

J. E. BELL.
SUPERHEATER BOILER.

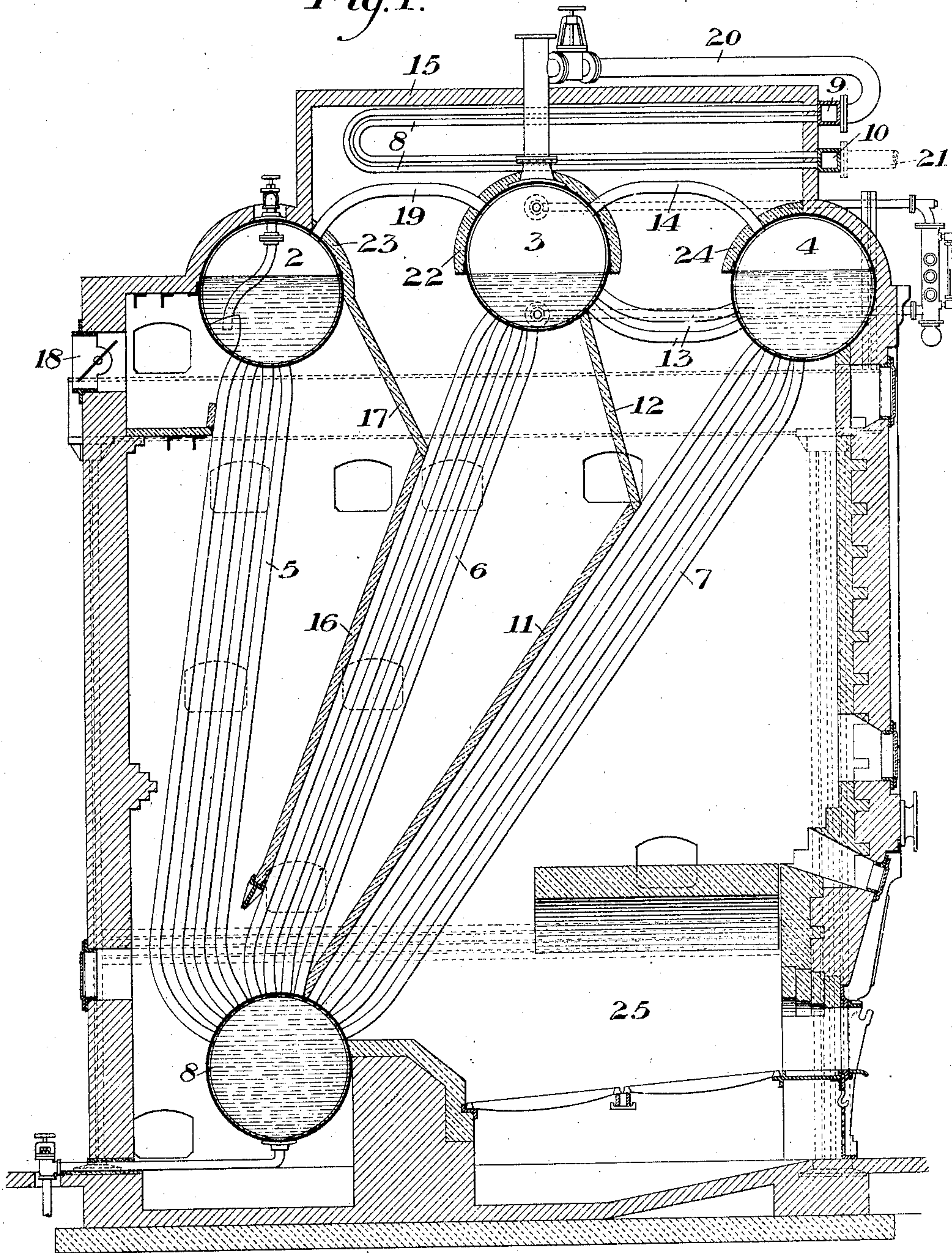
APPLICATION FILED JUNE 6, 1906. RENEWED APR. 4, 1907.

908,939.

Patented Jan. 5, 1909.

2 SHEETS—SHEET 1.

Fig. 1.



WITNESSES

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INVENTOR

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2 SHEETS—SHEET 2.

Fig. 2.

