may be applied to existing boilers and which is readily accessible for repairs. The superheater being located in the intermediate part of the boiler is subjected to the action of the gases before they leave the boiler, so that an efficient superheating action is obtained.

Many variations may be made in the form and arrangement of the boiler, superheater, and the connections without departing from my invention.

I claim—

1. The combination with a boiler, of a superheater located in the boiler-setting, an external supply-pipe independent of the steam-main, and leading from the steam-space of the boiler direct to the superheater, and an external valved pipe leading from the superheater to the steam-main; substantially as described.

2. The combination with a boiler, of a superheater located within the boiler-setting and having longitudinal boxes in the side wall, tubes extending from said boxes transversely within the path of the gases, an external inlet-pipe independent of the steam-main, and leading from the steam-space directly to the superheater, and a valved pipe leading from the superheater to the steam-main; substantially as described.

3. A boiler having a superheater within the

boiler-setting, an external pipe independent of the steam-main, and leading direct from the steam-space of the boiler to the superheater, an outlet-pipe leading from the superheater to the steam-main, and a valve on one only of said pipes; substantially as described.

4. A boiler having a superheater within the boiler-setting, an external inlet-pipe independent of the steam-main, and leading from the steam-space of the boiler direct to the superheater, a valved steam-main leading from the steam-space, and a valved outlet-pipe for the superheater connected to the steam-main beyond its valve; substantially as described.

5. A boiler having a superheater within the boiler-setting, said superheater having three substantially parallel boxes extending longitudinally of the boiler at one side and one above the other, and two sets of U-shaped tubes connecting said boxes and extending transversely within the setting; substantially as described.

6. A superheater having an upper and lower box out of alinement, a longer intermediate box and U-shaped tubes connecting the intermediate box with both the upper and lower boxes; substantially as described.

In testimony whereof I have hereunto set my hand.

JOHN ROWLAND BROWN.

Witnesses:

B. BAIR,

B. HUNTHAL.