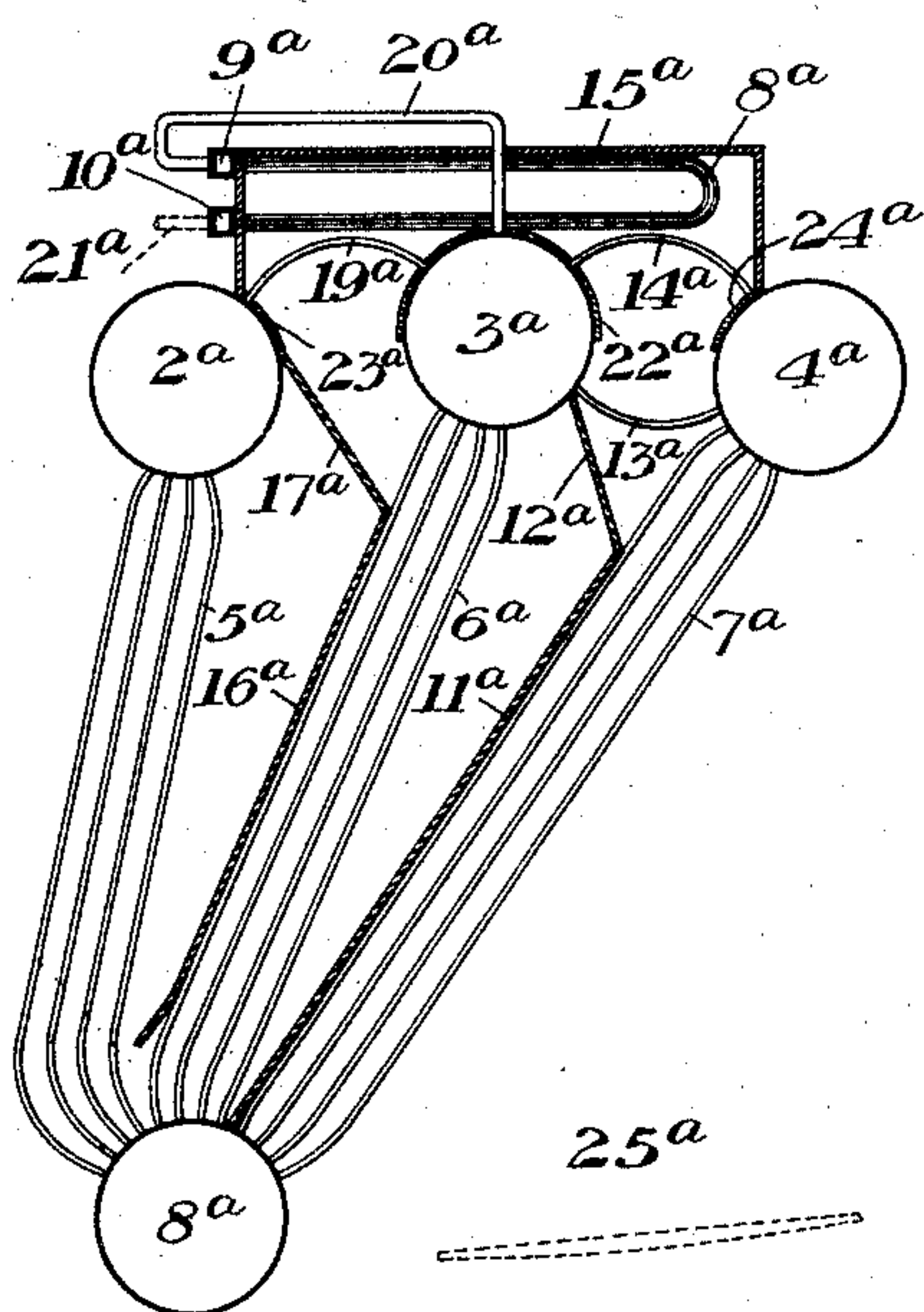
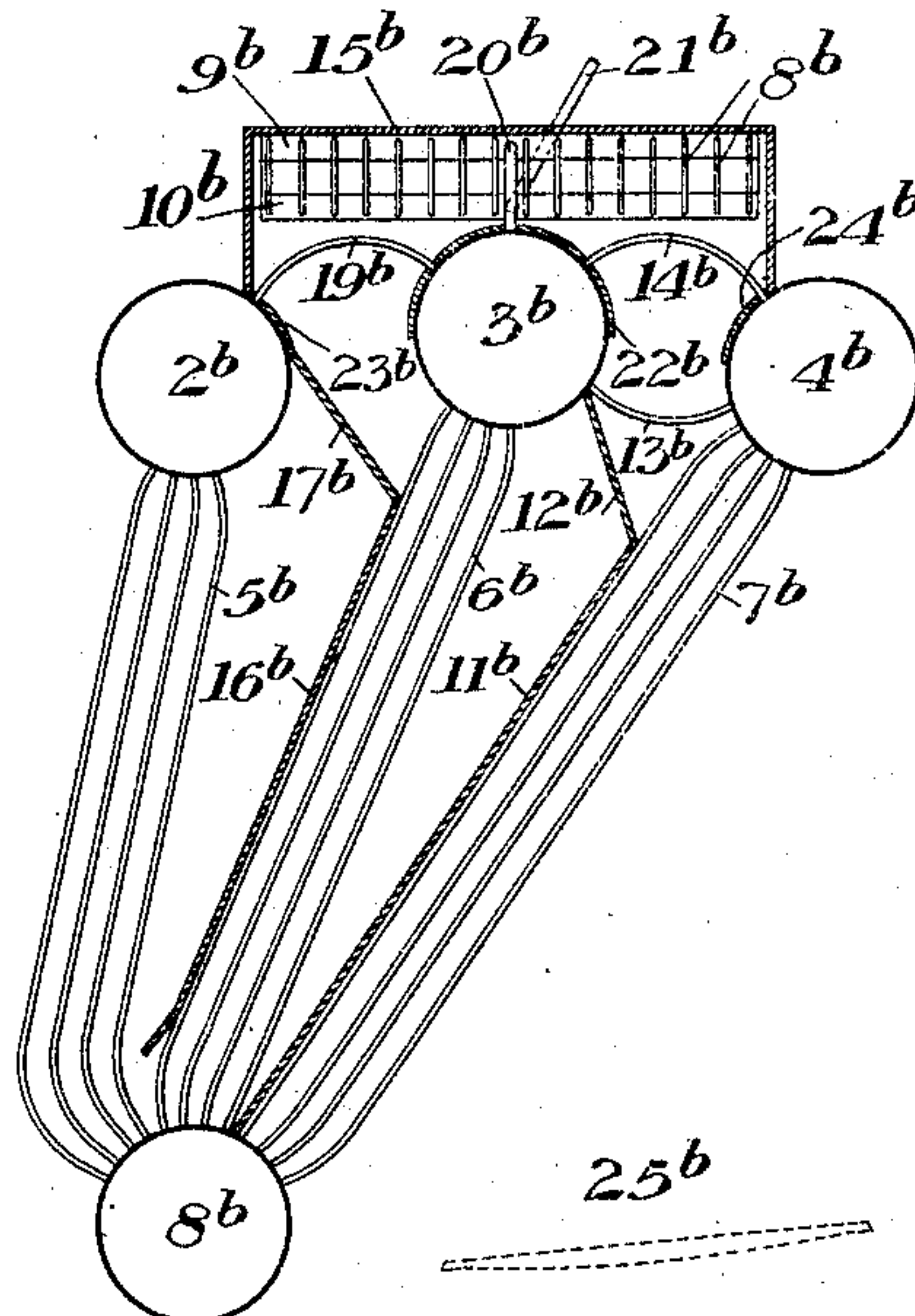


Fig. 3.



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.

SUPERHEATER-BOILER.

No. 908,939.

Specification of Letters Patent.

Patented Jan. 5, 1909.

Application filed June 6, 1906, Serial No. 320,368. Renewed April 4, 1907. Serial No. 366,411.

To all whom it may concern:

Be it known that I, JOHN E. BELL, of New York, in the county and State of New York, have invented a new and useful Superheater-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 sectional side elevation, showing one form of my improved superheater boilers; and Figs. 2 and 3 are similar views, partly broken away, showing modified forms.

My invention relates to combined superheaters and boilers, and it is designed to provide a simple and effective structure of this kind which may be applied to existing boilers having head room, and which is easily accessible for inspection, repair, and cleaning. It is also designed to provide a structure of this kind in which the boiler may be easily converted into a saturated steam boiler or into a superheater boiler.

In the drawings, referring to the form of Figs. 1, 2, 3 and 4 are transverse steam and water drums connected by banks of tubes 5, 6 and 7 with a mud drum 8. This mud drum may be either a single or double compartment drum, or may be in the form of two or more connected mud drums. The superheater, which I have shown as consisting of U-shaped tubes 8 and connecting end boxes 9 and 10, is placed above the steam and water drums.

In order to direct the hot gases over the superheater tubes, I provide the front baffle 11 with an extension 12, which prevents the gases passing rearwardly under the drum 3. The space between the drums 3 and 4 is left open, so that the gases flow up between the water circulating tubes 13 and the steam connecting tubes 14 and into the box-like top extension 15 of the casing, which incloses the superheater and is preferably of the same width as the boiler setting. The second baffle 16 is also provided with an extension 17 leading to the drum 2, which compels the gases flowing over the superheater tubes to descend among the second bank of tubes to the bottom of the baffle before they rise through the third bank of tubes and pass to the outlet-flue 18. The drums 2 and 3 are preferably connected by steam tubes 19, the steam being taken to the superheater from the middle upper drum 3

through the supply-tube 20. This tube leads to one of the superheater boxes shown at 9, while the outlet-pipe 21 for superheated steam leads from the other box. Those portions of the three drums which are above the normal water level and in contact with the hot gases, are preferably protected by lagging or refractory covering shown at 22, 23 and 24. This is to prevent the burning of the drums in which the steam circulation is of course less rapid than in the superheater tubes.

In the use of the apparatus, the flame and gases rise from the combustion chamber 25 and pass up among the front bank of tubes, and thence upwardly between the drums 3 and 4 and among the tubes 13 and 14 into the superheater chamber. They thence flow back over the superheating tubes and descend among the tubes 19 and between the drums 2 and 3, whence they pass down through the second bank of tubes. They then reach the lower end of the baffle 16, and rise among the third bank of tubes to the outlet flue.

In Fig. 2 I show a form similar to Fig. 1, except that the position of the superheater boxes is reversed, the boxes 9^a and 10^a being at the rear. In this figure parts similar to those in Fig. 1 are marked with similar numerals with the letter "a" applied.

In Fig. 3 I show a form similar to Fig. 1 except that the boxes 9^b and 10^b are located in the side-wall of the superheater chamber or box, the U-shaped superheater tubes extending transversely of the setting and parallel with the axes of the drums. In this case the superheater tubes may extend substantially the width of the boiler, or the boxes may be applied to both side walls, the U-shaped tube extending to near the center of the boiler.

The advantages of my invention result from the peculiar location of the superheater, which is easily accessible for cleaning, repairs, etc. The superheater may be easily applied to existing boilers where the head room is present, with few changes in the setting. The boiler can also be easily converted into a saturated steam boiler by removing the baffle extensions 12 and 17, and if desired, closing the spaces between the water drums. The flame and gases pass over water-tubes before reaching the superheater, thus preventing burning of the superheater.

The number of steam and water drums may be varied. Two or more mud drums may be used; the drums may be longitudinal instead of transverse as shown; if transverse drums are used the number of banks of tubes may be varied, and many other variations may be made without departing from my invention

I claim:—

10 1. A water tube boiler having transverse steam and water drums connected by banks of tubes to a lower mud drum or drums, a superheater located in the boiler setting over the steam and water drums, and baffling arranged to direct the gases successively over
15 water tubes thence up over the superheater and thence down and over other water tubes of the boiler, substantially as described.

20 2. A water tube boiler having transverse steam and water drums connected by banks of tubes to a lower mud drum or drums, a superheater located within the boiler setting above the steam and water drums, and baffling arranged to direct the gases successively over the front water tubes, thence
25 over the superheater and thence over successive water tubes of the boiler; substantially as described.

30 3. A water tube boiler having transverse steam and water drums connected by sets of tubes to a transverse mud drum or drums, a source of heat in front of the front bank of tubes, baffling arranged to direct the gases among the front tubes, thence over one of
35 the steam and water drums and thence down among further water tubes, and a superheater in the path of the gases; substantially as described.

40 4. A water tube boiler having transverse steam and water drums connected by sets of tubes to a transverse mud drum or drums, a source of heat in front of the front bank of tubes, baffling arranged to direct the gases among the front tubes, thence over one
45 of the steam and water drums and thence down among further water tubes, a superheater in the path of the gases, and protective covering for the steam space of the steam and water drum; substantially as de-
50 scribed.

5. In a water tube boiler, a steam and

water drum having tubes connecting it with a mud drum, and baffling arranged to force the gases upwardly among the tubes and over the top of the steam and water drum
55 and thence down among other water tubes below said steam and water drum; substantially as described.

6. In a water tube boiler, a steam and water drum having tubes connecting it with
60 a mud drum, baffling arranged to force the gases upwardly among the tubes and over the top of the steam and water drum and thence down among other water tubes below said steam and water drum, and a super-
65 heater in the path of the gases and above said steam and water drum; substantially as described.

7. A water tube boiler having at least two transverse steam and water drums con-
70 nected by banks of tubes to one or more transverse mud drums, a source of heat in front of the front bank, baffling in the rear part of the front bank arranged to force the gases upwardly among the tubes and
75 through the space between the first and second steam and water drums into a chamber extending over the drums, and rear baffling arranged to cause the gases to thence pass downwardly among the second bank of
80 tubes; substantially as described.

8. A water tube boiler having at least two transverse steam and water drums con-
85 nected by banks of tubes to one or more transverse mud drums, a source of heat in front of the front bank, baffling in the rear part of the front bank arranged to force the gases upwardly among the tubes and through the space between the first and sec-
90 ond steam and water drums into a chamber extending over the drums, rear baffling arranged to cause the gases to thence pass downwardly among the second bank of tubes, and a superheater in the space above the steam and water drums; substantially
95 as described.

In testimony whereof, I have hereunto set my hand.

JOHN E. BELL.

Witnesses:

ESTHER V. BURRELL,

GEORGE H. SONNEBORN.